Coventry and Warwickshire Pathology Services

Directory of Pathology Services

Version 16
May 2024

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INTRODUCTION

In trying to condense such a large mass of factual information some errors or omissions may have occurred. Please contact the CWPS Deputy Quality Manager (ruth.owen@uhcw.nhs.uk) if you have any comments or cause to question any of the content.

GENERAL INFORMATION

The Service Aims and Objectives

Coventry and Warwickshire Pathology Services (CWPS) is a managed network of laboratories hosted by University Hospitals of Coventry and Warwickshire NHS Trust. Laboratory services are provided by laboratories at University Hospital, Coventry, Warwick Hospital, Warwick, and George Eliot Hospital, Nuneaton. CWPS provides a comprehensive service to the above hospitals and to the General practitioners in Coventry and Warwickshire.

Quality Statement and Standards

The Coventry and Warwickshire Pathology Services will provide a high-quality diagnostic and clinical interpretive service to its users.

Every effort is made to ensure an accurate result is issued promptly to the correct source.
To ensure the highest quality of service, all departments participate in the relevant External Quality Assurance Schemes that are available and rigorous internal QC checks are regularly made.

CWPS laboratories are a UKAS accredited medical laboratory No 8718, 8719, 8720 and 8721.
For a list of the accredited tests we provide, please refer to the UKAS website www.ukas.com for our scope of accreditation. Tests not appearing on our scope are either under consideration or in the process of accreditation and so currently remain outside of our scope of accreditation. However, these tests have been validated to the same high standard as accredited tests and are performed by the same trained and competent staff. These are highlighted by * in the departmental sample requirement tables.

Components of the service are formally audited according to a schedule; corrective and preventative actions are implemented in a timely fashion to ensure a cycle of continuous improvement.

If you have any general comments or problems with the service you receive please contact our Quality Manager or the head of the relevant department.

Laboratory Opening Times

Blood sciences are located at all three sites within CWPS. Microbiology is located at University Hospital, Coventry. Immunology and Viral Serology are located at the George Eliot Hospital site only.
Cellular Pathology and non-gynae cytology at University Hospital and Warwick Hospital.

All laboratory departments at each hospital are open during the core hours of 9.00 am to 5.00pm Monday to Friday, (except bank holidays). Extended routine service hours and on-call are provided outside of the core hours.

Core opening hours for Microbiology are 8am to 9pm.

The Mortuary is open from 7.30 am to 4.30 pm Monday – Friday on all 4 sites.

Out of Routine Hours

On all three sites the blood sciences laboratory provides a reduced routine service out of hours. This service also covers bank holiday periods.

Microbiology operates an emergency 'out of hours' on-call service after 9pm.

There is no out of hours provision for Cellular Pathology.

Please see individual departments for further details on opening hours.

Reports

References ranges are printed with all results where appropriate; in addition all results outside these reference ranges are flagged by an asterisk on the paper report, and by H and L flags or an asterisk on the electronic report.

On occasions results may be printed with an appended comment.

Visiting the Laboratories

CWPS encourages users to visit the departments, please contact the Quality Manager who would be happy to make the necessary arrangements.

All visitors must report to the Pathology reception desk.

Service Requirements

The laboratory requires your input to operate effectively. Please do not hesitate to contact the laboratory if you have any specific investigative requirements or have any concerns with the service provided.

Measurement Uncertainty

Measurement uncertainty is calculated for all in-house assay and this information is available on request to the relevant department.

Complaints and Concerns

All complaints from all sources are registered on the laboratory complaints database and investigated thoroughly, findings are translated into learning opportunities and embedded into the laboratory's improvement processes.

Patients/Carers

The Laboratory makes every attempt to effectively resolve complaints immediately and encourages complainants to discuss issues relating to service provision with a member of staff.

Patients and carers can approach laboratory staff within the service concerned, such as the Phlebotomy Manager, or if preferable, talk to someone independent of their care by discussion with PALS (Patient Advice and Liaison Service).
Formal complaints can also be made in writing to the department manager or the pathology quality manager, the laboratory will acknowledge all complaints within 3 working days and aim to complete all investigations and respond to the complainant within 25 working days.

If the complainant remains unhappy following this, PALS can offer guidance on whether the issues are eligible to be investigated under the NHS Complaints Procedure.

Please also see www.uhcw.nhs.uk/for-patients-and-visitors/did-we-get-it-right

Clinical users

Clinical users can complain directly to the department manager or clinical lead, we encourage clinical users to discuss any issues regarding the service provision by appropriate means of communication.

To enable a thorough investigation, we encourage all formal complaints to be made in writing with a clear description of the event and any patient information that will support the laboratory in its investigation, the laboratory will acknowledge all complaints within 3 working days and aim to complete all investigations and respond to the complainant within 25 working days.

Patient Consent and Data Protection

The Pathology department relies on the requesting clinician to meet the requirements for patient consent for any pathology investigations. Therefore, we will presume consent to have been given if patient attends for blood test (presents arm) or delivers a sample to the laboratory with a suitably completed request form.

Under the human tissue act 2004 informed written patient consent is required for all solid tissue samples submitted to cellular pathology, genetic testing and for the storage of relevant material from deceased patients. If appropriate, the consent should always include reference to its retention for further diagnostic or therapeutic purposes.

All Pathology samples from living patients may be stored without consent for the following purposes for which patients should be aware; audit, education and training, performance assessment, quality assurance and anonymised research.

For further information please see following documents on UHCW e-library: Human tissue policy and arrangements for HTA licensing and the associated patient information leaflet Human Tissue samples.

Patients should also be aware that their personal information (and family information where relevant, e.g., genetic testing) will be provided with all samples sent to the Pathology laboratory. All patient information and results are treated as confidential and will be stored securely with restricted access to Pathology staff to ensure compliance with the Data Protection Act 1998.

Consumables and Supplies

GPs

Pathology consumables for GP practices and Pharmacies across the pathology network are distributed from the QE Facilities depot in Coventry.
Please complete the appropriate electronic order form and email to:
ghnt.gefstockcwps@nhs.net

For GP surgeries:

Pathology Consumables Order

QE Facilities Contact Numbers

QE Facilities Main Number 024 7661 9174 (Monday -Friday 08:30 - 17:00)

QE Facilities Duty Phone	07943 083 110
QE Facilities Supervisor Phone	07973 973 274

UHCW

The Laboratory does not supply routine sample consumables to wards/outpatient clinics, these must be ordered directly by the ward/OPD through supplies. There are a few exceptions to this such as 24-hour urine bottles containing Acid, and Quantiferon tubes that must be collected from Pathology specimen reception.

Cellular pathology and non-gynae cytology supplies must be ordered separately by contacting the respective department.

George Eliot Hospital

George Eliot Hospital ward laboratory consumables are routinely checked by the laboratory and are re-stocked as appropriate.

Cellular pathology and non-gynae cytology supplies must be ordered separately by contacting the respective department.

Warwick Hospital

Laboratory consumables are supplied to wards in response to the laboratory receiving a supplies request form. The wards send this to the laboratory, or send it to Peter the Porter, who delivers supplies to wards.

Postal Addresses

University Hospitals of Coventry and Warwickshire NHS Trust (UHCW)
Department of Pathology
University Hospitals of Coventry and Warwickshire NHS Trust
Clifford Bridge Road
Coventry
CV2 2DX

George Eliot Hospital (GEH)

Department of Pathology
George Eliot Hospital NHS Trust
College Street
Nuneaton
Warwickshire
CV10 7DJ

South Warwickshire University NHS Foundation Trust (SWFT)

Department of Pathology
South Warwickshire University NHS Foundation Trust
Lakin Road
Warwick
Warwickshire
CV34 5BW

Lab Tests OnLine

For more information on laboratory tests please direct patients to the Lab Tests Online[UK] website, which has been designed to help patients to understand the many clinical laboratory tests that are used in diagnosis and treatment. You can search for conditions and diseases and find how laboratory tests can help in diagnosing and managing them. You can also search for tests directly. There is also a LTOL app available too, please see the website address below.

www.labtestsonline.org.uk

Laboratory Location

University Hospitals of Coventry and Warwickshire NHS Trust

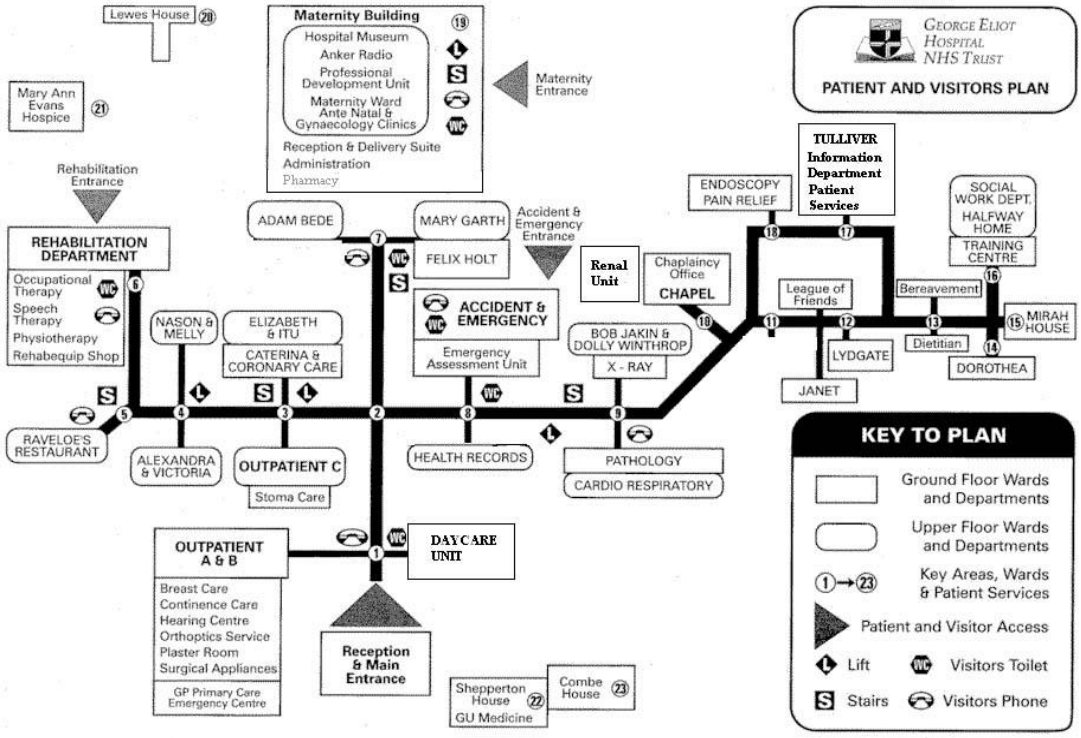
The Pathology Laboratory is located on the fourth floor, West Wing, University Hospital, Coventry.
The outpatient Phlebotomy service is provided from the outpatient department, at University Hospital, and also on the ground floor of the City of Coventry Health Centre just inside the main entrance.

At Rugby phlebotomy is provided from the Rugby St Cross Blood taking unit which is on North road next to the chapel.

Please see Trust website for directions to UHCW: www.uhcw.nhs.uk/find-us

George Eliot Hospital NHS Trust

The laboratory is located on two floors within phase II of the hospital.
The main entrance is on Old Meeting Street directly opposite the X-ray department.
The ground floor accommodates Blood Sciences and specimen reception.
Please see Trust website for directions to George Eliot Hospital:www.geh.nhs.uk/patients/getting-here-and-getting-around/



South Warwickshire University NHS Foundation Trust

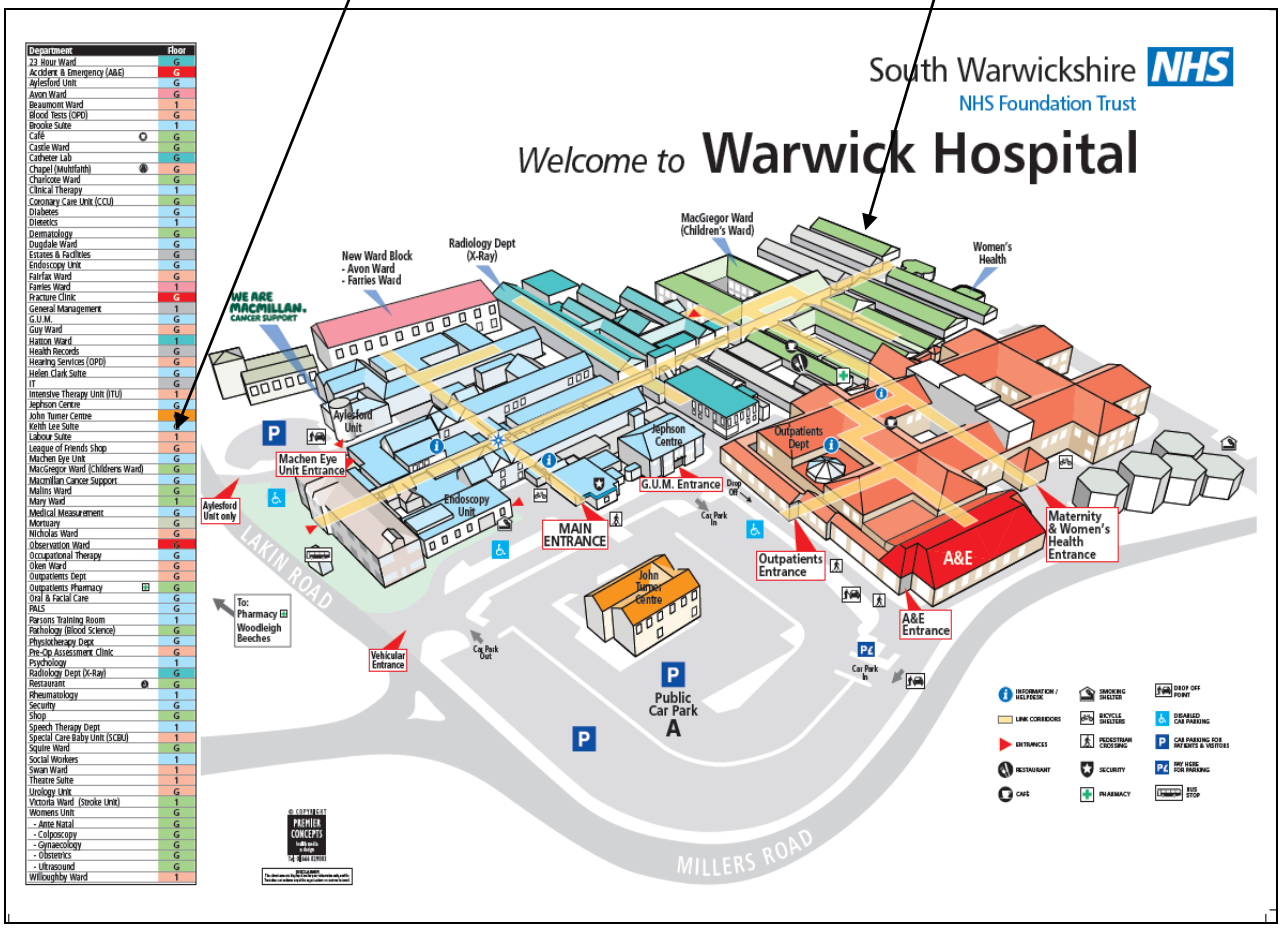
The Blood Sciences Laboratory is located on the ground floor in the main Hospital, at the far end of the main corridor to the main entrance. The Cellular pathology Laboratory is located in a separate building on Lakin Road on the opposite side of the road to the main Hospital.

Please see Trust website for directions to Warwick Hospital:

www.swft.nhs.uk/our-hospitals/warwick-hospital

Cellular Pathology

Blood Sciences Laboratory



Coventry and Warwickshire Pathology Services

CWPS Laboratory Contacts

Senior Management Team

		External	Internal (UHCW)
Clinical Diagnostics Clinical Director	Beth Harrison	024 76967137 Beth.harrison@uhcw.nhs.uk	27137
Head of CWPS (Strategy and Stakeholder engagement)	Neil Anderson	024 76965397 neil.anderson@uhcw.nhs.uk	25397
Director of Operations Clinical Diagnostic Services	Ian Sturgess	024 76965466 Ian.sturgess@uhcw.nhs.uk	25466
Clinical Head of Service for Pathology	Cate Wight	024 76968320 catherine.wight@uhcw.nhs.uk	28320
Finance Manager	Kaly Johal	024 76967231 Kaly.johal@uhcw.nhs.uk	27231
Clinical Diagnostics Director of Nursing and AHP	Janine Beddow	024 76965480 Janine.beddown@uhcw.nhs.uk	25480
Head of Operations Pathology	Daljeet Sandher	024 76965480 Daljeet.sandher2@uhcw.nhs.uk	25480
Performance, Optimisation, and Workforce Strategy Manager	Joanne Nicholson	024 76964936 Joanne.nicholson@uhcw.nhs.uk	24936
Quality Governance Manager	Dipa Parekh	024 76965462 Dipa.parekh@uhcw.nhs.uk	25462
Infectious Diseases and Cellular Pathology Manager	Mandip Hira	024 76965467 Mandip.hira@uhcw.nhs.uk	25467
Bloods Sciences and Pre-Analytics Manager	Nigel Blease	024 76865611 nigel.blease@uhcw.nhs.uk	GEH Ext 5611

Clinical Leads

Biochemistry and Immunology	Kamaljit Kaur Chatha	024 76965477 Kamaljit.Chatha@uhcw.nhs.uk	25477
Blood Transfusion	Maria Mushkbar	02476965539 maria.mushkbar@uhcw.nhs.uk	25539
Haematology	Beth Harrison	024 76967137 Beth.harrison@uhcw.nhs.uk	27137
Microbiology	Steven Montgomery-Laird	02476 965451 steven.laird@uhcw.nhs.uk	25451
Virology and Molecular Pathology	Lisa Berry	024 76965473 Lisa.berry@uhcw.nhs.uk	25473
Cellular Pathology	Sarah Read-Jones	024 76968320 Sarah.read-jones@uhcw.nhs.uk	28320
Mortuary	Hesham El Daly	024 76964640 Hesham.el-daly@uhcw.nhs.uk	24640

Network Managers

		External	**Internal**
Deputy Quality and Improvement Manager	Ruth Owen	024 76964972 Ruth.owen@uhcw.nhs.uk	24972
Biochemistry and Immunology Manager	Mark Huntley	024 76153452 mark.huntley@uhcw.nhs.uk	3452 (GEH)
Haematology and Pre-Analytics Manager	Jane Newbold	Jane.newbold@uhcw.nhs.uk	
Blood Transfusion Manager	Tina Taylor	024 76965512 Tina.taylor@uhcw.nhs.uk	25512
Microbiology Manager	Victoria Longthorne	024 76965467 victoria.longthorne@uhcw.nhs.uk	25467
Virology and Molecular Pathology Manager	Tina Wotherspoon	024 76965488 Tina.wotherspoon@uhcw.nhs.uk	25488
Cellular Pathology Manager	Clare Wood	024 76966817 Clare.wood@uhcw.nhs.uk	26817

Mortuary Manager	Marianne Stocking	024 76967516 marianne.stocking@uhcw.nhs.uk	27516
Strategic Partnership Lead – Primary Care	Ruth Hallett	024 76965358 Ruth.hallett@uhcw.nhs.uk	25358
Strategic Partnership Lead – Secondary Care	Julie Bailey	024 76865198 Julie.bailey@uhcw.nhs.uk	5198
Secondary Care Lead and Pathology Site Manager – SWFT Site	Mel Bahey	Melanie.bahey@swft.nhs.uk	
Pathology IT Manager	Wendy Wheatley	024 76965529 Wendy.wheatley@uhcw.nhs.uk	25529 (UHCW)
Pathology Practice Education Coordinator Midlands and East4)	Rachel Cleaton	Rachel.cleaton@uhcw.nhs.uk	
Training and Recruitment Strategy Lead	Helen Keyworth	Helen.keyworth@uhcw.uk	

General Enquiries

UHCW	024 76965426	25487 (UHCW)
George Eliot	024 76865174	5174 (GEH)
Warwick	01926 495321 Ext 4198	4198 (SWFT)

Sending a Specimen to the Laboratory

Accurate patient identification and proper labelling of specimens are the first and most critical steps in this process. Timely specimen transport and specimen preparation are also necessary to ensure specimen integrity and accurate results.

Request forms

Samples sent to the laboratory must be accompanied with the appropriate completed request form, to ensure specimens are processed correctly and without unnecessary delay. Listed below are the different laboratory paper request forms that are available (except UHCW see e-requesting below):

Types of forms available	UHCW	George Eliot	South Warwick
Biochemistry/Haematology/Immunology	e-request only	e-request or Blue	Lorenzo e-request or White
Microbiology	e-request only	Yellow	White
Serology	e-request only	Pink	Pink
Molecular Pathology	e-request only	Pink	Pink
Blood Transfusion	White	White	Pink
Blood Transfusion antenatal	Yellow	Yellow	White with yellow background
Blood Transfusion Maternal and Cord Investigations	White	White	Pink
Antenatal Downs syndrome, T13 and T18 screening	Green	Green	Green
Haemoglobinopathy screening	White FOQ form	White	White
Cellular Pathology	White	White	White
Non-gynae cytology	White	White	White
Private Patients	White	White	White

GP Request forms

All GPs in Coventry and Warwickshire should have access to T-Quest electronic order communications which should be used for all Pathology requests. For further information or any GP order comms issues please contact Ruth Hallett or Pathology Order communication facilitators Charlene.OKane@uhcw.nhs.uk (07468702110) or gregory.tindall@uhcw.nhs.uk (07557 566390).

Electronic Requesting

UHCW
All inpatient and outpatient requests for Biochemistry, Immunology, Haematology, Virology and Microbiology MUST be requested electronically using the e-requesting facility on CRRS/Cerner. Request form labels should then be printed on the ward/clinic and attached to the plastic specimen bag. The date and time of collection should be written on the request label when the sample is collected. Please contact ICT at UHCW if e-requesting training is required.

SWFT
All inpatient and outpatient requests for Biochemistry, Immunology, Haematology, Virology and Microbiology can be requested electronically using the e-requesting facility on Lorenzo. Request form labels should then be printed on the ward/clinic and attached to the plastic specimen bag. The date and time of collection should be written on the request label when the sample is collected.

GEH
T-Quest electronic requesting is available for inpatient and outpatient requests for Biochemistry, Immunology, Haematology, Virology and Microbiology. Request form labels should then be printed on the ward/clinic and attached to the plastic specimen bag and blood tubes. The date and time of collection should be written on the request label when the sample is collected.

Completing the Request Form and Sample Details

Please see table below with details of essential labelling requirements for both request forms and samples for all Pathology requests.
The laboratory will not process unlabelled or mislabelled repeatable patient samples but will refer back to the requestor. Therefore, please ensure all the essential information is provided on both the sample and request form. The identification criterion applies to both paper and electronic formats.

	ESSENTIAL	DESIRABLE
SAMPLE	• Patient's full name* **<u>plus 1 of the following identifiers</u>** • Date of birth and/or hospital number (only if patient's name given) • NHS Number • Patient's address	• Date and time of sample collection • Where appropriate - Nature/site of sample, e.g. distal, left etc
REQUEST FORM	• NHS Number • Patient's full name* • Date of birth and/or hospital number (only if patient's name given) • Patient's location (or destination of final report) • Investigations clearly indicated. • Where appropriate - Nature/site of sample, e.g. distal, left etc * or other coded identifier	• Date and time of sample collection **and** collector's details (i.e. phlebotomist name) • Clinical details • Patient's address (& post code) • Requesting practitioners contact number • Patient's consultant, GP or name of requesting practitioner • Gender

Handwritten and printed electronic labels for sample (SMALL labels) and request form (large addressograph labels) identification are acceptable EXCEPT for Blood Transfusion.
Please DO NOT use large addressograph labels on sample tubes.

Please ensure that the location and consultant/GP details are correct, as this information is necessary for the correct delivery of reports. In Cellular Pathology if the requesting Consultant is not supplied then the sample will not be processed until this information is available. In addition **the date and time of sample collection are important** as some parameters are affected by extended time 'standing on cells'.

Please note Blood transfusion have different minimum labelling requirements and the Laboratory will refuse samples which do not meet the minimum labelling requirements listed below.

MINIMUM REQUIREMENTS ON BLOOD TRANSFUSION SPECIMENS (SAMPLE TUBE)

1. Surname (in full, correctly spelt and in the correct position)
2. Forename (in full, correctly spelt and in the correct position)
3. Date of birth (not age or year of birth)
4. **Hospital number or NHS number of major incident number. If the NHS number has been used on the sample, this is acceptable providing both the NHS number AND hospital number of the patient are on the request form (Exceptions antenatal requests/CRM requests)**
5. Gender (and/or on the request form)
6. Collector's details
7. Date and Time specimen collected.

*NB. Do NOT use patient's ID label on Blood Transfusion tubes; these tubes are to be completed by hand.

The laboratory reserves the right to refuse to process any samples that are not fully labelled.
If patient's ID label is used on the sample, please ONLY use the small patient ID labels that are designed specifically for specimen tubes. These must be stuck length ways on the tube **not** sticking at right angles as this interferes with the processing of the sample. Do **NOT** use the large patient ID labels that are used for request forms, etc to label blood samples.

Samples must be sent sealed in a transport bag, and where appropriate ensure the container caps are screwed on tight. Do not send leaking samples to the laboratory – the requests will be rejected and a repeat requested. The request form should NOT be placed in the sealable part of the bag with the specimen.

It is important to indicate fluid type when samples other than blood are sent.

High Risk Specimens

All staff are required by the Health and Safety at Work Act to take reasonable care for their own safety and that of other people who may be affected by their actions.

All specimens are potentially an infection risk and must be handled carefully.

Specimens from patients suspected of suffering from a Category 4 infection, e.g. a suspected viral haemorrhagic fever case must be discussed with the Virology laboratory before samples are collected.

Coventry and Warwickshire Pathology Services

Transport of Samples to the Laboratory

From Wards

N.B. All specimens should be placed in plastic transport bags prior to transportation.

Specimens can be delivered to the laboratory by hand or by the pneumatic air tube system where available.

At Warwick Hospital Monday to Friday 09:00 – 17:00, collections are made regularly from the wards (wards have been notified of times).

Please ensure staff are fully trained in the use of the air-tube system prior to sending samples.

The air tube system must not be used for the following samples:

- CSF samples for Xanthochromia
- Cellular Pathology/non-gynae Cytology samples
- Cryoglobulins and cold agglutinins samples
- Samples with ice
- Samples that are difficult to repeat
- Samples of an infectious nature

All samples not sent through the air tube should be brought to specimen reception and handed to a member of staff or placed in the appropriate box at University Hospital.
At University Hospital if a sample is URGENT or has special handling requirements please hand to a member of staff at specimen reception and do NOT place in the box with routine samples.
There is regular transport of samples between all sites for centralised tests: Hospital of St Cross Rugby, George Eliot Hospital, Warwick Hospital, University Hospital and City of Coventry Health Centre.

From GP Surgeries

Ensure that all samples are sealed in the clear transport bag. All samples must be sealed in the secondary plastic bag before placing in the transport box.

GP Specimens are delivered to the City of Coventry Heath Centre or Hospital of St Cross, Rugby specimen reception by QE Facilities Ltd. Samples are then forwarded for analysis to George Eliot Hospital for Blood Sciences or University Hospital for Microbiology. Times of these collections should be available locally, if in doubt please consult Laboratory service manager or QEF.

QE Facilities Contact Numbers
QE Facilities Main Number 024 7661 9174 (Monday -Friday 08:30 - 17:00)

QE Facilities Duty Phone	07943 083 110
QE Facilities Supervisor Phone	07973 973 274
QE Facilities Pathology Orders	ghnt.qefstockcwps@nhs.net

Spillage of body substances/fluids

- Spillages should be dealt with immediately. Wearing disposable gloves, plastic aprons and eye protection if splashing is likely to occur. Blood spillages should be cleaned up using chlorine-releasing agents such as hypochlorite granules, which will inactivate BBVs. High levels of available chlorine are recommended (10,000 parts per million) because microbial activity is reduced in the presence of organic material.

- The granules should be left in contact for sufficient time to ensure the virus is inactivated, i.e. two minutes.

- Disposable paper towels should be used to clean up the spillage and placed in yellow clinical waste bags. The area should then be cleaned with detergent solution and dried thoroughly.

- Body fluid spillage should be cleaned up using disposable paper towels, hot detergent solution and thoroughly dried. The area may then be wiped over with a 70% methylated spirit wipe.

- Blood spillage on surfaces that cannot be treated with hypochlorite should be covered with disposable paper towels to soak up excess debris treated as clinical waste and the area washed with detergent and dried. Disposable gloves and aprons should be worn.

Urgent Requests

NB. *PLEASE DO NOT* MARK TESTS AS “URGENT” IF THEY ARE ROUTINE. Most routine ward results for Blood Sciences are available within 4 hours of receipt in the laboratory.

UHCW

Samples from critical care units are automatically treated as urgent. All other urgent samples must be clearly marked as urgent and handed to a member of staff in specimen reception or sent in the air tube.

The laboratory has a policy for telephoning results outside critical limits. Please note urgent results are not phoned unless they are outside these limits, this is because they are immediately available on EPR.

George Eliot Hospital

When making an emergency request please phone the relevant departments and clearly mark the form “URGENT”, together with your contact details. As soon as the results are available they can be accessed on all ward terminals, or a surgery representative will be contacted.

Warwick Hospital

Urgent samples from wards must be placed in red bags. ITU, A+E and Admissions use an air tube system to send samples to the laboratory. Other wards must contact

porters on Ext. 4107 to organise urgent transport to the laboratory. Between the hours of 9am to 5pm Mon to Fri, the laboratory does not require phoning; outside these hours, the laboratory must be contacted on Ext. 4198, in addition to the porters, to alert the laboratory staff as this is an on-call laboratory at night.

Out of Hours Requests

Blood Sciences

The Blood sciences laboratories have a night shift providing a reduced routine service at night and weekends. Microbiology provides an on-call service after 9pm. There is no 'out of hours' service for Cellular Pathology.

Microbiology

Microbiology at UHCW provides an on-call service for out of hour requests.

Cellular Pathology

There is no 'out of hours' service for Cellular Pathology.

Rejection by the Laboratory of Specimens Submitted for Analysis

The laboratory may, on occasions, reject samples that are submitted for testing.

Rejection can be for the following reasons:

- The patient details on the specimen and request form do not match.
- Insufficient information is provided on the request form to determine the investigation(s) required.
- The sample type is incorrect.
- The specimen has leaked or fails to comply with health and safety policy.
- The quality of the sample is inadequate (too old, haemolysed, insufficient etc).
- Sample and/or request form are not labelled. See P16 for minimum labelling requirements.

The laboratory will endeavour to contact the requestor, and a report will be issued with a statement explaining why the request has been rejected.

Coventry and Warwickshire Pathology Services

PHLEBOTOMY SERVICE

A comprehensive phlebotomy service is supplied by CWPS for inpatients, outpatients and GP surgeries within Coventry and Warwickshire. For any queries regarding Phlebotomy, please contact Jo Nicholson 02476 964936

Phlebotomy Contacts

		External	Internal (UHCW)
CWPS Network Pre-Analytical Service Lead (Specimen reception)	Ben Foster	Ben.foster@uhcw.nhs.uk	
CWPS Phlebotomy Manager UHCW and SWFT	Sandi Crisford	Sandra.crisford@uhcw.nhs.uk	
CWPS Phlebotomy Manager GEH and STX	Lindsay Henderson	lindsay.henderson2@uhcw.nhs.uk	
UHCW NHS Trust Phlebotomy Supervisors	Norma Langridge Byronne Thorne		
University Hospital Phlebotomy department		024 76966338	26338
City of Coventry Health Centre Phlebotomy department		024 76961376	
Rugby Hospital Phlebotomy department and supervisor		01788 663749	33749
George Eliot Hospital			
Phlebotomy Department and Supervisor	Laura Mackillop	024 76865417 07557 565775	5417(GEH)
Warwick Hospital (and			

Stratford Hospital)			
Phlebotomy Department and Supervisor	Neeraj Malhotra	01926 495321 Ext 4203	4203 (SWFT)

Phlebotomy Notes

- A colour coded, evacuated blood collection system is used at CWPS instead of the conventional needle and syringe. This system is cleaner and safer to both patient and staff. A tube guide is available in this directory.

- If a needle and syringe is used, then a blood transfer device should be used to transfer blood from the syringe to the tube, this avoids haemolysing the sample.

- All forms should be signed in order for tests to be carried out, the phlebotomist should fill out the time blood taken, and the time of last dose of any medications which are to be measured.

- All tests should be requested on the appropriate forms.

- If for any reason the phlebotomist is unable to obtain a blood sample the form will be returned to senior ward staff who will inform the doctor.

- Fasting tests – ward staff must be informed and instructions given if any fasting tests are required to ensure that the patient is correctly prepared. The phlebotomist must check with the patient that they have fasted, and mark the form accordingly

- Serial blood tests – if these are due to be taken when the Phlebotomy Service is not available, a member of the resident staff will be required to undertake sample collections as required.

- The plastic tubes have expiry dates on them and lose vacuum after this date. Please return any out of date blood collection tubes to the laboratory for disposal.

UHCW Phlebotomy Services

Coventry

Inpatients
A phlebotomy service is provided to all wards Monday to Saturday, including bank holidays. Doctors who require blood tests on their patients must ensure all e-requests (with phlebotomist required) are completed BEFORE 06:00 hours on the day of collection.
Requests received after this time will not be dealt with until the next morning.
If a patient is not available on the ward when the phlebotomist calls the request form will be left in the red phlebotomy folder with reason why the bloods were not taken and a member of the ward staff will be informed.

Outpatients and General Practitioners
Phlebotomy service is available at the outpatients department, University Hospital and also at the City of Coventry Health Centre (Ground Floor) from 0800 - 16:45.
Both clinics operate an Appointment only system that can be booked using:
www.uhcw.nhs.uk/bloodtests
or by calling the telephone appointment line 02476 153546

We do not accept Walk-ins.

The phlebotomy service at University Hospital and City of Coventry Health Centre is not open at weekends or on bank holidays.

Rugby

Inpatients
A phlebotomy service is provided to all wards Monday to Saturday. Doctors requiring blood tests on their patients should ensure that all e-requests (with phlebotomist required) are completed before 06:00h on the day of collection.
Doctors should make their own arrangements for phlebotomy on Sundays and Bank holidays.

Outpatients and General Practitioners
A phlebotomy service is provided at the Friends Blood Taking Unit at the Hospital or St Cross. Located near Brookfield House just off North Road next to the chapel.

Opening hours: The Appointment only blood taking clinic sessions for adults and children are listed below:

Monday -Friday 8am-4.45pm
Wednesday Evening 5pm-7pm
Saturday Morning 7am-10pm

Appointments must be booked online at:
www.uhcw.nhs.uk/bloodtests

Coventry Locality Blood Tests clinics
There are nearly 40 community blood tests clinics located around Coventry in Pharmacies, Clinics, and GP surgeries. Most of these are run on an appointment basis but some also are drop in.

Patients are encouraged to use these locality clinics where possible. For further information please see:

www.uhcw.nhs.uk/bloodtests

George Eliot Hospital Phlebotomy Services

A phlebotomy service is supplied to the George Eliot Hospital and the surrounding catchment area including a home visit phlebotomy service.

Inpatients
The phlebotomist ward round commences at 07.00 hours and all forms must be available. Once a ward has been completed the phlebotomist will not be able to return to bleed patients whose forms were unavailable.

A limited phlebotomy service is available on weekends and bank Holidays. To enable this service to operate effectively it is important that non-urgent requests wait until the Monday morning phlebotomy round.

Pathology Phlebotomy Department
The department is open as follows:

Monday to Friday 07.00 hours to 16.45 hours

To make an appointment telephone 02476 153546 between 10am – 3pm or for online booking go to: www.geh.nhs.uk/directory-of-services/blood-tests/.

Community Clinics
To make more services available out of the traditional healthcare setting Phlebotomy sessions are provided at some community clinics.

Home Visit Phlebotomy Service
The aim of this service is to improve patient access to phlebotomy; all home visits must be authorised by the GP.
To request a GP home visit for a housebound patient ONLY please request using the electronic Swift Queue system. If you require access to Swift Queue please contact: Abby.jackson@uhcw.nhs.uk

Warwick Hospital Phlebotomy Services

Inpatients
A phlebotomy service is provided to all wards every weekday and on Saturday and Sundays mornings. Requests for this work must be available on the ward by 07:00 each morning. After this time, it is responsibility of medical staff to obtain blood samples for laboratory requests.

Outpatients and General Practitioners
Phlebotomy services are available at the following sites for outpatients and patients from general practice:

Warwick Hospital (Outpatient Department)
Monday to Friday 08:05-16:45

Stratford Hospital (Outpatient Department)
Monday to Friday 08:05-16:45

Phlebotomy sessions are also provided at several GP surgeries – contact individual surgeries for further details.

Phlebotomy Tube Guide

CWPS uses the Greiner bio-one VACUETTE evacuated blood collection tubes. Please see the following table for the recommended order or draw and common tests for each tube type.

Recommended Order of Draw

When collecting blood samples correct tube order is important to avoid cross contamination with anticoagulants. Blood samples should be collected in the following order and mixed immediately. Insufficient mixing can result in inaccurate results and the need to re-draw.

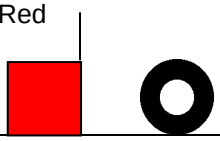
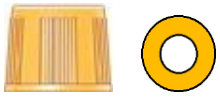
1. Blood Culture bottles
2. Coagulation tubes
3. Tubes with no additives, i.e., clotted biochemistry samples
4. Other tubes with additives, e.g., EDTA tubes

Paediatric Collection Tubes

Special smaller tubes for the collection of paediatric blood samples are available for all the below categories. Biochemistry routinely uses lithium heparin tubes for paediatric samples to ensure the maximum yield of plasma for analysis.

Coventry and Warwickshire Pathology Services

CWPS greiner bio-one VACUETTE blood collection guide

Cap Colour and cap ring colour	Tube Volume	Tube Contents	Investigations	Comments
		Blood Culture	Aerobic followed by anaerobic – if insufficient blood for both culture bottles, use aerobic bottle only.	Please follow Trust Policy
Pale Blue 	3ml	Trisodium Citrate	Coagulation Screen, D-Dimer, Lupus Anticoagulant Thrombophilia Screen Factor V Leiden, Prothrombin gene Liquid TB Investigations	Fill between arrow 3 tubes required when requesting a Thrombophilia Screen
Red 	6ml	Serum Clot activator	Cryoglobulins (must be collected and transported at 37°)	Must be arranged with phlebotomy department
Yellow 	5ml	Clotting accelerator and separation gel	Routine Biochemistry Glandular fever screen (IM) Immunology Antibiotic Levels Viral serology	
Green 	6ml	Lithium Heparin	Chromosomes Bone marrow/peripheral blood markers Acylcarnitines, Aluminium Vitamins B1, B2, B6 and Vitamin C	
Lavender 	4ml	EDTA	FBC, ESR, Plasma Viscosity, HLA B27, C3d, CD4/Viral loads, Viral and Meningococcal PCR, Molecular genetics, Cyclosporin, Tacrolimus, Cobalt, Chromium, ACTH, Renin, aldosterone and Metanephrines. Lamotrigine, Levetiracetam, G6PDH, Gut Hormones, Gastrin, Chromogranin A and B, PTH	6ml for ANC blood grouping. All tests except FBC, ESR require separate tubes.
Lavender 	4ml	EDTA	HbA1c	
Pink 	6ml	EDTA	Crossmatch, Blood grouping, Antenatal serology Cold agglutinins	Must be handwritten. See minimum requirements on P13.
Grey 	2ml	Sodium Fluoride	Blood Glucose, alcohol Lactate, free fatty acids, 3OH Butyrate and Isoniazid	Fill to line
Royal Blue 	6ml	Sodium Heparin	Zinc, copper, selenium and Manganese	

BLOOD SCIENCES

INTRODUCTION

Blood Sciences comprises Clinical Biochemistry and Immunology, Haematology and Blood Transfusion.
The Biochemistry, Haematology and Blood Transfusion laboratories are located on all three Hospital sites with Immunology centralised on the George Eliot Hospital site. The George Eliot site is also the Hub lab for GP and outpatient work.

There is a 24/7 service for Blood Sciences on all four sites.

Blood Sciences Laboratories Opening Hours and Locations

University Hospital, Coventry

The Biochemistry, Haematology and Blood Transfusion departments are located on the fourth floor of the West Wing. The laboratories are open for routine specimens between 08.00 - 20.00 hrs Monday to Friday. A reduced routine service operates at other times.

Requests from all critical care units and the Emergency department will automatically be treated as urgent. Urgent requests from all other areas should be clearly marked as urgent and handed to a member of staff at specimen reception.

George Eliot Hospital

The Biochemistry, Immunology, Haematology and Blood Transfusion departments are located on the ground floor of the Pathology Laboratory.
The laboratories are open for routine specimens 24/7 and this is covered by a shift system.

Warwick Hospital

The Biochemistry, Haematology and Blood Transfusion departments are located on the ground floor of Warwick Hospital.
The laboratories are open for routine specimens 24/7 and this is covered by a shift system.

Cytogenetics and Molecular Genetics

Samples for Cytogenetics and Molecular Genetics are sent to the West Midlands Regional Genetics Laboratory at Birmingham Women's Hospital. Please use the appropriate WM regional Cytogenetics or Molecular genetics request form and send 1x lithium heparin sample (for cytogenetics) and/or 1x EDTA sample (for molecular genetics). Transport of the samples to the Women's Hospital is arranged by the Blood Sciences Laboratories and reports are sent back directly to the requesting clinician.

For more information and link to Germline Genetic Test Request Form, please see West Midlands Regional Genetics Laboratory website:

https://bwc.nhs.uk/west-midlands-regional-genetics-laboratory

Sample Requirements for WMRGL

Venous Blood
For molecular genetic testing, (e.g. NGS, SNP array, QF-PCR) please send DNA or 3-5 ml VB in EDTA.
For conventional cytogenetics (e.g. karyotype, FISH) please send 3-5ml VB in lithium heparin.

Prenatal
CVS: 10-30mg in transport medium.
Amniotic fluid: 10-20ml in universal container.
Fetal blood: Lithium heparin and EDTA (min 0.5ml).
Maternal/paternal blood: 3-5ml VB in EDTA.

Non-invasive prenatal
NIPT (trisomy 13, 18, 21):
10ml maternal blood in Streck BCT tube.
NIPD (fetal sexing/single gene disorder): 10-20ml maternal blood in Streck BCT tube. Invert Streck tubes x10 and store at room temperature.
NIPD familial control samples: DNA or 3-5ml VB in EDTA.

Tissue
Fresh in a sterile container and NOT fixed in formalin.
POC/Placental biopsy (containing chorionic villi): 15mm2 in tissue culture medium or sterile saline.
Fetal or postnatal tissue biopsy (e.g. skin, muscle, cord): 5mm2 in tissue culture medium or sterile saline.
Cardiac/cord blood: 1-2ml in EDTA.

SAMPLES SHOULD BE SENT TO THE LABORATORY WITHIN 24 HOURS OR RISK BEING COMPROMISED

Genomics Lab contact details
Tel: 0121 335 8036
Email: bwc.genetics.lab@nhs.net

LABORATORY OPENING TIMES
Monday to Friday: 07:00 - 18:00 Saturday: 09:00 - 14:00

Genetics samples processed at CWPS
Some Molecular Genetics tests are provided within CWPS, these include HFE genotyping, A1AT genotyping, Factor V Leiden, Janus Kinase 2 mutation and FH. These tests should be requested on the usual Blood science request form, please see Molecular diagnostics section of the directory on page 124 for further details.

Coventry and Warwickshire Pathology Services

CLINICAL BIOCHEMISTRY AND IMMUNOLOGY

Contact Numbers

For clinical advice and result interpretation please contact a Clinical Biochemist. Outside normal working hours the on-call Consultant Biochemist can be contacted via the hospital switchboard.

	External	Internal (UHCW)
Biochemistry and Immunology Manager Mark Huntley	024 76965457	25457
Clinical Lead Kamaljit Kaur Chatha, Consultant Clinical Biochemist	024 76965477	25477

University Hospital, Coventry

General Enquiries / Urgent Requests	024 76965399	25399
Duty Biochemist email	dutybiochemist@uhcw.nhs.uk	
Please contact staff via switchboard at the following times: Monday-Friday 20.00-08.00 Saturday 13.00-09.00 (Sunday) Sunday 13.00-08.00 (Monday)		

Senior Staff

Prof. Dimitris Grammatopoulos, Consultant Clinical Biochemist and Professor in Molecular Medicine	024 76965477	25477
Dr Deon Coley-Grant, Consultant Clinical Biochemist and POCT Clinical lead	024 76965477	25477
Dr Richard Baretto, Consultant Immunologist Only on site at CWPS one day per week (Thursday), for medical immunology advice at other times please contact Dr Baretto at Heartlands Hospital or via email Richard.baretto@uhcw.nhs.uk Richard.baretto@heartofengland.nhs.uk.	024 76965477 (Thursday) 0121 424 0185 (Heartlands Hospital)	25477

Dr Michael Petchey, Principal Clinical Biochemist and FASP lead	024 76965450	25450
Catherine Darby, Senior Clinical Biochemist	024 76965478	25478
Gemma Reidy, Senior Clinical Biochemist	024 76965449	25449

George Eliot Hospital

	External	Internal
General Enquiries / Urgent Requests	024 76 153552	3552
Immunology Laboratory	024 76153160 Immunologylab@uhcw.nhs.uk	3160
Senior Staff		
Catherine Wood, Principal Clinical Biochemist	024 7686 5568	5568

Warwick Hospital

	External	Internal
General Enquiries / Urgent Requests	01926 495321 Ext 4198/4201/4294	4198/4201/4294
Senior Staff		
Dr Sethsiri Wijeratne Consultant Chemical Pathologist	01926 795321 Ext 4199	4199
Dr Mike Irving Senior Clinical Biochemist	01926 795321 Ext 4294	4294

Point of Care

	External	Internal
Jacqueline Fairchild, POCT manager pointofcare@uhcw.nhs.uk	02476 965353	25353

Regularly Requested Groups of Tests

*For most combinations of Biochemistry tests, one clotted sample is usually sufficient.

Standard Profiles are made up of tests as follows:

Urea and Electrolytes (U&E)
Sodium, Potassium, Urea, and Creatinine (estimated GFR will be calculated on general practice and outpatient samples).

AKI alerts are also generated for all U&E requests.

Liver Function Tests (LFT)
Total Protein, Albumin, Alkaline Phosphatase, Alanine Aminotransferase (ALT), Total Bilirubin.

Bone Profile
Calcium, Albumin, Adjusted Calcium, Alkaline Phosphatase

Lipid Profile
Total Cholesterol, Triglyceride, HDL, calculated LDL, Cholesterol/HDL ratio and Non-HDL cholesterol.

Thyroid Function Tests
TSH only. If the TSH is outside set limits (>7 mU/L or <0.1 mU/L) then a free Thyroxine (FT4) will be automatically undertaken. FT4 on other samples and FT3 will be added if the clinical details and TSH/FT4 results warrant it. Full clinical details are essential for this algorithm to work.

If you regularly request a certain group of tests to monitor certain patients we may be able to set up a special profile for you. Please contact Biochemistry to discuss.

Paediatric Samples

The volume of serum obtained from a paediatric bottle is dependent on the PCV. The department will endeavour to analyse as many tests as possible on the volume of serum available. Special tubes for the collection of paediatric blood samples are available. Biochemistry uses lithium heparin tubes for paediatric samples to ensure the maximum yield of plasma for analysis.

When requesting a U&E and glucose give priority to the lithium heparin paediatric tube as this can be used for glucose measurements if received within four hours.

CSF Samples

All CSF samples should be collected into plain universal containers (white top, minimum of 1 ml in each) and one fluoride oxalate tube (about 0.5 ml CSF for glucose). These must be labelled with name, hospital number, ward, date of birth, the time that the CSF was obtained and sequence order of sampling. The last samples should usually be sent to Microbiology except when analysis for Xanthochromia is required.

When Xanthochromia analysis is required, the sample collected last should be sent to Biochemistry for analysis, a minimum of 0.5 ml is required and this sample must be protected from light and send to Biochemistry ASAP (but NOT in the air tube).

Requests for CJD testing (RT-QulC) require 0.5 ml of clear and colourless CSF which must be sent to lab ASAP after collection for storage at -80 °C.
To arrange testing of CSF sample CJD unit in Edinburgh must be contacted on 0131 5371980 to discuss case. If CJD unit accept sample for analysis, please contact Biochemist on 024 76965478 to arrange transport of sample to Edinburgh.

Fluid samples

All other fluid samples, e.g., pleural, ascitic fluid should be collected into a plain sterile universal container (about 5 ml) and clearly labelled with fluid type.
Please indicate on the form what type of fluid is being sent as this will be printed on the final report together with the results.

Faeces

At least a two pence sized **pellet** of faeces on the spatula inside the stool container is sufficient for calprotectin and elastase and the sample must be transported straight to the laboratory. If Microbiology also required, please send a separate sample.

Toxicology other than Salicylate and Paracetamol

During working hours the requesting clinician can phone the Regional Toxicology Laboratory, 0121 507 4135 for advice on investigations and sample requirements. The laboratory will arrange transport to the Regional Toxicology Laboratory if required and can perform a urine screen for common drugs of abuse in Biochemistry.

Outside normal working hours the requesting clinician must telephone the West Midlands Poisons Unit on 0121 507 4007. If the request is accepted, the laboratory will arrange transport.

Assays and Samples

Some specialised tests may not be listed; please contact a Clinical Biochemist if you cannot find the test in the list of available assays.

Volume of Sample

The volumes given are as whole blood. In most instances a generous volume has been asked for to allow repeat determinations and/or further tests which may be indicated (or added on requests at a later date). Samples are stored for at least 4 days after the collection date. For this reason every effort should be made to supply the volume of blood requested. It is appreciated that it is not always possible to provide these volumes, in which case the laboratory will do its best to perform the tests on the sample available. If a very small volume is sent please indicate which tests should have priority.

*One 5ml-clotted sample is usually sufficient for most combinations of Biochemistry and Immunology tests. Additional samples are usually only required for more specialist investigations.

Turnaround Times

The turnaround times for routine Biochemistry tests (e.g., U&E) from the time of receipt in the testing laboratory are:

	Urgent	Inpatient	Outpatient and GP
Turnaround time	1 hour	4 hours	6 hours

More specialist work that is batched and tests that have to be sent away to other laboratories for analysis will take longer than this. Please see the specimen requirements tables on the next page which includes specific turnaround times for individual tests, including referred work.

Once results have been validated by the laboratory they should be available on the ward electronic reporting system immediately. Therefore, telephone calls to the laboratory for results are unnecessary.

Requesting Additional Investigations

The department stores primary sample tubes for about 4 working days.

Tests can be added to samples already processed by the laboratory where there is a clear indication that adding them to the original request would be of immediate clinical benefit, and there is no plan to re-bled patient. Additional requests should be made within 24h of the original sample collection where possible. If the original sample is haemolysed no additional tests can be added.

Add-on requesting is limited to Acute Investigations:

Amylase	**Paracetamol**	**Salicylate**	**Troponin I**	**HCG**
UE	**CRP**	**Calcium**	**Magnesium**	**LFT**
CK	**LDH**	**Phosphate**		

Please consider requesting the following tests when the patient is next bled if results would not be of immediate clinical benefit: B12/Folate/Ferritin, TSH, and Tumour Markers.
For requests that fall outside this repertoire (including Immunology tests) please call the Duty Biochemist to discuss.

Requests for add-ons MUST be received on a new request form, which should be sent to lab ideally with the request number of the original sample in the clinical details. This is to ensure add on tests are send back to the consultant who requested them, and to also minimise phone calls to the laboratory.

Please also ensure the laboratory has the correct sample type for the add-on or it is not a test that requires urgent processing, or we will not be able to process.

Coventry and Warwickshire Pathology Services

Common Interferences in Biochemistry tests

Haemolysis, icteric and lipemic indices are measured on all Biochemistry samples and tests results are not reported when the indices are above the accepted reportable cut off where there is likely to be significant interference for that test

EDTA contamination (e.g., from FBC tube): Potassium will be increased, Calcium, magnesium and ALP decreased.

Prolonged delay in centrifugation of sample: Potassium, phosphate, LDH will be increased, and bicarbonate decreased.

Inappropriate sampling site, e.g., sample taken from a drip arm: Increase in drip analyte (e.g. sodium or glucose). Dilutional effect likely to be seen on other analytes.

Potential for Biotin interference in Immunoassays

The use of over-the-counter (OTC) high dose biotin (Vitamin B7) supplements has gained popularity in recent times. Many patients take biotin supplements (generally 5-10 mg tablets) marketed as beauty products to improve the health of hair, skin and nails. High-dose biotin (100 mg) is sometimes prescribed to treat metabolic diseases and there are also ongoing trials of mega-dose (up to 300mg/d) Biotin in Multiple Sclerosis. The Biotin – Streptavidin couple is part of the assay design for many biomarker immunoassays. If patients are taking large doses of this Biotin / Vitamin B7, there is known potential for significant interference in immunoassays for a number of commonly requested tests in Biochemistry.
Interference may be positive or negative depending on assay design: sandwich-type immunoassays are generally negatively affected, and competitive designs are usually positively affected.

If you have a test result that does not fit with the clinical picture, it is worthwhile excluding biotin ingestion as a potential cause of test interference, by asking the patient / parent / carer about any OTC supplements or checking for a biotin prescription.
Clinicians caring for patients being investigated for chest pain / acute coronary syndrome should take particular care when interpreting Troponin I results where biotin can cause a negative interference and potentially falsely reassuring results. In such cases, the clinician should ask about biotin supplements for all patients for which a Troponin I is requested.

Please contact the Duty Biochemist if you wish to discuss any results where interference is suspected.

NHS
Coventry and Warwickshire Pathology Services

BIOCHEMISTRY SAMPLE REQUIREMENTS

Test Name	Sample Type and Volume	Notes	Turnaround Time
ACTH	4ml EDTA	**Must be received in lab within 30 minutes of collection.** Disorder cortisol secretion must be demonstrated prior to ACTH measurement. Sent to Charing Cross Hospital	1-2 weeks
Active B12	5ml Clotted	Only indicated if patient has symptoms of B12 deficiency and total B12 not low. MMA will be reflexed on borderline active B12 results. Sent to St Thomas' Hospital	1-2 weeks
Acylcarnitines	0.5 ml Lithium heparin	Please send separate lithium heparin bottle for this test; dried blood spot and plasma carnitines will both be measured. Sent to Birmingham Children's Hospital	2-3 weeks
Adalimumab and antibodies (Humira)	5ml Clotted	Sent to City Hospital	1-2 weeks
Adrenaline (free)	24hr Urine in acid bottle	Part of the Catecholamine screen. Sent to Heartlands Hospital	3-4 weeks
Alphafetoprotein (AFP)	5ml Clotted	Used as a tumour marker.	4-6 hours
Alanine Transaminase (ALT)	5ml Clotted	Part of LFT Profile	4-6 hours
Albumin	5ml Clotted	Part of LFT and Bone Profiles	4-6 hours
Albumin/creatinine ratio (ACR), urine	Random urine	Should be early morning urine sample when free of acute intercurrent illness.	24 hours
Alcohol	2ml Fluoride	Do not use alcohol swab during venepuncture.	4-6 hours
Aldosterone	4ml EDTA	Patient should be off anti-hypertens drugs and normokalaemic. Sample should be collected after patient has been sitting for 10 minutes. Sent to Wythenshawe Hospital	2-3 weeks
Alkaline Phosphatase (ALP)	5ml Clotted	Part of LFT and Bone Profiles.	4-6 hours
Alkaline Phosphatase Isoenzymes	5ml Clotted	This test should only be done if total ALP is >250 IU/L. GGT should also have been measured prior to requesting. Sent to Nottingham City Hospital	1-2 weeks
Alpha-1- Antitrypsin (total)	5ml Clotted	Genotyped if total <1.4 g/L and informed patient consent.	4-6 hours
Alpha-1- Antitrypsin	4ml EDTA	Will only be processed if patient	2 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
genotyping		consent provided in clinical details.	
Aluminium	6ml Lithium heparin	Sent to City Hospital	1-2 weeks
Amikacin	5ml Clotted	Pre-dose sample.	4-6 hours
Amino Acids, plasma	0.5 ml Lithium heparin	Send sample straight to lab Sent to Birmingham Children's Hospital Disorders of homocysteine metabolism may not be detected by this method, if suspected please request plasma total homocysteine.	2-3 weeks
Amino Acids, urine	Random urine 5ml	Send sample straight to lab. Sent to Birmingham Children's Hospital Screening test which will detect AA renal transport disorders and most primary AA disorders, however the sample of choice for primary AA disorders is plasma.	2-3 weeks
Amiodarone	5ml Clotted	Sample should be taken pre-dose. Please state dose and time of last dose. Sent to Leicester Royal Infirmary	2-3 weeks
Ammonia	4ml EDTA or paediatric EDTA	**Transport to lab on ice immediately after collection (15 mins).**	1 hour
Amylase, serum	5ml Clotted		4-6 hours
Amylase, urine	Random Urine		4-6 hours
Amylase, fluid	Fluid in sterile universal		4-6 hours
Amyloid A	5ml Clotted	Sent to PRU, Sheffield	1-2 weeks
Androstenedione	5ml Clotted	Sent to QEHB	2-3 weeks
Angiotensin Converting Enzyme, serum	5ml Clotted	If patient on ACE inhibitors suggest take pre dose sample. *Not UKAS accredited test	1 week
Angiotensin Converting Enzyme, CSF	CSF in sterile universal 4	NB. This test is not routinely available and should only be requested if Neurosarcoidosis strongly suspected. Sent to Queens Square, London	2-3 weeks
Antibiotic level (e.g. Teicoplanin, Rifampicin)	5ml Clotted	Please ensure sample collected at correct time point, e.g. pre dose. Sent to Microbiology, Bristol	2-3 days
Antifungals (e.g. Itraconazole)	5ml Clotted	Please ensure sample collected at correct time point, e.g. pre dose. Sent to Microbiology, Bristol	1 week

Test Name	Sample Type and Volume	Notes	Turnaround Time
Antidiuretic Hormone (ADH/Vasopressin)	5ml Clotted or 6ml lithium heparin or EDTA Tube	Precursor copeptin is measured not ADH. This test rarely adds useful information, only processed if discussed with Biochemist first. Sent to Newcastle	2-3 weeks
Antihypertensive drug screen, urine	Random Urine	Sent to Heartlands Hospital	2-3 weeks
Antimullerian Hormone (AMH)	5ml Clotted	Sent to Manchester Royal Infirmary	1 week
Antenatal Screen for Downs Syndrome, T13 and T18 (First Trimester:(free Beta HCG, PAPP-A, and NT) Second trimester: (HCG, AFP, Inhibin A and UE3)	5ml Clotted	Specific green request form required which MUST be completed in full after counselling of patient. First trimester twins and Second Trimester samples are analysed at Birmingham Women's Hospital	2-3 days
Apolipoprotein A1 and B	5ml Clotted	Sent to PRU, Sheffield	1-2 weeks
Apolipoprotein E genotype	4ml EDTA		4-8 weeks
Aspartate Transaminase (AST)	5ml Clotted	Not part of routine LFT profile.	4-6 hours
Azathioprine metabolites (6TGN, 6MMPN)	4ml EDTA	Sent to City Hospital	1-2 weeks
Bence Jones Protein (urine free light chains)	Urine in sterile universal	Early morning urine preferred	3 days
Beta-2-microglobulin	5ml Clotted		4-6 hours
Bicarbonate	5ml Clotted		4-6 hours
Bilirubin (Total), serum	5ml Clotted	Part of LFT profile	4-6 hours
Bilirubin (conjugated)	5ml Clotted		4-6 hours
Bile Acids	5ml Clotted	Investigation of pruritis in pregnancy only.	4-6 hours
Biotinidase	2ml Lithium heparin	Transport to lab immediately after collection. Sent to Birmingham Children's Hospital	2-3 weeks
Blood Gases		This test is no longer available within any CWPS laboratory. Please use a ward blood gas machine.	
Brain Natriuretic Peptide (BNP)	5ml Clotted	Assay is pro-NT BNP.	2-3 days
Brivaracetam	4ml EDTA	Sent to Epilepsy Society	1-2 weeks
CA 125	5ml Clotted	Has no place in screening for cancer.	4-6 hours
CA 15-3	5ml Clotted	Has no place in screening for cancer.	4-6 hours
CA 19-9	5ml Clotted	Has no place in screening for cancer.	4-6 hours
Cadmium	4ml EDTA	Sent to City Hospital	1-2 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
Caeruloplasmin	5ml Clotted		4-6 hours
Caffeine	5ml Clotted	State dose and time of last dose on the request form. Sent to City Hospital	1-2 weeks
Calcium, serum	5ml Clotted	Avoid stasis if possible. Albumin and adjusted calcium also reported.	4-6 hours
Calcium, urine	24 Urine in plain bottle		24 hours
Calcitonin	6ml Lithium heparin	**Must be received in lab within 30 minutes of collection** Sent to PRU, Sheffield	3-4 weeks
Calculi	10mg calculi in sterile universal	Sent to UCL Hospital	1-2 weeks
Calprotectin (faecal)	Faecal sample (separate sample for any microbiology)	Send to lab ASAP after sample collection. *Not UKAS accredited test	2-3 days
Carbamazepine	5ml Clotted	Sample should be collected pre dose. Please state dose and time of last dose on request form.	4-6 hours
Carbohydrate deficient transferrin (CDT)		Sent to PRU, Sheffield	1-2 weeks
Carboxyhaemoglobin (carbon monoxide poisoning)	6ml Lithium heparin	Test not available in lab . Any GP/OPD samples will be analysed on blood gas machine on ward.	1 hour
Carcinombryonic Antigen (CEA)	5ml Clotted	Has no place in screening for cancer.	4-6 hours
Carnitine (free)	6ml Lithium heparin or paediatric tube	Sent to Birmingham Children's Hospital	2-3 weeks
Carotinoids (α/β carotene)	5ml Clotted	Sent to City Hospital	2-3 weeks
Catecholamines	24 hour urine in **ACID** bottle	Adrenaline, noradrenaline, dopamine and Metanephrines measured. Usually only one 24-hour collection required, or alternatively collect sample for plasma Metanephrines. Sent to Heartlands Hospital	2-3 weeks
Chitotriosidase	0.5 ml Lithium heparin	Sent to Birmingham Children's Hospital	2-3 weeks
Cholesterol (Total)	5ml Clotted	Fasting sample not necessary	4-6 hours
Cholinesterase (red cell)	4ml EDTA	To diagnosis organophosphate and carbamate toxicity. Sent to City Hospital	1-2 weeks
Cholinesterase (activity and phenotype)	4ml EDTA	For investigation of scoline apnoea (suxamethonium sensitivity). Sent to Southmead Hospital, Bristol	3-4 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
Chloride	5ml Clotted		4-6 hours
Chromium	4ml EDTA	Sent to City Hospital	1-2 weeks
Chromogranin A and B	5ml Aprotinin (available from lab)	Has no place in screening for cancer. Sent to Hammersmith Hospital	2-4 weeks
Ciclosporin	4ml EDTA	Sample should be taken pre dose. Please indicate time of last dose.	24 hours
Citrate	24 urine in plain bottle	Sent to UCL Hospital	1-2 weeks
CJD testing (RT-QulC)	CSF in sterile universal	**Transport to laboratory immediately after collection.** At least 0.5 ml of CSF required (clear, colourless). To arrange testing please contact CJD unit 0131 5371980 to discuss case. If CJD unit accept sample for analysis, contact Biochemist on 024 76965478 to arrange transport of sample. Sent to CJD unit, Edinburgh	2 weeks
Clozapine	4ml EDTA	Pre dose or taken minimum of 12 hours post dose Sent to City Hospital	1-2 weeks
Cobalt	4ml EDTA	Sent to City Hospital	1-2 weeks
Copper, serum	5ml Clotted	For investigation of Wilson's disease please request caeruloplasmin instead. Sent to City Hospital	1 week
Copper, urine	24 hour urine in plain bottle	Sent to City Hospital	1-2 weeks
Cortisol, serum	5ml Clotted	Should ideally be collected at 9am.Urine free cortisol is a better screen for Cushing's syndrome than a random serum cortisol.	4-6 hours
Cortisol, saliva	Sarstedt Salivette	Contact 024 76965478 to arrange collection of Salivette Sent to QEHB	2-3 weeks
Cortisol, urine	24 hour urine in plain bottle	Sent to Queen Elizabeth Hospital	1-2 weeks
C-peptide	5ml Clotted or 6ml Lithium heparin	**Must be received in lab within 1 hour of collection** Must be concurrent sample for glucose. Sent to Royal Surrey County Hospital	2-3 weeks
C-reactive Protein (CRP)	5ml Clotted		4-6 hours
C-terminal peptide (CTX)	4ml EDTA	Fasting sample required, **Must be sent straight to lab after collection.** Sent to Norwich Hospital	2-3 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
Creatine Kinase (CK)	5ml Clotted		4-6 hours
Creatinine, serum	5ml Clotted	Part of U&E profile.	4-6 hours
Creatinine, urine	24 hour urine in plain bottle		24 hours
Creatinine Clearance	5ml Clotted and 24 hour urine in plain bottle	Blood sample must be taken during urine collection period preferably mid-point. Request form should also state height and weight of patient.	24 hours
Cryoglobulins	2x Clotted red top (without gel) and 2x EDTA	Samples MUST be collected and transported at 37°C, therefore can only be collected by phlebotomy department **at UHCW and SWFT.** Sent to Heartlands Hospital	1-2 weeks
Cystatin C	5ml Clotted	Sent to Kings College Hospital	1-2 weeks
7-Dehydrocholesterol	1ml Lithium heparin	Sent to Birmingham Children's Hospital	2-3 weeks
Dehydroepiandrosterone Sulphate (DHEAS)	5ml Clotted		1 week
11-deoxycortisol	5ml Clotted	Sent to Kings College Hospital	3-4 weeks
Digoxin	5ml Clotted	Sample should be taken at least 6 hours post dose. Please indicate daily dose, time of last dose and request potassium at the same time.	4-6 hours
Dihydrotestosterone (DHT)	5ml Clotted	Sent to Kings College Hospital	3-5 weeks
Dopamine	24 hour urine in acid bottle	Part of the Catecholamine screen. Sent to Heartlands Hospital	3-4 weeks
DPD deficiency tests (fluoropyrimidine therapy toxicity)	4ml EDTA	Sent to West Midlands Regional Genetics Lab	1-2 weeks
Drugs of Abuse	Random urine	Screen includes Amphetamines, Barbiturates Benzodiapines, cocaine, THC, methadone, metamphetamine, opiates. Please indicate on form if further investigations required or contact lab if confirmation of results needed by alternative method.	24 hours Please contact lab if required urgently.
Elastase	Faecal sample		2 weeks
ELF test	5ml Clotted	This test is only available to Gastroenterology Sent to iQUR	1-2 weeks
eGFR	5ml Clotted	Calculated on all OPD and GP U&E requests, except ANC and paediatric samples.	4-6 hours

Test Name	Sample Type and Volume	Notes	Turnaround Time
EGFR Mutation testing for circulating tumour DNA	Specific blood tube required	Contact 024 76965478 to arrange blood bottle and request form collection. Sent to Molecular Pathology , QEHB	2-3 weeks
Erythropoietin (EPO)	5ml Clotted	Sent to Wolverhampton Hospital	1-2 weeks
Ethanol	2ml Fluoride	Do not use alcohol swab during venepuncture.	4-6 hours
Ethosuxamide	5ml Clotted	Sent to Epilepsy Society	1-2 weeks
Ethylene glycol	6ml Lithium heparin	Sent to City Hospital	24 hours
Everolimus	4ml EDTA	Sent to QEHB	1 week
Ferritin	5ml Clotted		4-6 hours
Flecainide	5ml Clotted	Sent to Leicester Royal Infirmary	2-3 weeks
FIT (faecal immunochemical test) for symptomatic patients	Stool sample collected using FIT collection device	Testing for symptomatic patients as per NICE guidance DG30. Test currently only available to Primary Care and must be request on T-Quest. Once requested on T-Quest order will be picked up by bowel cancer screening hub and they will send FIT sampling device directly to patient with return envelope. Queries for results should be sent to uhc-tr.fitbcs@nhs.net For more information please see: www.coventryrugbygpgateway.nhs.uk/pages/faecal-occult-blood-testing-fit-guidance/	2-3 days from posting the sample back to the Hub.
Free light chains	5ml Clotted		4-6 hours
Folate	5ml Clotted		4-6 hours
Follicle Stimulating Hormone (FSH)	5ml Clotted		4-6 hours
Free Fatty Acids	0.5 ml Fluoride	**Transport to lab immediately. after collection.** Sample will only be analysed if patient is hypoglycaemic at time of sampling. Sent to Birmingham Children's Hospital	1-2 weeks
Fructosamine	5ml Clotted	Alternative test for monitoring Diabetic control, if HbA1c analysis affected by Hb Variant. Please do NOT request for diagnosis. Sent to Queen Elizabeth Hospital	1-2 week
Galactosaemia screen (GAL-1-PUT)	1rml Lithium heparin (no gel) or dried blood	Ideally do not send on Fridays or at weekends. Sent to Birmingham Children's Hospital	1-2 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
	spot		
γ-Glutamyl Transferase (GGT)	5ml Clotted	Useful in helping to differentiate causes of raised ALP.	4-6 hours
Gastrin	2x 4ml EDTA	Patient must be fasting, off H2 receptor blockers for 48h, and off proton pump inhibitors for 2 weeks prior to test. **Must be received in lab within 15 minutes of collection,** Part of Gut hormone profile, but can be done as single test. Sent to Hammersmith Hospital	2-4 weeks
Gentamicin	5ml Clotted	Should be taken pre-dose.	4-6 hours
Glucagon	2x 4ml EDTA	See Gut Hormones	2-4 weeks
Glucose, serum	**2ml Fluoride** or 5ml Clotted (inpatient only)	Please collect in fluoride oxalate bottle if likely to take more than 4 hours to analysis, i.e. all outpatient and GP requests. If fasting sample required, patient should fast for at least 8 hours.	4-6 hours
Glucose, fluid, CSF	2ml Fluoride		4-6 hours
Glucose Tolerance Test (GTT)	2ml Fluoride	To book GTT please phone following numbers: Rugby: 01788 663190 or 01788 663749 George Eliot: 024 76865174 Warwick: 01926 495321 Ext 4075 For Coventry: Please book online at: www.uhcw.nhs.uk/bloodtests Please see GTT protocol on page 83.	4-6 hours
Glucose-6- Phosphate Dehydrogenase (G6PD)	2x 4ml EDTA	Please also request FBC and reticulocytes. Sent to Kings College Hospital	1-2 weeks
Glycoaminoglycans (mucopolysaccharide screen)	5ml urine in plain universal	Sent to Birmingham Children's Hospital	3-4 weeks
Growth Hormone (GH)	5ml Clotted	Random GH samples will not be analysed except in acromegaly patients or if hypoglycaemic. Please request IGF-1 for first line investigation of acromegaly or GH deficiency.	1 week
Gut Hormones	2x 4ml EDTA	Fasting sample required. **Must be received in lab within 15 minutes of collection,** Sent to Hammersmith Hospital	2-4 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
Haemochromatosis gene	4ml EDTA	Please also request transferrin saturation. Will only be analysed if saturation is >40%, Ferritin >650 or there is a family history of Haemochromatosis.	2 weeks
Haptoglobin	5ml Clotted		4-6 hours
HbA_{1c} (glycated haemoglobin)	4ml EDTA	Please use EDTA tube with yellow insert lid	2 days
HDL- Cholesterol	5ml Clotted		4-6 hours
Heavy metals screen	4ml EDTA and random urine	Sent to City Hospital	1-2 weeks
Homocysteine	5ml Clotted	**Must be received in lab within 2 hours of collection** Sample should be collected in the morning.	1 week
Human Chorionic Gonadotrophin (hCG)	5ml Clotted	Used as a tumour marker and to help diagnosis miscarriage/ectopic pregnancies.	4-6hours- Tumour marker, 1 hour - PUL
3-hydroxybutyrate	2ml Fluoride oxalate	**Transport to lab immediately after collection**. Sample will only be analysed if patient is hypoglycaemic at time of sampling. Sent to Birmingham Children's Hospital	1-2 weeks
5-Hydroxy Indoleacetic Acid (5HIAA)	24 hour urine in **ACID** bottle	Sent to Heartlands Hospital 5HIAA is affected by diet; levels can increase following ingestion of pineapples, bananas and some nuts.	2-3 weeks
17-Hydroxyprogesterone	5ml Clotted	If analysis is required urgently on neonate, please discuss with Clinical Biochemist. Sent to Queen Elizabeth Hospital	2-3 weeks
Immunoglobulins (G, A, M)	5ml Clotted		4-6 hours
Infliximab and abs	5ml Clotted	Sent to City Hospital	1-2 weeks
Inhibin A and B	5ml Clotted	Has no place in screening for cancer. Sent to PRU, Sheffield	2-3 weeks
Insulin	5ml Clotted or 6ml Lithium heparin	**Must be received in lab within 1 hour of collection.** Must be concurrent sample for glucose. Sent to Royal Surrey County Hospital	2-3 weeks
Insulin like growth Factor 1 (IGF 1)	5ml Clotted		1 week
IGF Binding Protein 3	5ml Clotted	Sent to Queen Elizabeth Hospital	3-4 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
(IGFBP 3)			
Iron	5ml Clotted	Only used in cases of iron overdose. For investigation of anaemia request ferritin.	4-6 hours
Isoniazid	2ml Fluoride	2 h post dose. If suspect delayed absorption collect samples at 2 and 6 h post dose Sent to Microbiology, Bristol	2-3 weeks
Lactate	2ml Fluoride	**Must be received in lab within 15 minutes of collection**	1 hour
Lactate Dehydrogenase (LDH)	5ml Clotted		4-6 hours
Lamotrigine	4ml EDTA	Sent to City Hospital	1-2 weeks
LDL-Cholesterol	5ml Clotted	Ideally fasting sample so that triglycerides are not raised due to recent food intake.	4-6 hours
Lead	4ml EDTA	Sent to City Hospital	1-2 weeks
Levetiracetam	4ml EDTA	Sent to City Hospital	1-2 weeks
Lipase	5ml Clotted	This test is not routinely available. Only indicated if Amylase raised and cause unknown. Sent to Kings College Hospital	1-2 weeks
Lipids	5ml Clotted	Profile contains Cholesterol, triglycerides, HDL, LDL, non-HDL and Chol/HDL ratio. If fasting sample required, please fast for 12 hours.	4-6 hours
Lipoprotein (a)	5ml Clotted	Sent to City Hospital	1-2 weeks
Lithium	5ml Clotted	Sample should be taken at least 12 hours post dose. Please indicate daily dose and time of last dose. Monitor thyroid function regularly.	4-6 hours
Liver function tests (LFT)	5ml Clotted	Profile contains total protein, albumin, ALT, ALP and bilirubin	
Luteinizing Hormone (LH)	5ml Clotted		4-6 hours
Lysosomal Enzymes assay (e.g. Fabrys and Pompes))	2x 4ml EDTA	Please state which enzyme required, samples must be sent to BCH on morning of collection, please ensure sample in lab by 10am Mon-Thurs. Please contact Clinical Biochemist before requesting. NB. Fabrys and Pompe just require 1x EDTA and can be sent at any time as blood spot method used.	2-3 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
		Sent to Birmingham Children's Hospital	
Magnesium, serum	5ml Clotted		4-6 hours
Magnesium, urine	Random or 24 hour urine in plain bottle		24 hours
Manganese, plasma	6ml Trace element tube		1-2 weeks
Mercury	Urine in sterile universal	Not helpful in looking for toxicity due to dental fillings. Sent to City Hospital	1-2 weeks
Metabolic screen	5ml urine in sterile universal	Send sample straight to lab. Sent to Birmingham Children's Hospital	1-2 weeks
Metanephrines (plasma)	4ml EDTA	**Sample must be sent to lab within 30 minutes of collection.** Sent to Wythenshawe Hospital	2-3 weeks
Methanol	2ml Fluoride	Sent to City Hospital	1 week
Methaemoglobin	6ml Lithium heparin	Can also be analysed from arterial blood gas sample.	
Methotrexate	5ml Clotted	Only measured on patients on high dose infusion. If required at weekend, please contact lab day before collection. Sent to Queen Elizabeth Hospital	24 hours
Methylmalonic acid (MMA)	5ml Clotted	Active B12 will be measured as first line test – MMA will be reflexed if indicated. Sent to St Thomas Hospital	1-2 weeks
Mucopolysaccaride Screen	5ml Urine in sterile universal	Send sample straight to lab. Sent to Birmingham Children's Hospital	3-4 weeks
Mycophenolate	4ml EDTA	Sent to Harefield Hospital	1-2 weeks
Noradrenaline (free)	24 hour urine in **ACID** bottle	Part of the catecholamine screen. Sent to Heartlands Hospital	3-4 weeks
Neurone-specific enolase (NSE)	5ml Clotted	Has no place in screening for cancer. Sent to St Thomas' Hospital	2-3 weeks
Neurotensin	10 ml Aprotinin	Not routinely available. Please indicate on request form if required as part of gut hormone profile. Sent to Hammersmith Hospital	2-4 weeks
Oestradiol	5ml Clotted NB. Lithium heparin tubes are unsuitable for analysis	Not recommended for the investigation of menopause or monitoring treatment except with implants.	4-6 hours
Oligoclonal Bands	CSF and	Serum sample must be collected	1-2 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
	Clotted sample (yellow)	at the same time as CSF. Sent to Birmingham Immunology	
Oligosaccharides	5ml urine in sterile universal	Send sample straight to lab. Sent to Birmingham Children's Hospital	3-4 weeks
Organic Acids	5ml urine in sterile universal	Send sample straight to lab. Sent to Birmingham Children's Hospital	2-3 weeks
Osmolality, serum	5ml Clotted	If part of water deprivation test, please inform laboratory prior to start.	24 hours
Osmolality, urine	5ml urine in sterile universal	If part of water deprivation test, please inform laboratory prior to commencing. See protocol on page 87.	24 hours
Oxalate	24 hour urine in plain bottle	Urine glycolate can also be measured on same urine sample if required. If plasma oxalate required, please discuss with lab prior to collection. Sent to UCL Hospital	1-2 weeks
Pancreatic Polypeptide (PPP)	2x 4ml EDTA	See Gut Hormones	2-4 weeks
Paracetamol	5ml Clotted	Please indicate time of overdose if known. Sample should be taken at least 4 hours post overdose	1 hour
Parathyroid Hormone (PTH)	4ml EDTA		4-6 hours
Parathyoid hormone related peptide (PTH-RP)		Please contact lab to discuss before requesting as test not currently routinely available.	6-8 weeks
Phenylalanine	6ml Lithium heparin	Sent to Birmingham Children's Hospital	2-3 weeks
Phenobarbitone	5ml Clotted	Sample should be taken pre dose. Please indicate daily dose and time of last dose on request form. Sent to City Hospital	1 week
Phenytoin	5ml Clotted	Sample should be taken pre dose. Please indicate daily dose and time of last dose on request form.	4-6 hours
Phosphate, serum	5ml Clotted		4-6 hours
Phosphate, urine	24 hour urine in plain bottle		24 hours
Phytanic and pristanic acids	2ml Lithium heparin	Part of VLCFA profile. Sent to Birmingham Children's Hospital	2-3 weeks
Placental alkaline phosphatase	5ml Clotted	Has no place in screening for cancer. Sent to Charing Cross Hospital	2-3 weeks
Porphobilinogen	Urine in sterile universal	Please give full clinical details. **Keep samples protected from light after collection**.	2-3 weeks Discuss with Biochemist if

Test Name	Sample Type and Volume	Notes	Turnaround Time
		Sent to Cardiff Porphyria Service	urgent
Porphyrins, blood	4ml EDTA	**Keep samples protected from light during transit to the laboratory.** Sent to Cardiff Porphyria Service	2-3 weeks See investigation protocol on page 90.
Porphyrins, urine	Urine in sterile universal	Please give full clinical details. **Keep samples protected from light**. Sent to Cardiff Porphyria Service	2-3 weeks See page 90. Please discuss with Biochemist if urgent.
Porphyrins, faecal	Faeces	Not required for initial screen, see page 90. **Keep samples protected from light**	Sample will be stored. Analysis only indicated if urine/blood screen abnormal.
Potassium, serum	5ml Clotted		4-6 hours
Potassium, urine	Urine in sterile universal or 24 hour urine in plain bottle		24 hours
Pre-eclampsia markers (P-IGF)	5ml Clotted	Sent to John Radcliffe Hospital	1-2 days
Pregnancy Test, urine		Test no longer available in laboratory.	
Procollagen type 1 N-terminal (P1NP)	5ml Clotted	Sent to Norwich Hospital	2-3 weeks
Procollagen type 3 peptide (P3NP)	5ml Clotted	Sent to Manchester Royal Infirmary	3-4 weeks
Progesterone	5ml Clotted	Day 21 sample in a 28 day cycle for infertility Ix.	4-6 hours
Prolactin	5ml Clotted		4-6 hours
Prostate Specific Antigen (PSA)	5ml Clotted		4-6 hours
Protein (Total), serum	5ml Clotted		4-6 hours
Protein, urine	24 hour urine in plain bottle		24 hours
Protein/creatinine ratio	Urine in sterile universal		24 hours
Protein, CSF	CSF in sterile universal		4-6 hours
Protein, fluid	Fluid in sterile universal		4 hours
Protein Electrophoresis, serum	5ml Clotted	Early morning urine should also be sent for free light chains if	2-3 days 1 week if

Test Name	Sample Type and Volume	Notes	Turnaround Time
		myeloma suspected.	immunofixation required
Protein Electrophoresis, urine	Urine in sterile universal		3 days
Pseudocholinesterase	4ml EDTA	For investigation of scoline apnoea (suxamethonium sensitivity). Sent to Southmead Hospital, Bristol	2-3 weeks
Purine and pyrimidines	24 hour urine in thymol bottle or random urine in sterile universaland 4ml EDTA blood	For adults 24 hour bottle containing thymol required. Before requesting please contact Clinical Biochemist for protocol and to arrange urine bottle. Sent to St Thomas' Hospital	3-4 weeks
Pyruvate Kinase	4ml EDTA	Also request FBC and RET Sent to Kings College Hospital	1-2 weeks
Quinine	4ml EDTA	Sent to King's College Hospital	1-2 weeks
Reducing substances, urine (NB.included in metabolic screen).	5ml Urine in sterile universal	This test is no longer routinely Offered. For investigation of Galactosaemia, preferred test is blood Gal-1-Put. Sent to Birmingham Children's Hosp	1-2 weeks
Reducing substances, faecal	Faeces	This test is no longer routinely offered. If lactose intolerance suspected, recommend exclusion diet If test still required please discuss w Biochemist.	
Renin	4ml EDTA	Patient should be off anti-hypertensives drugs and normokalaemic. Sample should be collected after patient has been sitting for 10 minutes. Sent to WythenshaweHospital	2-3 weeks
S100 protein	5ml Clotted	Should only be used to monitor patients with Melanoma. Sent to King's College Hospital	1-2 weeks
Salicylate	5ml Clotted	Please provide time of suspected overdose if known	1 hour
Selenium	5ml Clotted	Sent to City Hospital	1 week
Sex Hormone Binding Globulin (SHBG)	5ml Clotted		4-6 hours
Sirolimus	4ml EDTA	Sent to Harefield Hospital	1 week
Sodium, serum	5ml Clotted		4-6 hours
Sodium, urine	Urine in sterile universal or 24 hour urine in plain bottle		12 hours

Test Name	Sample Type and Volume	Notes	Turnaround Time
Somatostatin	2x 4ml EDTA	See gut hormones.	2-4 weeks
Steroid Profile	Urine in sterile universal or 24 hour urine in plain bottle (adults)	Sent to UCL Hospital.	2-3 weeks
Sweat Test		Sweat test collections are arranged with paediatric outpatients, please contact 024 7696 7232. Sweat tests are not performed at Warwick Hospital.	24 hours
Tacrolimus (FK506/Prograf)	4ml EDTA		24 hours
Tau protein	5ml Clotted and fluid in plain universal	CSF suspected fluid and blood sample is required. Sent to Birmingham Immunology.	1 week
Testosterone	5ml Clotted		4-6 hours
Theophylline	5ml Clotted	Sample should be taken pre dose. Please indicate daily dose and time of last dose.	4-6 hours
Thiamine (Vitamin B1)	6ml Lithium heparin or 4ml EDTA	**Sample must be brought straight to lab after collection (protect from light).** Please discuss with lab prior to requesting. Sent to Rotherham Hospital	2-3 weeks
Thiopurine methyltransferase (TPMT)	4ml EDTA	Should be measured prior to starting azathioprine Rx. This test only needs to be measured once in an individual patient unless they had had blood transfusion. Sent to City Hospital	1 week
Thyroglobulin	5ml Clotted	For the monitoring of thyroid cancer only. Thyroglobuln antibodies will only be measured if interference suspected, or previously antibody positive. Sent to Queen Elizabeth Hospital	3-4 weeks
Thyroid Stimulating Hormone (TSH)	5ml Clotted	TSH used as the first line test. FT4 or FT3 used as follow up tests. If secondary hypothyroidism suspected please indicate, or discuss further tests with Clinical Biochemist.	4-6 hours
Thyroxine (Free)	5ml Clotted		4-6 hours
Tobramycin	5ml Clotted	Please indicate whether sample is pre or post dose.	4-6 hours
Topiramate	5ml Clotted	Sent to Cardiff Toxicology Laboratory	1-2 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
Toxicology	Urine collected in sterile universal	Drugs of abuse screen will be performed on all urine toxicology requests. If further tests required, or if you require confirmation of any positive screens please contact Clinical Biochemist. All positive screens on <16 years will be confirmed at City Hospital. Confirmation and full toxicology screens testing sent to City Hospital.	1 day 2-3 days (City Hospital)
Transferrin	5ml Clotted	Transferrin saturation also reported. Please also send EDTA sample for HFE gene if Haemochromatosis suspected.	4-6 hours
Transferrin electrophoresis (CGDS)	6ml Lithium heparin	Samples should not be collected before 10d of age and ideally after 21d. Sent to Birmingham Children's Hospital	4 weeks
Triglycerides	5ml Clotted	If fasting required, patient must have fasted for 12 hours.	4-6 hours
Tri-iodothyronine (Free)	5ml Clotted		4-6 hours
Troponin I (hsTNI)	5ml Clotted		1 hour
Urea (and electrolytes U&E), serum	5ml Clotted		4-6 hours
Urea, urine	24 hour urine in plain bottle		12 hours
Uric Acid	5ml Clotted		4-6 hours
Valproic Acid	5ml Clotted	Sample should be taken pre dose. Please indicate dose and time since last dose on request form. Only indicated for compliance checking.	4-6 hours
Vancomycin	5ml Clotted	Sample should be collected pre-dose.	4-6 hours
Vasoactive Intestinal Peptide (VIP)	2x 4ml EDTA	See Gut Hormones	2-4 weeks
Very long chain fatty acids (VLCFA)	2ml Lithium heparin	Send sample straight to lab Sent to Birmingham Children's Hospital	2-3 weeks
Vitamin A	5ml Clotted	Sent to City Hospital	1-2 weeks
Vitamin B1 (Thiamine), B2 or B6	6ml Lithium heparin or 4ml EDTA	**Send sample straight to lab, and protect from light.** Please discuss with Clinical Biochemist prior to requesting as these tests are not routinely available and patient must have specific symptoms of deficiency. Sent to Rotherham Hospital and	2-3 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
		St Thomas' Hospital B2)	
Vitamin B12	5ml Clotted		4-6 hours
Vitamin C	6ml Lithium heparin	**Must be received in lab within 30 minutes of collection** Please don't request if patient has raised CRP, Vitamin C is affected by acute phase response. **Please discuss with Clinical Biochemist prior to requesting if patient not to be bled at UHCW**. Sent to Rotherham Hospital	4 weeks
Vitamin D 25-Hydroxycholecalciferol	5ml Clotted		4-6 hours
Vitamin D3 1,25-dihydroxycholecalciferol.	5ml Clotted	Sent to Norwich Hospital	2-3 weeks
Vitamin E	5ml Clotted	Sent to City Hospital	1-2 weeks
Vitamin K	5ml Clotted	**Sample must be protected from light** Test not routinely available Sent to St Thomas' Hospital	2-3 weeks
White cell Enzymes (e.g. Fabrys, Pompes)	2x 4ml EDTA	Please state which enzyme required, samples must be sent to BCH on morning of collection, please ensure sample in lab by 10am Mon-Thurs. Please contact Clinical Biochemist before requesting. NB. For Fabry and Pompe screen just require 1x EDTA and can be sent at any time as blood spot method used. Sent to Birmingham Children's Hospital	2-3 weeks
Xanthochromia (CSF spectrophotometry for bilirubin and haemoglobin)	CSF in sterile universal sample 4	**Transport to laboratory immediately after collection and protect from light.** Do NOT send in the air-tube. At least 0.5 ml of CSF required. Please also request CSF protein, and serum bilirubin and total protein.	1 hour
Zinc	6ml Trace element tube	Sent to City Hospital	1 week

Coventry and Warwickshire Pathology Services

IMMUNOLOGY SAMPLE REQUIREMENTS AND REFERENCE RANGES

Test	Sample Type	Reference Range Reported as Negative/Positive if no range quoted	Units	Turnaround Time
Acetylcholine Receptor Antibody	5ml Clotted			2-3 weeks Sent to Oxford Immunology
Adrenal Antibodies	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
Anaesthetic Drug Reactions Samples should be taken at 0 hrs (time of incident), 3 hrs and 24 hrs post incident for tryptase analysis.	5ml Clotted	<13	ug/L	1 week Sent to Birmingham Immunology
Antineutrophil Cytoplasmic Antibody (ANCA) Myeloperoxidase Proteinase 3	5ml Clotted	 <5.0 <3.0	 kU/L kU/L	24 hours (Monday to Friday)
Antinuclear Antibody (ANA) (CTD screen Includes dsDNA, Sm, RNP,Ro,La,Scl-70,Jo-1,Centromere, Fibrillarin, RNA polymerase111, ribosomal P proteins, PM-SCL, PCNA, Mi-2)	5ml Clotted			2-3 days
Aquaporin 4 antibodies (NMO)	5ml Clotted	`		2-3 weeks Sent to Oxford Immunology
Aspergillus pptns	5ml Clotted	<40	mg/L	1-2 weeks Sent to Birmingham Immunology
Autoimmune encephalitis syndrome screen (GABA B1 R, glutamate R (NMDA R, AMPA1/2 R, VGKC complex, DPPX abs)	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
Avian pptns (Budgie, Pidgeon)	5ml Clotted	Budgie <8 Pigeon <38	mg/L	1-2 weeks Sent to Birmingham Immunology
Beta-2 glycoprotein (B2GP1) Antibodies	5ml Clotted	<20	EU/ml	1-2 weeks Sent to Birmingham Immunology

Basal Ganglia Antibodies	5ml Clotted			2-3 weeks Sent to UCL
BP180/230 antibodies (Pemphigoid)	5ml Clotted	BP180 <20 BP230 <10	U/ml	2-3 weeks Sent to St John Institute of Dermatology
Brain Antibodies (Yo, Ma, Ta, Hu, GAD, CV2,amiphysin, SOX1, Tr (DNER), Zic4))	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
C1 Esterase Inhibitor	5ml Clotted	0.195-0.345	g/L	1-2 weeks Sent to Birmingham Immunology
C1q Antibodies	5ml Clotted	<15	U/ml	2-3 weeks Sent To Birmingham Immunology
C1q complement component	5ml Clotted – Straight to lab	0.08-0.15	g/L	2-3 weeks Sent toPRU, Sheffield
C2	5ml Clotted	10-80	mg/L	3-4 weeks Sent to PRU, Sheffield
C3d	4ml EDTA – Straight to lab	<3	mg/L	4-5 weeks Sent to PRU, Sheffield
C3 Nephritic factor Only indicated if C3 low	5ml Clotted –			2-3 weeks Sent to PRU, Sheffield
Cardiolipin Antibodies IgG (antiphospholipid antibodies) IgM	5ml Clotted	<10 <10	kU/L kU/L	1 week
Cyclic Citrullinated Peptide antibodies (CCP)	5ml Clotted	<5	kU/L	24 hours
Centromere Antibodies	5ml Clotted			2-3 days
CH50	5ml Clotted Straight to lab after collection	23-46	U/ml	2-3 weeks Sent to PRU, Sheffield
Coeliac Antibodies: Transglutaminase IgA and IgG	5ml Clotted	<5	kU/L	2-3 days
Collagen Type 11 Antibodies	5ml Clotted			Sent to PRU, Sheffield
Complement function; Classical (CH100) or alternative pathway	5ml Clotted Straight to lab after collection			2-3 weeks Sent to PRU, Sheffield

Complement C3	5ml Clotted	Newborns 0.60–1.10 g/L 3 months 0.70–1.20 g/L 6 months 0.70–1.40 g/L 9 months 0.80–1.40 g/L 12 months 0.80–1.50 g/L 2–10 years 0.80–1.50 g/L 12–18 years 0.90–1.60 g/L 20 years 0.80–1.60 g/L 30 years 0.80–1.60 g/L 40–70 years 0.90–1.70 g/L	g/L	4-6 hours
Complement C4	5ml Clotted	0.12-0.36	g/L	4-6 hours
double stranded DNA Antibodies (dsDNA) Positive samples are also tested on Crithidea to improve specificity of the test	5ml Clotted	<15	kU/L	2-3 days
Desmoglein DG1/DG3 antibodies (Pemphigus)	5ml Clotted	<30	U/ml	2-3 weeks Sent to St John Institute of Dermatology
Endomysial antibodies Test will be added by lab on TTG results > 10 xULN	5ml Clotted			2-3 weeks Sent to Sheffield Immunology
Epidermal/skin antibodies	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
Extractable Nuclear Antibodies (ENA) JO-1, Ro, La, SCL 70,nRNP,Sm	5ml Clotted			2-3 days
Functional Antibodies: Pneumococcal H. influenza b Tetanus toxoid	5ml Clotted	 Optimal > 0.1 Optimal > 1.0 Minimal >0.15	 mg/L IU/ml µg/ml	3-4 weeks Sent to Heartlands Hospital
GAD antibodies	5ml Clotted	<10	IU/ml	1-2 weeks Sent to Birmingham Immunology

Ganglionic ACR Antibodies	5ml Clotted			3-4 weeks Sent to Oxford Immunology
Ganglioside Antibodies (GM1, GM2, GD1a, GD1b and GQ1b)	5ml Clotted			2-3 weeks Sent to Birmingham Immunology
Gastric Parietal Cell Antibodies	5ml Clotted			3-4 days
Glomerular Basement Antibodies (Quantitative)	5ml Clotted	<10	kU/L	24 hours
Glycine receptor Antibodies	5ml Clotted			4-5 weeks Sent to Oxford Immunology
Histone Antibodies	5ml Clotted	0-40	U/ml	2-3 weeks Sent to Sheffield PRU
HMGCR antibodies	5ml Clotted	<15	U	Sent to Immunology Oxford
HU/YO/RI (Neuronal/paraneoplastic)	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
IgE (total)	5ml Clotted	Age related	kU/L	24 hours
IgE (specific)	5ml Clotted			2-3 days or 1-3 weeks if sent away to PRU Sheffield
IgG Subclasses (IgG4)	5ml Clotted	Age dependent		1-2 weeks Sent to Birmingham Immunology
IGLON5 Antibodies	5ml Clotted			2-3 weeks Sent to Oxford Immunology
Interferon gamma release assay (IGRA) for latent TB (Quantiferon)	4 specific Quantiferon tubes – available from specimen reception or hospital phlebotomy department			1-2 weeks Sent to Heartlands Hospital Please use specific request form available from lab
Insulin Antibodies	5ml Clotted	0-5	mg/L	1-2 weeks Sent to Sheffield PRU
Intrinsic Factor Antibodies Only analysed if GPA positive	5ml Clotted			1-2 weeks Sent to Birmingham Immunology

Islet Cell Antibodies	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
Islet Antigen 2 (IA-2) antibodies	5ml Clotted	<10	IU/ml	1-2 weeks Sent to Sheffield PRU
Liver, Kidney, Microsomal Abs	5ml Clotted			3-4 days
Liver blot antibodies (M2, gp210, Sp100, LKM, LC-1, SLA/LP and f-Actin abs)	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
LRP4 Antibodies	5ml Clotted			2-3 weeks Sent to Oxford Immunology
Lymphocyte Activation Markers	4ml EDTA Phone lab to arrange			1-2 weeks Sent to Heartlands Hospital
NMDA receptor abs -part of AIESS	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
Mannose binding lectin	5ml Clotted	1.0-4.0	mg/L	1-2 weeks Sent to Sheffield PRU
MAG Antibodies	5ml Clotted			1-2 weeks Sent to Birmingham Immunology
Mitochondrial M2 antibodies	5ml Clotted	0-10	EU/ml	1-2 weeks Sent to Birmingham immunology
Mitochondrial Antibodies	5ml Clotted			3-4 days
MOG Antibodies (Myelin Oligodendrocyte Glycoprotein)	5ml Clotted			2-3 weeks Sent to Oxford Immunology
MUSK Antibodies (Muscle specific tyrosine kinase)	5ml Clotted			2-3 weeks Sent to Oxford Immunology
Myocardial Antibodies	5ml Clotted			2-3 weeks Sent to Birmingham Immunology
Myositis specific Antibodies (Hep2, Centromere, EJ, Jo1, Ku, Mi2, OJ, PL12, PL7, PM SCL100, PM SCL75, SRP, MDAS, NXP-2, Ro52, SAE-1, TIF-gamma)	5ml Clotted			2-3 weeks Sent to Sheffield PRU

Neutrophil function tests: Adhension Respiratory burst for CGD	5ml lithium heparin with transport control **Phone 02476965 478 to arrange**			1-2 weeks Sent to Heartlands Hospital
Nuclear Antibody (ANA) (CTD screen Includes dsDNA, Sm, RNP,Ro,La,Scl-70,Jo-1,Centromere, Fibrillarin, RNA polymerase111, ribosomal P proteins, PM-SCL, PCNA, Mi-2)	5ml Clotted			2-3 days
Ovarian Antibodies	5ml Clotted			2-3 weeks Sent to Birmingham Immunology
Paranodal/Nodal abs	5ml Clotted			3-4 weeks Sent to Neurosciences, Oxford
Phospholipase A2 Antibody, (PLA2R)	5ml Clotted	<14 Negative 14-20 Borderline >20 Positive	RU/ml	2-3 weeks
Retinal abs (Recoverin and anti-enolase abs)	5ml Clotted			2-3 weeks National Hospital for Neurology
Rheumatoid Factor	5ml Clotted	<14	kU/L	4-6 hours
Salivary Duct Antibodies	5ml Clotted			2-3 weeks Sent Sheffield PRU
Scleroderma antibodies (Rheumatology requests only)	5ml Clotted			2- 3 weeks Sent to Cambridge Immunology
Smooth Muscle Antibodies	5ml Clotted			3-4 days
Soluble CD25	5ml Clotted	<2500	pg/ml	2-3 weeks Sent to GOSH
Thyroid Peroxidase Antibodies	5ml Clotted	≤60	kU/L	2-3 days
Tryptase	5ml Clotted	<13	ug/L	1 week Sent to Birmingham Immunology
TSH receptor abs	5ml Clotted	<0.9	IU/L	1-2 weeks Sent to Sheffield PRU

Voltage gated calcium channel antibodies (VGCC)	5ml Clotted			3-4 weeks Sent to Oxford Immunology
Voltage gated potassium channel antibodies (VGKC) – part of AIESS	5ml Clotted			2-3 weeks Sent to Birmingham Immunology
ZnT8 antibodies (Zinc transporter 8 abs)	5ml Clotted	<15	U/ml	1-2 weeks Sent to Sheffield PRU

BIOCHEMISTRY REFERENCE RANGES

Test	Sex	Reference Range	Units	Comments
ACTH	B	<30 ng/L (9am) <10 ng/L (Midnight)	ng/L	Adult reference range
Active B12	B	>70	pmol/L	25-70 referred for MMA testing
Acylcarnitines	B	Carnitine (free): 13-52 Acyl carnitines: Interpretative comment provided	μmol/L	
Adalimumab level and abs	B	Trough level >5	Ug/ml	Antibodies only measured if result <5
Adrenaline (urine free)	B	<100	nmol/24 hr	Paed ref ranges printed on report
Alphafetoprotein (AFP)	B	<7	kU/L	
Alanine Transaminase (ALT)	B	10-49	U/L	
Albumin Albumin/Creatinine ratio (ACR)	S/B U/B M F	35-50 Up to 1 yr 30-45 1-16 yrs 30-50 <20 <2.5 <3.5	g/L mg/L mg/mmol Creatinine	 Proteinurea: Albumin >200 mg/L, albumin/crt ratio >30 mg/mmol
Alcohol	B		mg/Dl	
Aldosterone	B	Up to 630	pmol/L	For samples taken at random throughout the day
Aldosterone/Renin ratio	B	<1000 Hyperaldosterism unlikely 1000-2000 Equivocal >2000 Consistent with Primary Hyperaldosteronism		ACE-I, ARBs and diuretics may lower ARR. Beta-blockers, alpha 2 antagonists, NSAIDS and calcium channel blockers may increase ARR.
Alkaline Phosphatase (ALP)	B	30-130 Neonate 70-380 Infant-16y 60-425	U/L	
Alkaline Phosphatase Isoenzymes	B	Interpretative comment provided		
Alpha-1- Antitrypsin	B	1.1-2.1	g/L	Genotyped if total <1.4 g/L and informed patient consent
Alpha-1-antitrypsin genotyping	B	Interpretative comment provided		
Aluminium	B	<0.37	μmol/L	Desirable result in CRF: <2.22

Test	Sex	Reference Range	Units	Comments
Amikacin	B	<5.0	mg/L	Pre-dose level
Amino Acids (urine and plasma)	B	Interpretative comments provided		
Amiodarone (Desethylamiodarone)	B	0.5 - 2.0 0.5 - 2.0	mg/L	Pre-dose target level
Ammonia	B	Sick/premature <150 Neonate <100 Infant-16 y <50 Adult 11-32	μmol/L	
Amylase	S/B U/B	30-118 <<650	U/L U/L	
Amyloid A	B	<10	mg/L	
Androstenedione		Neonates <8 Males (1-9y Tanner stage 1) <1.1 Females (1-9y Tanner stage 1) <1.8 Males T2 <0.3-1.7 Females T2 0.5-4.8 Males T3 0.5-3.0 Females T3 1.3-7.8 Males T4+5 0.9-3.7 Females T4+5 1.2-7.1 Males (18-40y) 1.1-4.7 Males ((40-67y) 0.8-3.1 Females (18y/pre meno) 0.9-7.5 Females (post menopausal) 0.4-2.9	nmol/L	Females and Males (9-18y), changes significantly during puberty, interpret in relation to Tanner stage.
Angiotensin Converting Enzyme	B	20-70	U/L	
Antibiotic level (e.g. Teicoplanin, Rifampicin)	B	https://www.nbt.nhs.uk/sites/default/files/document/Antibiotic%20Guideline%20Ranges%202021%20-%202022b%20%28gpulse%29.pdf		Please see:guidelines of Antimicrobial Referral lab website
Antifungals (e.g. Itraconazole)	B	https://www.gov.uk/guidance/mycology-reference-laboratory-mrl-reference-and-diagnostic-services#assay-results-interpretation		Please see ranges on Mycology reference lab website

Test	Sex	Reference Range	Units	Comments
Antenatal Screen for Downs Syndrome, T13 and T18	F	Full risk calculation and interpretation provided on report.		All screen positive results are phoned to Antenatal screening coordinator.
Antidiuretic Hormone	B	Interpretative comment provided		
Anti Mullerian hormone (AMH)	F	20-24y 11.9-67.8 25-29y 8.4-65.4 30-34y 4.8-53.9	pmol/L	
Apolipoprotein A	M F	1.10 – 2.05 1.25 – 2.15	g/L	
Apolipoprotein B	M F	0.55-1.40 0.55-1.25	g/L	Apo B/Apo A-I ratio Male 0.35 – 1.00 Female 0.30 - 0.90
Apolipoprotein E genotype	B	Interpretative comment provided		
Aspartate Transaminase (AST)	B	<34	U/L	
Bence Jones Protein (urine free light chains)	B	Interpretative comment provided		
Beta-2-microglobulin	B	1.00-2.40	mg/L	
Bicarbonate	B	22-29	mmol/L	
Bilirubin (Total)	B	<21	μmol/L	
Bilirubin (conjugated)	B	<7	μmol/L	≤25 Well neonates with prolonged jaundice (NICE CG98) <7 and/or <20% for total bilirubin in Gilbert's syndrome (NICE CKS Gilbert's syndrome)
Bile Acids	F	<14	umol/L	Range relates to third trimester of pregnancy
Biotinidase	B	2.5-10.5	nmol/PABA/min/ml	
Blood gases	B	H^+ 35-45 pH 7.38-7.42 pO_2 12-15 pCO_2 4.5-6.1 HCO_3 22-27 Osat 90-100	nmol/L kPa kPa mmol/L	Air bubbles will invalidate results, samples with air bubbles will not have pO_2 and saturation reported.
Brain Natriuretic peptide (NT-proBNP)	B	No ranges reported	pmol/L (ng/L)	**<47 pmol/L (<400 ng/L**) Normal; Heart Failure unlikely **47 – 236 pmol/L (400-2000 ng/L)** Raised;

Test	Sex	Reference Range	Units	Comments
				Uncertain diagnosis, ECG and specialist assessment and within 6 weeks **>236 pmol/L(>2000 ng/L)** High; Heart failure likely, ECG and specialist assessment within 2 weeks (NICE guideline 108, Aug 2010)
Brivaracetam	B	0.2-2.0	mg/L	
CA 125	F	≤35	kU/L	
CA 15-3	F	≤28	kU/L	
CA 19-9	B	≤33	kU/L	
Cadmium	B	Non-smoker <9 Smoker <27	nmol/L	Significant exposure >90
Caeruloplasmin	B	0.20 - 0.60	g/L	
Caffeine	B	12 - 36	mg/L	
Calcium (adjusted)	S/ B U/B	2.17-2.56 (Adjusted) Neonate 2.00-2.70 (total) Infant-16y 2.20-2.70 (total) 2.5-7.5	mmol/L mmol/24h mmol/24h	
Calcitonin	B	<10	ng/L	
Calprotectin (faecal)	B	1-6 months <538 6 months to 3 years <214 3-4 years <75 4-18 years <80 >18 years <100	ug/g	**<100 ug/g** Inflammatory bowel disease unlikely. IBS likely, treat according to local guidelines. If a repeat test: IBS likely. If IBD monitoring: Low risk of clinical relapse. **100 – 250 ug/g** Exclude infection. Repeat calprotectin within 2-4 weeks. If a repeat test: Refer

Test	Sex	Reference Range	Units	Comments
				routinely to Gastroenterology. If IBD monitoring: May indicate need for tighter control to assess disease development **> 250 ug/g** Exclude infection. Repeat calprotectin within 2-4 weeks. If a repeat test: Refer urgently to Gastroenterology. If IBD monitoring: Consider repeat. If levels remain high, perform further investigative procedures.
Carbamazepine	B	4-12	mg/L	Therapeutic range refers to pre-dose samples. 2-4 days to achieve steady state.
Carbohydrate deficient transferrin (CDT)	B	<2.6	%	
Carboxyhaemoglobin	B	Non-smokers <1.5 Smokers <5 Heavy smokers <9	%	> 20% indicates significant exposure.
Carcinoembryonic Antigen (CEA)	B	<2.6	µg/L	Reference range for non-smokers
Carnitine (free)	B	15-53	µmol/L	
Carotinoids	B	Alpha carotene 0.0-0.25 Beta-carotene 0.19-0.89	µmol/L	
Chitotriosidase	B	0.1-2.5	umol/min/L	
Cholesterol (Total)	B	No range reported	mmol/L	
Cholinesterase (suxamethonium sensitivity)	B	>5300	IU/L	The laboratory takes responsibility for informing the patient if

Test	Sex	Reference Range	Units	Comments
				sensitive and marking notes.
Cholinesterase activity (red cell)	WB	4260-11250	IU/L	Please note cholinesterase activity is affected by age, gender, liver disease, pregnancy and geographical area.
Chromogranin A	B	<60	pmol/L	
Citrate (urine)	M F M F	0.6-4.8 1.3-6.0 Citrate: creatinine ratio 0.04-0.33 0.11-0.55	mmol/24h mmol//mmol	
Chloride	S/B U/B	95-108 110-250	mmol/L mmol/24h	
Chromium	B	<40	nmol/L	MHRA threshold (7ppb) for patients with MoM hip joints = 135
Clozapine	B	350-600	ug/L	Non-compliance, suboptimal dose <350 Maximum drug efficacy 350-600 Increased risk of side effects >600
Cobalt	B	<10	nmol/L	MHRA threshold (7ppb) for patients with MoM hip joints = 120
Copper	S/B U/B	11-25 <0.8	µmol /L µmol/24h	
Cortisol	S/B U/B Saliva	7-9am145-619 <130 7-9am 3.2-22.8 11pm-12midnight <3.2	nmol/L nmol/24h nmol/L	
C-peptide	B	Interpretation provided.		
C-reactive Protein (CRP)	B	<10	mg/L	
C-terminal peptide (CTX)	B	0.1-0.5	µg/L	Age related reference ranges in children
Creatine Kinase (CK)	M F	46-17 134-145	U/L	Values up to 2x upper reference value can been seen in Afro-Caribbean population
Creatinine	SM SF	59-104 45-84 0 - <14days M 27 -	µmol/L	

Test	Sex	Reference Range	Units	Comments
		81 F 27 - 81 14d - <1yr M 14 - 34 F 14 - 34 1 - <3yr M 15 - 31 F 15 - 31 3 - <5yr M 23 - 37 F 23 - 37 5 - <7yr M 25 - 42 F 25 - 42 7 - <9yr M 30 - 48 F 30 -48 9 - <11yr M 28 - 57 F 28 - 57 11yr M 36 - 64 F 36 - 64 12yr M 36 -67 F 36 - 67 13yr M 38 - 76 F 38 - 74 14yr M 40 - 83 F 43 - 75 15yr M 47 - 98 F 44 - 79 16yr M 54 - 99 F 48 - 81 UM UF 8.4-22.0 5.3-15.9	mmol/24h	
Creatinine Clearance	B	70-120	mL/min	
Cryoglobulins	B			
Cyclosporin	B	No range reported	µg/L	
Cystatin C	B	<3m <1.71 3m-50y <1.00 >50y <1.40	mg/L	
7-Dehydrocholesterol	B	Interpretative comment provided	µmol/L	
Dehydro-epiandrosterone Sulphate (DHEAS)		M 2-3 years <0.08-0.6 F 2-3 years <0.08-0.6 M 4-9 years <0.08-2.4 F 4-9 years <0.08-2.9 M 10-14 years 1.0-7.3 F 10-14 years 0.9-6.7 M 15-21 y 2.8-14.2 F 16-21 year 2.7-	µmol/L	

Test	Sex	Reference Range	Units	Comments
		11.2 M 0.94 – 15.44 F 0.70 – 12.49		
11-deoxycortisol	B	5.0-12.1	nmol/L	
Digoxin	B	0.8-2.0	µg/L	6 to 24 h post dose. 5 - 6 days to steady state.
Dihydrotestosterone (DHT)	M F	0.86-3.40 <1.27 <0.62 (post menopausal)	nmol/L	These are adult ref ranges. Paediatric ranges printed on report.
Dopamine (urine)	B	<3500	nmol/24hr	Paed ref ranges printed on report
DPD deficiency	B	Tested for 4 DPYD common variants.		
Drugs of Abuse (urine)	B			Urine creatinine <1.7 mmol/L suggests specimen dilution.
eGFR	B	>60	ml/min/ 1.73 m^2	>60 indicates normal kidney if no proteinuria, haematuria, or abnormal kidneys on USS. UK CKD guidelines are available at www.renal.org
Elastase 1 (faecal)	B	Normal >200 Moderate pancreatic insufficiency 100-200 Severe pancreatic insufficiency <100	µg/g stool	
ELF	B	Interpretation on report		
Erythropoietin (EPO)	B	5.0-25.0	U/L	
Ethanol	B		mg/dL	
Ethosuxamide	B	40-100	mg/L	
Ethylene glycol	B			
Everolimus	B			No ranges reported with result
Ferritin	M F	22-322 10-291	µg/L	
FIT (faecal immunochemical test)	B	Reported as: <10: No excess blood detected in faeces. Follow up according to symptoms and check Haemoglobin and consider for routine referral.	µg Hb/g faeces	

Test	Sex	Reference Range	Units	Comments
		>10: patient may have already been referred on 2ww (secondary care will action). If not referred please refer on a 2ww proforma.		
Flecainide	B	200-800	µg/L	
Folate	B	>5.38	µg/L	
Follicle Stimulating Hormone. (FSH)	M F	Males 13–70 years 1–18 Paediatric Male 2–3 y < 1 4–9 y < 2.0 10–11 y < 5 12–21 y 1–8 Female: Follicular Phase 3–10 Midcycle Peak 3–33 Luteal Phase 2–9 Postmenopausal 23–116 Paediatric Female 2–3 y 1–5.0 4–9 y < 5.0 10–11 y 1–9 12–21 y 2–10	IU/L	
Free fatty acids	B	Interpretative comment provided (depends on glucose result). FFA:3OHB ratio <2	µmol/L	
Fructosamine	B	200-285	µmol/L	
Free light chains	B	Kappa 3.30-19.40 Lambda 5.70-26.30 Kappa/lambda 0.26-1.65	mg/L	
Galactosaemia screen (GAL-1-PUT)	B	Interpretative comment provided.		
γ-Glutamyl Transferase (GGT)	M F	<73 <38	IU/L	
Gastrin	B	<40	pmol/L	
Gentamicin	B	<1.0	mg/L	Pre-dose level.
Glucagon	B	<50	pmol/L	
Glucose	B CSF	3.0-5.6 Approx. 80% of serum value	mmo/L	Fasting venous serum ≥7.0 or random ≥11.1 consistent with diabetes in symptomatic adults

Test	Sex	Reference Range	Units	Comments
Glucose Tolerance Test (GTT)	B	See protocol on page 83 for interpretation		
Glucose-6- Phosphate Dehydrogenase (G6PD)	WB	4.6-13.5	U/g Hb at 30 °C	
Growth Hormone (GH)	M F	≤9 ≤24	mIU/L	IST at least one result greater than 17 mU/L. GGT at least 1 result below 5.5 mU/L
Gut Hormones	B	VIP <30 PP <300 Gastrin <40 Glucagon <50 Somatostatin <150 Neurotensin <100 Chromogranin A <60 Chromogranin B <150	pmol/L	
Haemochromatosis gene	B			Analyse for C282Y, H63D and S65C mutations.
Haptoglobin	B	0.4-2.8	g/L	
Hb_{A1c} (glycated haemoglobin)	B	<48	mmol/mol	DIAGNOSIS OF DIABETES MELLITUS: HbA1c of 48 mmol/mol and above is diagnostic of DM (WHO 2011) 42-47 mmol/mol indicates high risk of DM (NICE Guidance PH38 2012) MONITORING OF DIABETES MELLITUS (Adults): Type 2 target values: 48 mmol/mol - 57 mmol/mol (NICE Guideline NG28) Type 1 target values: 48 mmol/mol or lower (NICE Guideline NG17)
HDL- Cholesterol	M F	Ideally >1.0 Ideally >1.2	mmol/L	
Heavy metal screen	B	Reported as Detected or Not detected		
Homocysteine	B	4-14	µmol/L	Patients with raised Homocysteine levels

Test	Sex	Reference Range	Units	Comments
				may benefit from folate supplementation.
Human Chorionic Gonadotrophin (hCG)	B	<5	IU/L	Reference range for Adult males and non-pregnant females
3-hydroxybutyrate	B	Interpretative comment provided	μmol/L	
5-Hydroxy Indoleacetic Acid (5HIAA)	B	<40	μmol/24h	5HIAA is affected by diet; levels can increase following ingestion of pineapples, bananas and some nuts.
17-Hydroxy-progesterone	M F	Neonate (>48hrs) <8 Tanner Stage 1 M and F <5.0 Adult 1.2-5.0 Adult 0.6-4.0 Follicular 1.0-6.0 Luteal	nmol/L	
Immunoglobulin A	B	0-2 weeks <0.15 - 0.08 2-6 weeks 0.02 - 0.15 6-12 weeks <0.15 - 0.4 3-6 months <0.15 - 0.5 6-9 months 0.15 - 0.7 9-12 months 0.2 - 0.7 1-2 years 0.3 - 1.2 2-3 years 0.3 - 1.3 3-6 years 0.4 - 2.0 6-9 years 0.5 - 2.4 9-12 years 0.7 - 2.5 12-15 years 0.8 - 2.8 15-45 years 0.8 - 2.8 Over 45 years 0.8 - 4.0	g/L	
Immunoglobulin G	B	0-2 weeks 5.0 - 17.0 2-6 weeks 3.9 - 13.0 6-12 weeks 2.1 - 7.7 3-6 months 2.4 - 8.8 6-9 months 3.0 - 9.0 9-12 months 3.0 - 10.9	g/L	

Test	Sex	Reference Range	Units	Comments
		1-2 years 3.1 - 13.8 2-3 years 3.7 - 15.8 3-6 years 4.9 - 16.1 6-9 years 5.4 - 16.1 9-12 years 5.4 - 16.1 12-15 years 5.4 - 16.1 15-45 years 6.0 - 16.0 Over 45 years 6.0 - 16.0		
Immunoglobulin M	B	0-2 weeks <0.08 - 0.2 2-6 weeks 0.08 - 0.4 6-12 weeks 0.15 - 0.7 3-6 months 0.2 - 1.0 6-9 months 0.4 - 1.6 9-12 months 0.6 - 2.1 1-2 years 0.5 - 2.2 2-3 years 0.5 - 2.2 3-6 years 0.5 - 2.0 6-9 years 0.5 - 1.8 9-12 years 0.5 - 1.8 12-15 years 0.5 - 1.9 15-45 years 0.5 - 1.9 Over 45 years 0.5 - 2.0	g/L	
Infliximab level and antibodies	B	Trough level >1	ug/ml	Antibodies only measured if level <1
Inhibin	F	Inhibin A Male <3.6 Post menopausal: <3.6, Values in the premenopausal female vary with the stage of cycle 5-160 Inhibin B Male 25-325 Post menopausal: 0-4 Values in the premenopausal female vary with the stage of cycle 0-341	pg/ml	
Insulin	B	Interpretative comment provided (depends on glucose	pmol/L	

Test	Sex	Reference Range	Units	Comments
		result).		
Insulin like growth Factor 1 (IGF 1)		Males 0-3 y <2.0 – 16.8 4-6 y 2.9-27.0 7-9y 5.2-33.2 10-11 y 9.0-41.1 12-13 y 18.6-65.8 14-15 y 23.0-65.9 16-18 y 22.5-53.8 Females 0-3 y <2.3-22.4 4-6 y 4.6-30.2 7-9 y 7.4-36.0 10-11 y 15.3-58.2 12-13 y 22.1-68.5 14-15 y 24.8-64.5 16-18 y 24.7-55.8 19-21 y 15.2-42.0 22-24 y 12.9-37.6 25-29 y 10.9-33.8 30-34 y 9.23-30.4 35-39 y 8.2-29.0 40-44 y 7.5-28.5 45-49 y 6.9-28.0 50-54 y 6.2-27.2 55-59 y 5.9-27.3 60-64 y 5.6-28.6 65-69 y 5.2-29.3 70-79 y 4.6-28.1 80-90 y 4.0-27.0	nmol/L	
	B			
IGF Binding Protein 3 (IGFBP 3)			mg/L	Age and sex related ranges printed on report.
Iron	M F	11.6-31.3 9.0-30.4	μmol/L	4 hours post ingestion toxicity: Mild <55 Moderate <55-90 Severe >90
Isoniazid	B	3-5	mg/L	For peak levels for a daily dose regimen.
Lactate	B/S B/C	0.5 - 2.2 0.6-2.2	mmol/L	
Lactate Dehydrogenase (LDH)	B	120-246	U/L	
Lamotrigine	B	1 - 4	mg/L	Some patients may benefit from concentrations up to 15 mg/L
LDL-Cholesterol	B		mmol/L	

Test	Sex	Reference Range	Units	Comments
Lead	B	<0.10	µmol/L	
Levetiracetam	B	10-40	mg/L	
Lipase	B	5-65	IU/L	
Lipoprotein (a)	B	<75	nmol/L	
Lithium	B	0.4-1.0	mmol/L	5 days to steady state. Sample 12 hours post-dose.
Luteinizing Hormone (LH)	M F	Male 20–70 years 2–9 > 70 years 3–35 Paediatric Male: 2–3 y < 1.0 4–9 y < 1.0 10–12 y < 3.0 13–21 y 1.0–7 Adult Female: Follicular phase 2–13 Midcycle peak 9–76 Luteal phase 0.5–17 Postmenopausal 8–54 Paediatric Female 2–3 y < 1.0 4–9 y < 1.0 10–12 y < 12 13–21 y 1.0–52	IU/L	
Lysosomal enzymes		Reference ranges printed on report		
Magnesium	S/B U/B	0.7-1.0 <4 weeks 0.6-.1.0 1-16 years 0.7-1.0 2.4-6.5	mmol/L mmol/24h	
Manganese	B	<1 year 120-325 >1 year 73-210 Increased risk of toxicity >360	nmol/L	
Mercury (urine)	B	<6	nmol/mmol creatinine	
Methaemoglobin	B	<2	%	
Metabolic Screen (urine)	B	Interpretative comment provided		
Metanephrines (plasma)	B	Metanephrine <510 Normetanephrine <1180 3-Methoxytyramine <180	pmol/L	

Test	Sex	Reference Range	Units	Comments
Methanol	B			
Methotrexate	B		µmol/L	Depends on administration protocol used.
Methyl Malonic acid	B	≤65 yrs 0-280 >65 yrs 0-360	nmol/L	
Mucopolysaccaride Screen (urine)	B	Interpretative comment provided		Reference ranges for glycoaminoglycans printed on report.
Mycophenolate	B		mg/L	
Noradrenaline (urine free)	B	<600	nmol/24h	Paed ref ranges printed on report
Neurone-specific enolase	B	<16.3	µg/L	
Neurotensin	B	<100	pmol/L	
Oestradiol	M F	Males Not detected - 146.1 Females Follicular phase 71.6 - 529.2 Midcycle 234.5 - 1309.1 Luteal Phase 204.8 - 786.1 Postmenopausal female (untreated) Not detected - 118.2	pmol/L	
Oligoclonal Bands (CSF and serum)	B	Interpretative comment provided.		
Oligosaccharides (urine)	B	Interpretative comment provided.		
Organic Acids (urine)	B	Interpretative comment provided.		
Osmolality	S/B U/B	275 - 295 50 - 1200	mmol/Kg mmol/Kg	Urine value is dependent on fluid intake.
Oxalate (urine)	U/B	100-460 (adults) Oxalate: creatinine ratio 0-6 months <291 7-23 months <220 2-4 y <143 5-11y <76 12-17y <44 >18y M <33 >18y F <45	µmol/24h µmol/ mmol creatinine	
Pancreatic Polypeptide (PPP)	B	<300	pmol/L	
Paracetamol	B	No range reported	mg/L	

Test	Sex	Reference Range	Units	Comments
Parathyroid Hormone (PTH)	B	2.0-8.5	pmol/L	
PTH-related peptide (PTHrP)	B	0.7-1.8	pmol/L	
Phenylalanine (PKU monitoring)	B		µmol/L	
Phenobarbitone	B	5-20	mg/L	10 - 20 days to steady state. Therapeutic range refers to pre-dose samples.
Phenytoin	B	5- 20	mg/L	7 - 35 day to steady state. Therapeutic range refers to pre-dose samples
Phosphate	S/B U/B	0.8 - 1.5 4 weeks 1.3-2.6 4 weeks-1 yr 1.3-2.4 1-16 yrs 0.9-1.8 15 - 50	mmol/L mmol/24h	
Phytanic and pristanic acid		See VLCFA		
Placental Alkaline Phosphatase	B	<100	mU/L	
Porphobilinogen (urine)	B	Interpretative comments provided.		
Porphyrins (urine/faecal/blood)	B	Interpretative comments provided.		
Potassium	S/B U/B	Adult 3.5 - 5.3 <4 weeks 3.4-6.0 4 weeks-1 yr 3.5-5.7 1-16 yrs 3.5-5.0 25 - 125	mmol/L mmol/24h	May increase if delay in analysis, EDTA contamination or high platelet count and also affected by haemolysis.
Procollagen type 1 N-terminal peptide (P1NP)	M F	20-76 19-69	µg/L	
Procollagen type 3 peptide (P3NP)	B	1.7-4.2	µg/L	Consider liver biopsy in adult psoriatic patients on methotrexate if: Pre-treatment >8.0 3 samples >4.2 in 12 month period 2 samples >8.0 consecutively. Consider withdrawing methotrexate if 3

Test	Sex	Reference Range	Units	Comments
				samples >10 in a 12 month period. Active erosive arthritis or fractures may raise P3NP.
Progesterone	F		nmol/L	Values above 30 nmol/L are consistent with ovulation.
Prograf (tacrolimus)	B		µg/L	
Prolactin	M F	45-375 59-619	mU/L	Up to 1000 mU/L can occur due to stress.
Prostate Specific Antigen (PSA)	M	<4.0	µg/L	
Protein (Total)	B/S B/C B/U	60-80 0.15 - 0.45 <0.2 <0.15	g/L g/L g/L g/24hr	Urine protein:creatinine ratio >30 mg/mmol in Pregnancy indicates significant proteinuria.
Protein Electrophoresis (serum)	B	Interpretative comments provided.		
Pseudocholinesterase	B	>5300	IU/L	The laboratory takes responsibility for informing the patient if sensitive and marking notes.
Purine and pyrimidines (urine)	B			Reference ranges printed on report
Quinine	B	10-15	mg/L	
Reducing substances (urine and faeces)	B	Interpretative comment provided		
Renin activity	B	0.3-2.2	nmol/L/hr	For samples collected at random throughout the day.
S100 protein	B	<0.2	µg/L	
Salicylate	B	No range reported	mg/L	Therapeutic **<**60 mg/L
Selenium	B	0.9-1.7	µmol/L	
Sex Hormone Binding Globulin (SHBG)	M F	Males <50 years11.54 - 54.49 >50 years17.33 - 71.50 Females <50 years17.69 - 138.26 ≥50 years 23.65 - 110.61	nmol/L	
Sirolimus	B		ng/ml	With cyclosporin or tacrolimus : 4-12 Monotherapy: 12-20
Sodium	B/S B/U	133 - 146 40 – 200	mmol/L mmol/24h	

Test	Sex	Reference Range	Units	Comments
Somatostatin	B	<150	pmol/L	
Steroid Profile (urine)	B	Interpretative comment provided		
Sweat Test	B	<6 months old Chloride: <30 Normal 30-60 Equivocal > 60 CF >6 months old Chloride: <40 Normal 40-60 Equivocal > 60 CF Conductivity: <50 Normal 50-90 Equivocal >90 CF	mmol/L	
Tacrolimus (FK506/Prograf)	B		µg/L	
Tau Protein (fluid)	B	Interpretative comment provided		
Testosterone	M F	Males <50 years 6.9 - 23.2 ≥50 years 6.5 - 23.7 Females <50 0.3 - 1.2 ≥50 <0.2 - 1.3	nmol/L	
Theophylline	B	10 – 20	mg/L	Therapeutic range refers to pre-dose samples
Thiamine	B	66.5-200	nmol/L	
Thiopurine methyltransferase (TPMT)	B	High: >150 Normal: 68-150 Low: 20-67 Deficiency: <10	mU/L	Results not valid if patient has had recent blood transfusion.
Thyroglobulin	B		µg/L	
Thyroid Stimulating Hormone (TSH)	B	Adult 0.55 - 4.78 1-23 months 0.87 - 6.15 2-12 years 0.67 - 4.16 13-20 years 0.48 - 4.17	mU/L	
Thyroxine (Free T4)	B	Adult 11.5 - 22.7 1-23 months 12.1-18.6 2-12 years 11.1 - 18.1	pmol/L	

Test	Sex	Reference Range	Units	Comments
		13-20 years 10.7 - 18.4		
Tobramycin	B	Pre dose: <1.0 Post dose: 8-12	mg/L	
Topiramate	B	5-20	mg/L	
Toxicology (urine/blood)	B			
Transferrin	M F	2.2-3.7 2.5-3.8	g/L	Samples with transferrin saturation greater than 40% will also be analysed for HFE gene if requested.
Transferrin electrophoresis(CGDS)	B	Interpretative comment provided		
Triglycerides	B	<1.7	mmol/L	After a 12 hour fast. Values greater than 2.3 mmol/L require investigation
Tri-iodothyronine (Free T3)	B	Adult 3.5 - 6.5 1 -23 months 5.1 - 8.0 2 -12 years 5.1 - 7.4 13-20 years 4.7-7.2	pmol/L	
Troponin I	B	No range reported	ng/L	If baseline troponin I is less than 3 ng/l OR change at 2 hour is less than 20 ng/L then Myocardial Infarction is unlikely. If troponin I is equal to or greater than 120ng/L OR change at 2 hour is equal or greater than 20 ng/L then Myocardial Infarction is likely, in the appropriate clinical context. Please refer to your local Trust protocol.
Urea	S/B U/B	Adult 2.5 - 7.8 <4 weeks 0.8-5.5 4 weeks-1 yr 1.0-5.5 1-16 yrs 2.5-6.5 430-710	mmol/L mmol/24h	Values can increase significantly over 65yrs.
Uric Acid	S/M S/F	220-547 184-464	µmol/L	

Test	Sex	Reference Range	Units	Comments
	U/B	1.5-4.4	mmol/24h	
Urobilinogen (urine)	B			
Valproic Acid	B	<100	mg/L	
Vancomycin	B	10-20 mg/L For endocarditis, bone, joint and other deep infections, levels should be maintained between 15-20.	mg/L	Pre-dose level.
Vasoactive Intestinal Peptide (VIP)	B	<30	pmol/L	
Very long chain fatty acids (VLCFA)	B	Docosanoate (C22): <1y 22.3-85.4 >1y 30.3-91.6 Tetracosanoate (C24): <1y 19.1-65.9 >1y 25.0-73.5 Hexacosanoate (C26): <1y 0.23-1.05 >1y 0.28-1.34 C24/C22 ratio: 0.68-0.97 C26/C22 ratio 0.005-0.022 Pristanate <1y<0.7 >1y <2.3 Phytanate <1y <5 >1y <18	μmol/L	
Vitamin A	B M F	0-6y 0.7-1.5 7-12y 0.90-1.70 13-19y 0.90-2.50 20-99y 0.77 – 3.95 20-99y 0.99 – 3.35	μmol/L	
Vitamin B1 (Thiamine)	B	66.5-200	nmol/L	
Vitamin B12	B	211-911	ng/L	
Vitamin C	B	26.1-84.6	umol/L	
Vitamin D 25-hydroxycholecalciferol	B	>50	nmol/L	
Vitamin D3 1,25-dihydroxycholec-calciferol.	B	0-1y 77-471 1-3y 113–363 3-19 y 108–246 >19 y 55-139	pmol/L	
Vitamin E	B	0-1y 11.5-24.4 2-6y 7.0-21.0 7-12y 10.0-21.0 13-19y 13.0-24.0 20-99y 9.5-41.5	μmol/L	

Test	Sex	Reference Range	Units	Comments
Vitamin K	B	Vitamin K1 0.15-1.55 PIVKA-11 17.36-50.90	µg/L mAU/ml	
Xanthochromia (CSF spectrophotometry for bilirubin)	B	Interpretative comment provided		
Zinc	B	11-24	µmol/L	<7 May indicate deficiency 7-11 May have no clinical significance

ANTENATAL SCREENING PROGRAMME FOR DOWN'S (T21), EDWARD'S (T18), AND PATAU'S SYNDROME (T13)

The NHS Fetal anomaly screening programme (FASP) offers screening to all eligible pregnant women in England to assess the chance of babies being born with T21, and/or T18 or T13 and a number of physical conditions (unexpected development in the fetus).National policy is to offer screening to assess the chance of the baby being born with T21, T18 or T13. The test of choice for both singleton and twin pregnancies is first trimester combined screening. Women can choose:

- not to have screening
- to have screening for T21, T18 and T13
- to have screening for T21 only
- to have screening for T18 and T13 only

For the combined first trimester test (11 weeks 2 days to 14 weeks 1 day); fBhCG, PAPP-A in serum and Ultrasound nuchal translucency measurement are used to calculate a risk. Those patients who either miss the first trimester time window or in whom it is not possible to measure the nuchal translucency are offered the Quadruple second trimester test at 14 weeks 2 days to 19 weeks 6 days which measures fBhCG, AFP, uE3 and Inhibin A to calculate a risk.
Samples for second trimester screening are sent to Birmingham Women's Hospital for analysis.
Specific antenatal screening programme request forms are in use for this test and must be completed in full. All positive results are communicated to the Antenatal screening coordinator.

CREATININE CLEARANCE AND OTHER 24-HOUR URINE COLLECTIONS

Procedure for collecting 24 hour urine samples

The accurate collection of any timed urine is essential for meaningful results to be obtained.
The bladder should be emptied at the start of the collection period and this urine discarded. All urine, which is now passed, is collected into a plain container until the end of the scheduled collection period. The bladder should be emptied at the end of the collection period and this is included in the collection. The whole of the collection should be sent to the laboratory for analysis together with a 5ml Clotted blood sample taken at some point during the collection period.
Please include the patient's height and weight with all requests so that a correction can be made for body surface area. If the height and weight are not included an average body surface area of 1.73m^2 is used.

CREATININE CLEARANCE

Purpose

To assess renal glomerular function.

Principle

Creatinine production is relatively constant for a given body mass.
It is not significantly secreted or reabsorbed in the renal tubules. Thus its excretion and removal rate from the circulation is a measure of renal glomerular function (i.e. the amount of blood which could theoretically be cleared of a substance per minute).

Patient Preparation

None required.

Calculation

Creatinine clearance = Urine creatinine (umol/l) x Total urine volume (ml)
Serum creatinine (umol/l) x 1440 (minutes in 24 hours)

Interpretation

The reference range for creatinine clearance is 60-120 ml/min. Results for children are lower and can be expressed in terms of the adult body surface area of 1.73 sq.m by multiplying the creatinine clearance results by (1.73 / child's surface area), or using the formula:

Corrected Creatinine clearance = Creat Clearance x 1.73 x (weight in Kg +90)
(4 x weight in kg) + 7

- Impaired glomerular function usually leads to a reduced creatinine clearance although due to the wide range of normality and compensatory mechanisms, a normal Creatinine clearance does not exclude mild renal dysfunction.
- Creatinine clearance tends to overestimate renal function at a very high serum creatinine levels.
- Creatinine clearance tends to decline with age.
- During pregnancy, creatinine clearance rises to a peak of 140-160ml/min by 32 weeks and returns to normal as term approaches.

24 HOUR URINE COLLECTIONS FOR:

- Protein - No preservative required.
- Catecholamines (adrenaline, noradrenaline, dopamine, normetadrenaline, metadrenaline, 3-methoxytyramine) - ACID preservative.
- 5HIAA - ACID preservative.
- Calcium - No preservative required.
- Uric Acid - No preservative needed.
- Stone former screen – No preservative required

NOTE:

Acid bottles are available from CWPS Phlebotomy departments and Pathology Reception.

Creatinine clearance and 24 hour urine protein can be undertaken on the same collection.

ORAL GLUCOSE TOLERANCE TEST PROTOCOL FOR USE BY GP SURGERIES

The diagnosis of diabetes mellitus is made on the basis of an elevated fasting (≥7.0 mmol/l) or post-prandial glucose concentration (≥11.1 mmol/l) *in symptomatic patients* or two elevated concentrations in *asymptomatic patients*.
The oral glucose tolerance test (OGTT) is **not required for diagnosis in the majority of patients.**

Patients with impaired glucose tolerance (random glucose ≥7.8 – 11.0 mmol/L) should have a fasting glucose measured.

Patients with impaired fasting glycaemia (fasting glucose 6.1 – 6.9 mmol/L) should be offered an OGTT to exclude the diagnosis of diabetes.

Gestational Diabetes Mellitus
An oral glucose tolerance test should be performed on patients determined to be at increased risk according to current guidelines.

The diagnosis of gestational diabetes mellitus is made on the basis of oral glucose tolerance test results of elevated fasting (≥5.6 mmol/l) or 2 hour glucose concentration (≥7.8 mmol/l).

Patient preparation

A patient information leaflet should be given when the test is booked

Patients must be told to fast from midnight the night before the test and informed they are allowed to drink ONLY plain water during the fast

Any long-term drug treatments should be taken as usual on the morning of the test. OGTT should be avoided in patients on short-term steroids. If patient is taking metformin, this should be stopped for at least 1 month before undertaking the OGTT.

Phlebotomy preparation

Confirm patient has been given an information sheet and that they understand it.

Check patient has fasted.
Explain that they must remain at rest during the test and that smoking is not permitted.

Explain that if necessary water ONLY can be drunk during the test.

PERFORMANCE OF GTT – BY PRACTICE NURSE OR PHLEBOTOMIST

Take a fasting venous blood sample into a fluoride (glucose) tube. Clearly label the sodium fluoride tube with the patient details and 'FASTING'.

Using a glucometer*, check the patients fasting blood glucose concentration (*pre-test glucose*). The fasting *pre-test* glucose is used as a *go ahead* measure.

If the concentration is <10.0 mmol/L it is safe to proceed with the OGTT

If the concentration is ≥10.0 mmol/L DO NOT PROCEED WITH THE OGTT. Send the fasting venous sample (fluoride tube) to the laboratory for analysis and await results before proceeding with any further investigations. The patient can go home.

If safe to proceed with the OGTT, administer the glucose load in the form of liquid Polycal (Nutricia Clinical) [If you have difficulty obtaining this, please contact your local laboratory]:
Lucozade is no longer suitable for use for GTTs.

ADULTS: For a standard 75g of glucose - measure *113ml* of Polycal into a glass and dilute with 100 – 300ml water to make the drink palatable. If only weighing scales are available, the weight of Polycal to be used is *126gm*.

NB. Explain to the patient that the drink must be consumed within 5 minutes.

Take a second venous blood sample (fluoride tube) 2hrs (+/- 5mins) after the drink has been given (time starts from the first sip of the drink). Clearly label this sample '2 HR'.

Send the clearly labelled samples to the laboratory with a form requesting OGTT in the 'other tests' box.

***Use of glucometer**

The stated *pre-test* glucose levels used as a *go-ahead* measure are based on the assumption that the glucometer:

Is maintained appropriately (as stated by the manufacturer)

Has had quality control checks performed (both low and high levels immediately before patient testing) to ensure the meter is measuring accurately

Is used only by an *officially* trained member of staff

Please contact the Clinical Biochemistry Department at your local hospital if you have any queries with regard to this protocol:

George Eliot Hospital	02476 865549
University Hospital Coventry or St Cross Rugby	02476 965478
Warwick Hospital	01926 495321 ext 4201

Interpretation

If the above procedure is followed, venous plasma glucose is measured and the WHO criteria are as follows:

Venous plasma glucose concentrations (mmol/L)

Classification	Fasting		2 Hours
Normal	< 6.1	AND	< 7.8
Diabetes Mellitus	≥7.0	AND/OR	≥11.1
Impaired glucose tolerance	< 7.0	AND	≥7.8 but < 11.1
Impaired fasting glycaemia	6.1-6.9	AND	<7.8

SHORT SYNACTHEN TEST

Principle:
Adrenal glucocorticoid secretion is controlled by adrenocorticotrophic hormone (ACTH) released by the anterior pituitary. This test elevates the ability of the adrenal cortex to produce cortisol after stimulation by synthetic ACTH (Synacthen).

Indications:
For investigation of adrenal insufficiency

Precautions:
- Hydrocortisone should be omitted the evening before and morning of test.
- Prednisolone should be omitted for 24 hours before the test.
- HRT or any oestrogen should be discontinued for 6 weeks before test.
- Inhaled, nasal or topical steroids should be stopped for prior to test

Procedure:
All patients must have a 9am cortisol taken before the test is arranged. If the level is above 500nmol/l the test is generally unnecessary and this should be discussed with the referring doctor.

Minutes	Procedure	Sample
0	Take blood for cortisol Then administer 250µg Synacthen IM	1x yellow top serum Label sample as 0 min
30	Take blood for cortisol	1x yellow top serum Label sample as 30 min
60	Take blood for cortisol	1x yellow top serum Label sample as 60 min

Normal response:
Serum cortisol rises by > 200 nmol/l above basal or to a peak of > 550 nmol/l.

Interpretation:
A failure to respond suggests adrenal failure either primary or secondary. A long Synacthen test is required to confirm primary adrenal failure.

OVERNIGHT DEXAMETHASONE SUPPRESSION TEST

Indications:
Investigation of Cushing's syndrome.
Dexamethasone is a synthetic glucocorticoid with potency greater than cortisol. Administration suppresses the release of hypothalamic CRH and in turn pituitary ACTH in cortisol from the adrenal. It does not interfere with laboratory measurement of cortisol.

Precautions:
Care in patients with diabetes mellitus.
Care in patients with psychiatric symptoms due to Cushing's syndrome, which may worsen, Haloperidol may be needed.
Each dose should be written up as an individual dose.

Contra-indications:
Best avoided in pregnancy as inadequate evidence of safety.

Precautions:
Anti-epileptic drugs increase the rate of metabolism of Dexamethasone and serum levels may be insufficient to achieve suppression.
Insure patient is not taking synthetic steroids.

Procedure:
A) **OVERNIGHT DEXAMETHASONE SUPPRESSION TEST**
For exclusion of Cushing's syndrome; should be performed as an out-patient test.
1) Patient takes 1mg Dexamethasone at 23.00h, (2mg if patient is more than 120% ideal body weight).
2) Blood sample is taken for cortisol (single SST vacutainer) at 09.00am the following morning.

Interpretation:
Early morning cortisol after 1mg Dexamethasone should be suppressed to less than <50 nmol/l. Failure to suppress suggests Cushing's syndrome.
False positive results may occur in patients receiving drugs that accelerate Dexamethasone metabolism by the liver (e.g., Phenytoin, Phenobarbitone, Rifampicin, etc), oestrogen therapy or tamoxifen (because circulating corticosteroid binding globulin (CBG) levels are increased), in patients with endogenous depression, critical illness (e.g. following recent myocardial infarction) or in patients with alcoholic pseudo-Cushing's syndrome.

Coventry and Warwickshire Pathology Services

WATER DEPRIVATION TEST

Indications:
Investigation of suspected diabetes insipidus (DI).
This test helps to distinguish between patients with primary polydipsia and those with primary polyuria (i.e., DI). By determining the response to administered ADH analogue, cranial DI (ADH deficiency) can be differentiated from nephrogenic DI (ADH resistance).

Contra-indication:
Should not be undertaken if the patient is already dehydrated. Thyroid function and adrenal reserve must be normal, or patient should be on replacement.

Precautions:
Patient must be monitored throughout to:
a) Avoid severe dehydration.
b) Ensure compliance.
NB. The test is terminated if:
1) Urine osmolality exceeds 600 mmol/kg.
2) Weight falls by > 4 kg (> 3% in children).
3) Serum osmolality exceeds 300 mmol/kg.

Preparation:
- Exclude other causes of polyuria as per protocol investigation of polyuria.
- The Biochemistry laboratory MUST be notified at least 24 hours in advance of starting a WDT to ensure samples can be measured during the test.
- Usual fluid intake is allowed on the night before the test but advise patient to drink as little as possible. At 06.00am the patient is allowed to a light breakfast but without tea or coffee and should not smoke.

Procedure:
- At 08.00am patient empties his bladder and is weighed. Take blood (yellow tube) for osmolality measurements. A urine sample is sent to the laboratory for osmolality measurements – if > 750 mmol/kg the test is not indicated.
- All fluid and food are withheld until completion of the test. The patient must be monitored throughout to ensure compliance.
- Collect further samples of blood (for osmolality/electrolytes) and urine (for osmolality) as per table. The volume of each urine sample is recorded. The patient is weighed before and after each urine sample is past.

TIME	URINE	BLOOD	WEIGHT (baseline)
08.00	□	□	□
09.00	□		□
10.00	□	□	□
11.00	□		□
12.00	□	□	□
13.00	□		□
14.00	□	□	□
15.00	□		□
16.00	□	□	□

- If inadequate concentration of urine occurs after 8 hours, consider proceeding to Desmopressin test.

DESMOPRESSIN TEST

DESMOPRESSIN TEST

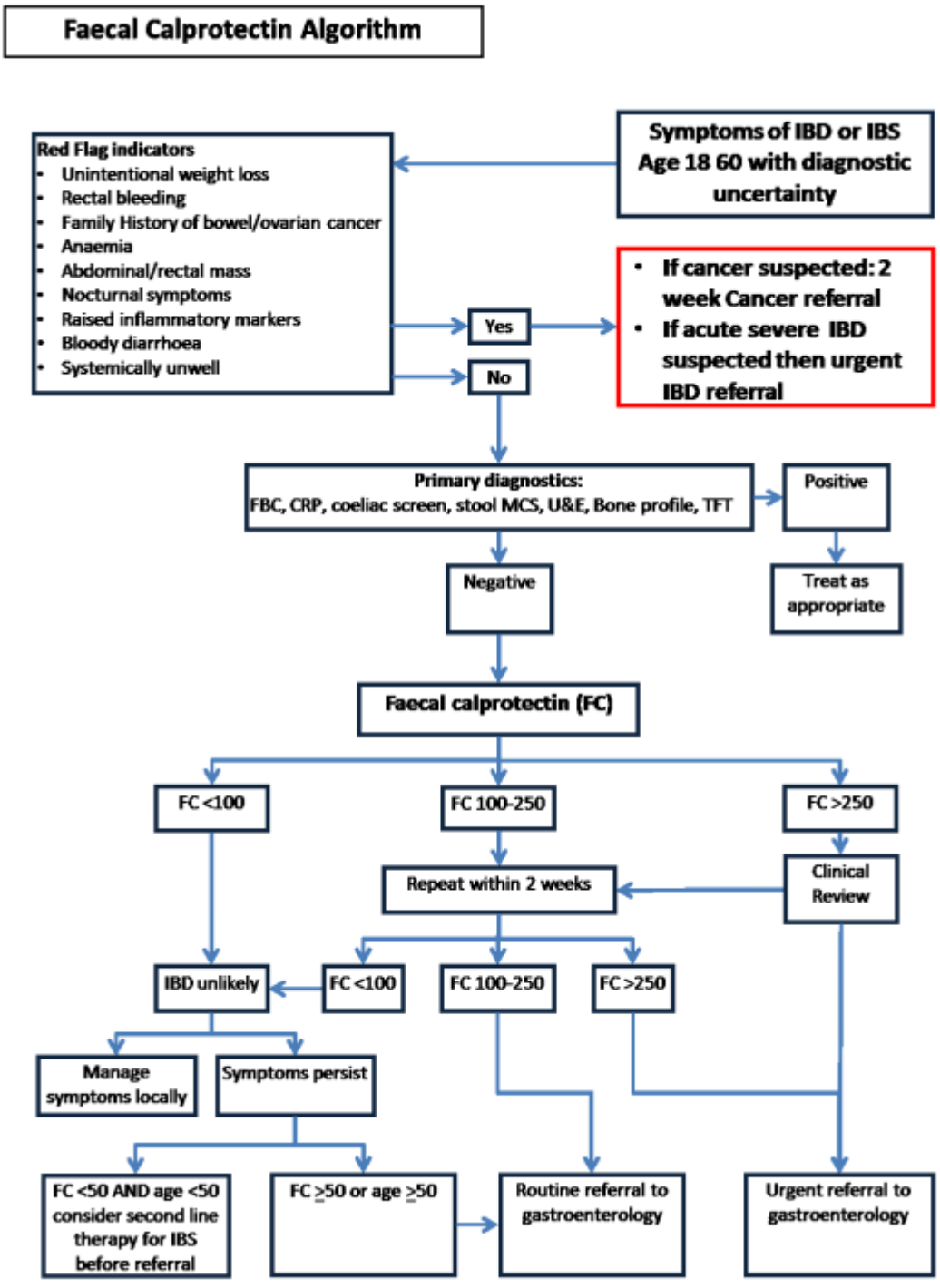
The synthetic analogue of vasopressin, DDAVP, is given intranasally (dose 40 ug in adults, 10 ug in infants and 20 ug in older children) or preferably, i.m. (dose 2 ug in adults, 0.05 ug/kg in children).
Fluid and food are now allowed but tea or coffee should be avoided. Care must be taken with the amount of fluid allowed to avoid water intoxication.
Collect all urine past at 30 minutes (intervals for 120 minutes). Record volumes of each sample and save an aliquot for osmolality measurements.
At 08.00 the next morning the patient gives a final urine sample. Blood is taken for electrolytes and osmolality measurements and the test is terminated.
In young children with gross polyuria in whom ADH resistance is likely, if may be safer to consider the DDAVP test first – if response is poor, need for a water deprivation test is averted.

Interpretation:

In normal subjects urine osmolality rises and urine volume and free water clearance follow progressively with water deprivation. U:S ratio should be 2.0 or more at the end of the test. Serum osmolality rises but remains below 295 mmol/kg. Normally urine osmolality rises > 600 mmol/kg after 8 hours water deprivation and after DDAVP.

Urine osmolality after fluid deprivation (mOsm/kg)	Urine osmolality after desmopressin (mOsm/kg)	Likely diagnosis
<300	>800	Neurogenic DI
<300	<300	Nephrogenic DI
>800	>800	Primary polydipsia
<300	>800	Partial cranial DI or nephrogenic DI or PP or diuretic abuse

FAECAL CALPROTECTIN IN PRIMARY CARE ALGORITHM



References

NHS England: Faecal Calprotectin in Primary Care as a Decision Diagnostic for Inflammatory Bowel Disease and Irritable Bowel Syndrome

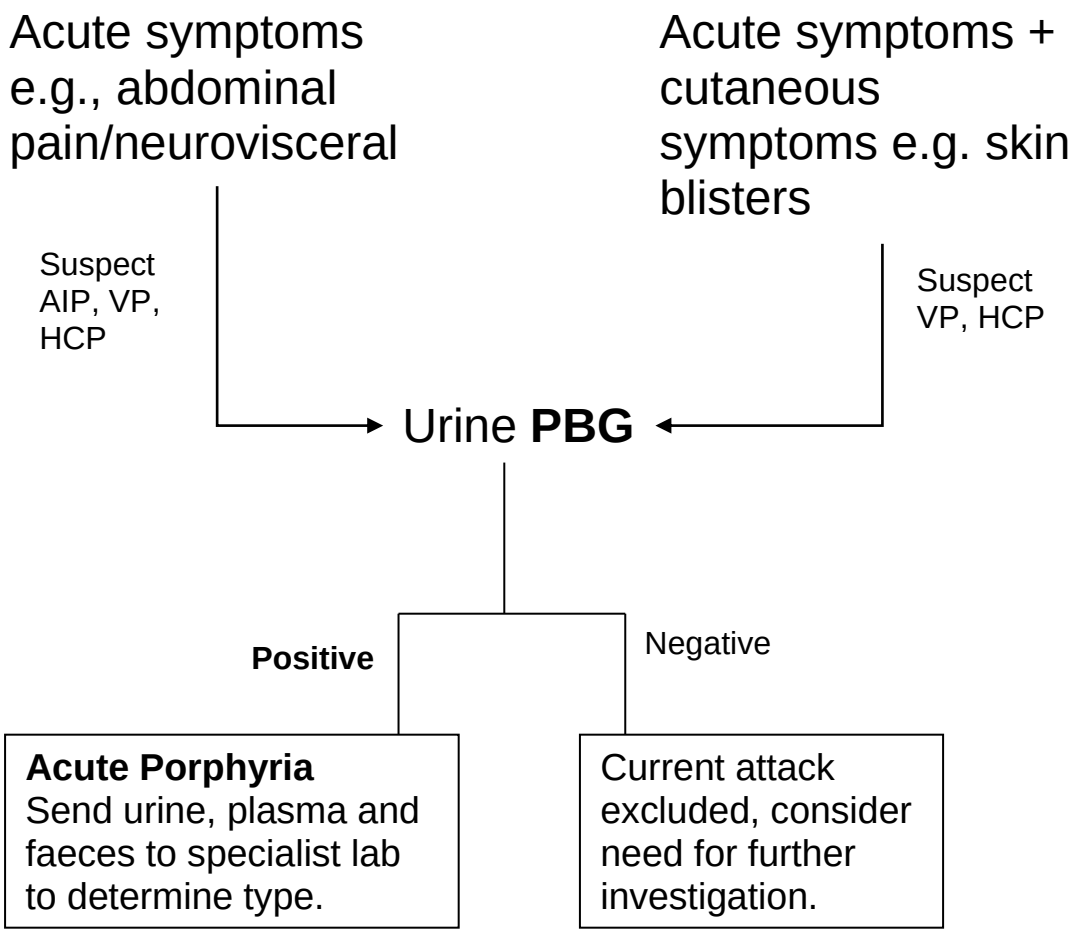
SAMPLE COLLECTION PROTOCOL FOR THE INVESTIGATION OF PORPHYRIA

Acute porphyria (+/- cutaneous symptoms)

Please collect random urine sample in plain universal that must be protected from light. Ideally an early morning urine sample should be collected. This will be analysed for urine PBG and total porphyrins at Porphyria Laboratory in Cardiff. If testing is required urgently, please discuss with Clinical Biochemist.

An EDTA blood sample (protected from light) may also be sent but acute porphyria can be excluded by urine alone.

Faecal samples are not required for first line testing, and if samples are sent to the laboratory these will be stored only.



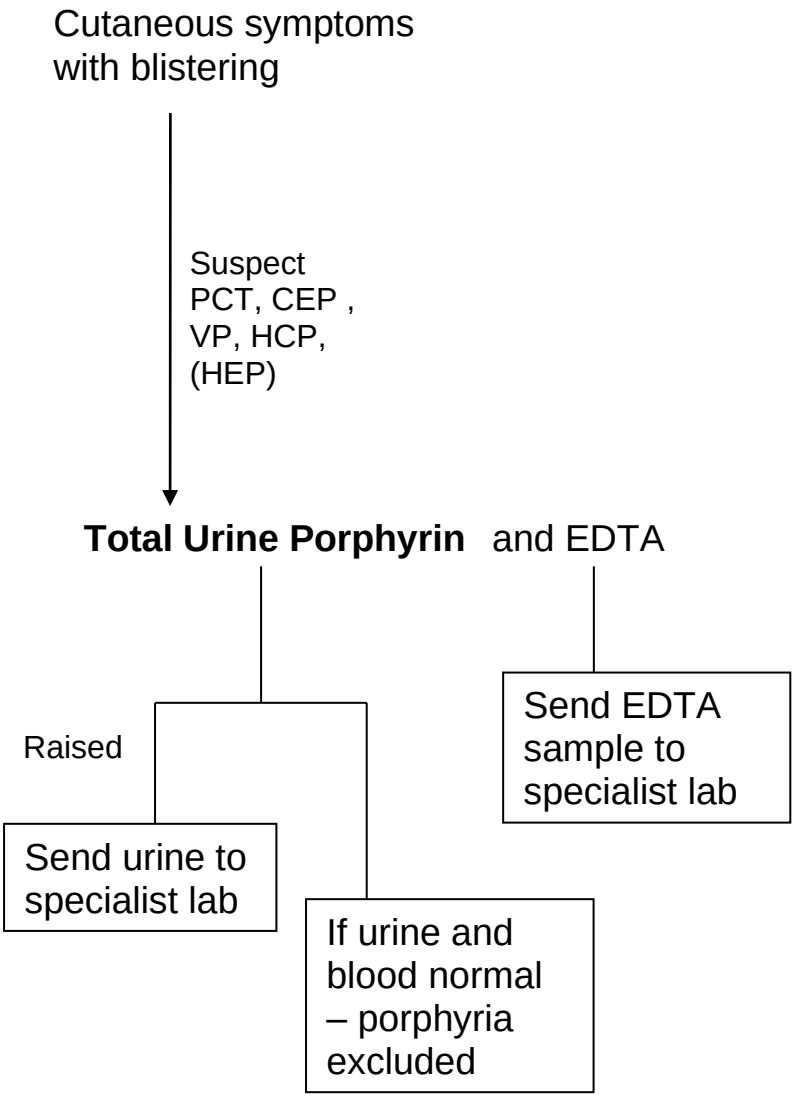
Cutaneous Porphyria

For the investigation of cutaneous porphyria please collect a random urine sample (plain universal) and EDTA blood sample, which must both be protected from light. Ideally an early morning urine sample should be collected.

The urine sample will be referred to the Porphyria Laboratory in Cardiff for total urine porphyrin testing.

The EDTA blood sample will also be sent to the Cardiff Porphyria laboratory for analysis.

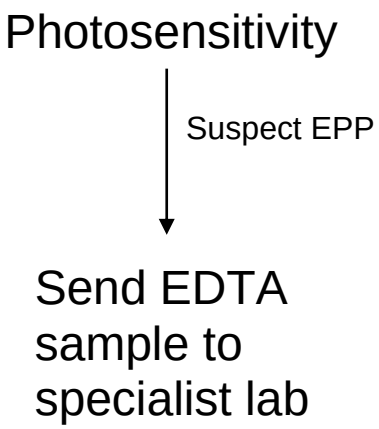
A faecal sample is not required for first line testing, and if samples are sent to the laboratory they will just be stored until the urine and/or blood results are available.



Photosensitivity

If photosensitivity is the only clinical presentation and no skin lesions are present then suspect diagnosis of EPP. Only an EDTA blood sample is required, which must be protected from light.
The EDTA blood sample will be sent to the Cardiff Porphyria laboratory for analysis.

Urine and faecal samples are not required.



Coventry and Warwickshire Pathology Services

HAEMATOLOGY

Range of Services

The Haematology services provided by the CWPS include:

- Blood counts
- Haemoglobinopathies
- Bone Marrow Examination
- Immunophenotyping (Flow Cytometry)
- Coagulation (Haemophilia and Thrombophilia service)
- Erythrocyte Sedimentation Rates
- Blood film morphology
- Glandular Fever Screening
- Malarial Parasites

Clinical Advice

Clinical advice may be obtained from the Consultant Haematologist.

Out of hours advice is obtained via switchboard from the Consultant On-Call for the Haematology Consortium.

Coventry and Warwickshire Pathology Services

Contact Numbers

	External	Internal (UHCW)
Clinical Lead		
Dr Beth Harrison, Consultant Haematologist	024 76965538	25538
Haematology and Pre-Analytical Manager		
Jane Newbold Jane.newbold@uhcw.nhs.uk		
UHCW		
Haematology Results	024 76965399	25399
Anticoagulation Referrals	024 76965532	25532
Consultants		
Dr Beth Harrison, Consultant Haematologist	024 76965538	25538
Dr Sarah Nicolle, Consultant Haematologist	024 76965539	25539
Dr Benjamin Bailiff, Consultant Haematologist	024 76965545	25545
Dr Duncan Murray, Consultant Haematologist	024 76965549	25549
Dr Maria Mushkbar, Consultant Haematologist	024 76965539	25539
Dr Francesca Jones, Consultant Haematologist	024 76965540	25540

George Eliot Hospital	External	Internal
General Enquiries / Urgent Requests (FBC)	024 7686 5208	5208
General Enquiries / Urgent Requests (Coagulation)	024 7686 5194	5194
Senior Staff Dr Mekkali Narayanan, Consultant Haematologist and Head of Department	024 7686 5176	5176
Dr Jhansi Muddana, Consultant Haematologist	024 7686 5097	5097
Dr Imran Manjra, Consultant Haematologist	024 7686 3555	3555
Trust Grade Doctor (Haematology)	024 76 351351	Bleep 2023
Haematology Secretary	024 7686 5033	5033

Warwick Hospital	External	Internal
General Enquiries / Urgent Requests	01926 495321 Ext 4205/4206	4205/4206
Senior Staff Dr Ian Chant, Clinical Scientist - Haematology	01926 495321 Ext 4418	4418
Dr Anton Borg, Consultant Haematologist	01926 495321 Ext 4498	4498
Dr Carolina Arbuthnot, Consultant Haematologist	01926 495321 Ext 8038	8038
Dr Katie Randall, Consultant Haematologist	01926 495321 Ext 4214	4214

Test Information

Blood Counts and ESR

All counts including differential white counts are performed by automated machines. Examination of blood films is only performed when indicated by information on the request form or from the automated count.

Emergency counts are also performed on automated machines. The result (at least a provisional one) will usually be available on the hospital clinical results system as soon as it comes off the laboratory analyser. It will only be phoned if it is significantly abnormal (see section on phoning results).

ESR is measured on the standard FBC sample, but please ensure the bottle is full.
Plasma viscosity is often a suitable, and more precise, alternative test to ESR for an inflammatory response.

Haemoglobinopathy testing

The laboratory employs Capillary Electrophoresis to screen for abnormal haemoglobins and thalassaemia. Abnormalities are confirmed where necessary by Hb electrophoresis, or DNA analysis at the National Reference Laboratory in Oxford. Please check whether a patient has been tested previously at this hospital before requesting a test.

Sickle cell disease/trait

For urgent pre-operative cases, a 'Sickle screen' should be requested. This will detect the presence of HbS but does not distinguish sickle cell trait from sickle cell disease. These test results are always confirmed by more complete Haemoglobinopathy testing. Please indicate on request form date and time of operation.

Thalassaemia

Thalassaemia will not automatically be tested for in patients with low MCVs, most of whom have iron deficiency. However, we do suggest that the patient should be tested, therefore the requestor needs to send another sample after obtaining consent from the patient.

In order to interpret the results of thalassaemia testing, it is important to know:

- The iron status of the patient (please request a serum ferritin at the time of Haemoglobinopathy testing).
- The ethnic origin of the patient (if parents of the patient are of different racial origins, please state both)
- If the patient is pregnant, and if so what is her estimated date of delivery (EDD).

Other Haemoglobinopathies

Further advice about haemoglobinopathy testing is available from Haematology Consultants.

Bone Marrow Examination

All bone marrow samples are taken by Clinical Haematology staff. Please discuss the request with the registrar taking referrals (bleep 1316) at UHCW or with the local consultant on call at the other sites.

Immunophenotyping

Immunophenotyping is useful in the diagnosis of leukaemia and related conditions. Please discuss any requests with the senior clinical staff, to ensure that the correct panel of antigens are tested for. Samples are sent to MIRHO (Midlands Integrated Reporting for Haemato-Oncology) at Clinical Immunology Service, Birmingham Medical School for analysis.

Coagulation Tests

Suspected Bleeding Diathesis: It is important to take a full history of present and past bleeding incidents and to enquire about family history and drug ingestion. A normal clotting screen does not rule out a bleeding tendency, and an abnormal screen doesn't mean that a patient will bleed excessively (sometimes it means they will clot more than normal!).
For screening purposes the following tests are usually sufficient, PT (Prothrombin Time), aPTT (activated Partial Thromboplastin Time) and platelet count.

- A coagulation screen should include PT and aPTTR.
- A screen for suspected disseminated Intravascular coagulation (DIC) should include the above plus D-Dimers, Fibrinogen and a platelet count (FBC).
- Requests for screens for inherited bleeding disorders should be discussed with a consultant haematologist.
- Full dose standard heparin therapy is monitored by the aPTTR
- Low molecular weight (LMW) heparin therapy does not usually require laboratory monitoring. If it does (e.g., during pregnancy, prolonged therapy in patient with renal impairment), it requires a specialised heparin assay (phone Laboratory to arrange).
- Warfarin therapy is monitored with the INR (no need for aPTTR)
- Further guidance on anticoagulation can be found in 'Warfarin Guidance' on the UHCW intranet e-library.
- For use and monitoring of new anticoagulants, see 'Guidelines on the use of new Anti-coagulants – Dabigatran and Rivaroxaban' on the UHCW intranet e-Library.

Thrombophilia testing

Thrombophilia screening should be reserved for those patients where thrombosis is either unexpected or unusual or those with a family history of thrombosis. (For the Coventry & Warwickshire guideline on thrombophilia testing, see:

http://uhwebapps.uhcw.nhs.uk/eLibrary/filecon/download.aspx?Doc=117974&VERI=jy5cbmp5

- Tests should not be requested in the acute phase of a thrombosis. The results do not affect the acute management and may be misleading.
- Some tests are invalid if the patient is on heparin whilst others are invalid if the patient is on warfarin (and even up to 4 weeks after warfarin has been stopped)
- Thrombophilia screening should not be performed in patients who are pregnant, on an oral contraceptive or HRT, as these may invalidate some test results.

H.I.T.T (Heparin-induced thrombocytopenia with thrombosis) Screen

Request for H.I.T.T screens should be discussed with a consultant haematologist and then arranged with the laboratory due to the specialist nature of the analysis (i.e. sample type/timing of transport). It is also necessary to assess the likelihood that the case is actually HITT (i.e. calculate a 'HITT score') in order to interpret the result of

the screen correctly (see HITT guideline on UHCW intranet e-library) The samples are sent to Queen Elizabeth Hospital, Birmingham and if results are required urgently, it is helpful to phone the lab and discuss (see Haematology Sample Requirements table below for contact details)

Screening for DVT

D-Dimer screening must only be used as a negative predictor in conjunction with pre test probability, see below:-

Wells Score (adjusted 2003)

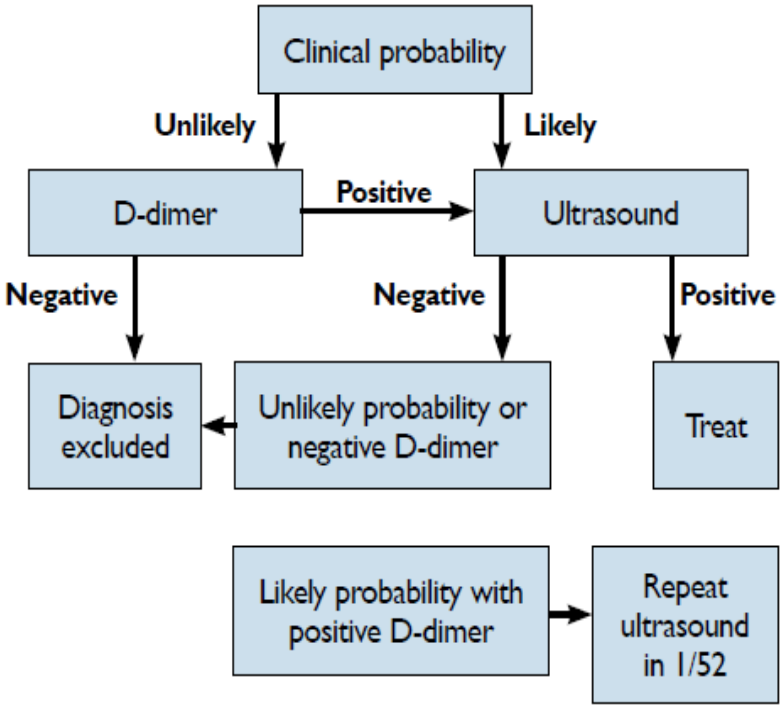
Before using the D-Dimer test to rule out a DVT, please calculate the pre-test probability score for DVT as developed by Wells and adapted in 2003:

	Points
Active cancer (treatment ongoing or within previous six months or palliative)	1
Paralysis, plaster	1
Bed ≥3 days; major surgery within 12 weeks	1
Tenderness along veins	1
Entire leg swollen	1
Calf swollen >3 cm	1
Pitting oedema	1
Collateral veins	1
Previous DVT	1
Alternative diagnosis likely	–2

DVT unlikely: ≤1. DVT likely: ≥2.

If probability is 'likely', do not use the D-dimer, but proceed to leg Doppler ultrasound examination. If probability is 'unlikely' then test D-dimer.

Follow the management algorithm below:



Dr N Jackson, UHCW, Jan 2013.

Turnaround Times

The turnaround times indicated in the following table are intra laboratory times for routine requests. Most non-urgent routine Haematology work should be available within 4-6 hours upon receipt in the laboratory in which it is analysed.

Requests deemed as 'urgent' are treated as priority, and results for basic Haematology/ Coagulation investigations should be available on the ward electronic reporting systems within 1 hour of receipt in the laboratory.

Some specialised tests may not be listed in the following table; please contact the department if you cannot find the test in the following list.

Requesting Additional Investigations

ESR, reticulocytes, manual differential, heterophile antibodies and Haemoglobinopathy testing may be added to a FBC request up to 24 hours after taking the sample.
Blood film for malaria parasites and additional coagulation tests can be only requested within 4 hours of sample collection.

Please send a new e-request or paper request form for any additional investigations.

Coventry and Warwickshire Pathology Services

HAEMATOLOGY SAMPLE REQUIREMENTS

Test Name	Sample Type and Volume	Notes	Turnaround Time
Adamts13 Assay	5ml of citrated blood and 5ml clotted sample (when indicated)	Contact consultant haematologist and Coagulation Laboratory at UHCW ext. 25350 Sent to: Clinical Laboratory Services Level Minus 1 Queen Elizabeth Hospital Mindelsohn Way Edgbaston Birmingham B15 2WB 0121 371 5999 0121 627 2000 (Haematology)	2 weeks
Bleeding Time		Contact haemophilia office at UHCW (ext. 25394) Contact Laboratory at GEH ext, 5194	
Blood Film with clinical comment	4ml EDTA		3 days
Bone marrow		Discuss with Consultant Haematologist.	7 days
Bone marrow flow cytometry	2-4 ml EDTA	Sent to: Division of Immunology & Infection, Vincent Drive, Birmingham, B15 2TT Phone:0121 4148715	2-5 days
Bone marrow chromosomes Bone marrow molecular studies	5 ml lithium heparin and/or 4 ml EDTA	Sent to: Regional Genetics Laboratory Birmingham Women's Hospital Metchley Park Road Edgbaston Birmingham B15 2TG Phone: 0121 627 2710	1-4 weeks
CD4 Counts	4 ml EDTA	Processed at UHCW	1-3 days
Coagulation Screen	3 ml Citrate	Includes INR, PT and aPTT ratio. Ensure the tube is filled to the line; otherwise excess dilution with citrate occurs.	4-6 hours
Coagulation Factor assays	x3 3ml Citrate	Phone lab to arrange, especially if urgent UHCW Ext 25350	1-2 weeks
Collagen Binding Assay		Discuss with consultant	4-6 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
		haematologist Sent to: Haematostasis Laboratory Level 2 Leicester Royal Infirmary LE1 5WW Phone: 0116 258 6619	
D-Dimer (FDP)	3 ml Citrate	Useful negative predictor for DVT when used in conjunction with pre test probability score. **Use local probability guidelines.**	1-2 hours as generally requested urgently
EMA binding for Hereditary Spherocytosis	4ml EDTA	Phone lab to arrange, as sample must be sent to BCH on morning of collection. Sent to Coagulation lab , Birmingham Children's Hospital	1-2 weeks
ESR	4 ml EDTA	Performed on same tube as FBC (bottle must be filled to line).	4-6 hours
Full Blood Count (FBC)	4 ml EDTA	MCV may increase after 8 hours storage.	4-6 hours
Haemoglobinopathy Screen	4ml EDTA	Record ethnic origin on request form. If pregnant indicate how may weeks. Tests performed: FBC, detection of Hb variants; HbA2 + HbF estimations & ferritin. **Use special request form, including the Family Origin Questionnaire if first antenatal booking.**	3 days for at least a provisional result. If further complex analyses required, may take 3-4 weeks.
Haemoglobinopathy Investigations (DNA studies)	4ml EDTA	Contact the laboratory. Ethnic origin is essential. Sent to: National Haemoglobinopathy Reference Centre Molecular Haematology Department of Haematology Level 4 The John Radcliffe Hospital Oxford OX3 9DU Phone: 01865 572 769	1-4 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
Heparin Assay (Anti Xa)	3ml citrate	Sample must be taken 4h post dose low Mw heparin. Sample must arrive in lab within 30 min	1 week
HIT screen	6ml clotted x 2 and 4ml EDTA x2	Sent to: Clinical Laboratory Services Level Minus 1 Queen Elizabeth Hospital Mindelsohn Way Edgbaston Birmingham B15 2WB 0121 371 5999 0121 627 2000 (Haem)	3 days from date of receipt at referral lab
HLA B27	4ml EDTA	Processed at UHCW	1 week
Infectious Mononucleosis Screen	5ml clotted	Also request FBC for blood film.	24 hours
INR	3ml citrate	Ensure tube is filled to the line otherwise excess dilution with citrate occurs. Oral anticoagulant monitoring. Please indicate if monitored by lab.	4-6 hours
Immunophenotyping (Cell Markers) WCC markers for leukemia and immuno-deficiency disorders	4ml EDTA	Discuss with Consultant Haematologist or Haematology Clinical Scientist (telephone Dr Ian Chant on 0776 231 6873) Sent to: Division of Immunology & Infection, Vincent Drive, Birmingham, B15 2TT Phone:0121 4148715	
Fibrinogen	3ml Citrate	Requested as part of DIC screen and performed by laboratory when indicated.	4-6 hours
Malarial Parasites	4ml EDTA	Supply any information regarding recent travel. Best taken at peak of fever.	4-6 hours
Malarial Parasites Referral Confirmation		All positive results are confirmed by the: Malaria Reference Lab London School of Hygiene and Tropical Medicine Keppel Street London WC1E 7HT	

Test Name	Sample Type and Volume	Notes	Turnaround Time
Plasma Viscosity (PV)	4ml EDTA	Stored at room temperature	5 days
PNH Screen	4ml EDTA	Sent to: Cell Markers Laboratory Heartlands Haematology Diagnostic Service Birmingham Heartlands Hospital Bordesley Green East Birmingham B9 5SS Phone: 0121 424 0908	2-5 days
Protein C	3ml Citrate		
Protein S	3ml Citrate		
Reticulocytes	4ml EDTA	Usually requested with FBC.	4-6 hours
Rituximab monitoring assay (CD20)	2ml EDTA	*Not UKAS accredited test	1 week
Sickle Screen	4ml EDTA	As for Haemoglobinopathy screen. For urgent screen please contact consultant haematologist on-call.	3 days or 1 hour if urgent
Lupus Anticoagulant Screen	3ml Citrate		1 week
Thrombin Clotting Time	3ml Citrate	This test is only available as part of a non-accidental injury screen at UHCW	4-6 hours
Thrombophilia Screen incorporates: • Antithrombin • Protein C • Protein S • Activated Protein C. Resistance (APCR – if positive, then DNA analysis will be performed for Factor V Leiden) • Prothrombin gene mutation (20210A)	3 x 3ml Citrate	Ensure age and clinical background criteria are met (see web-link above)- if in doubt contact Consultant Haematologist. Tests may be requested separately. Results may be invalid if patient is pregnant, on contraceptive/HRT or had a recent thrombosis.	2 weeks
Von Willebrand - Activity - Antigen	3 x 3ml Citrate	Discuss with Consultant Haematologist.	1-4 weeks
Von Willebrand Multimeric Analysis	Contact laboratory for advice	Discuss with consultant haematologist and sample sent to: Haematology Department Ground Floor Laboratory Medicine Birmingham Children's Hospital	8-12 weeks

Test Name	Sample Type and Volume	Notes	Turnaround Time
		Whittall Street Birmingham Phone: 0121 333 9869	

Coventry and Warwickshire Pathology Services

HAEMATOLOGY REFERENCE RANGES for Adults 18 years and above

Test	Sex	Reference Range	Consider further investigations	Units
FBC				
Haemoglobin	M F	130-170 120-150	If below 120 or above 180 If below 110 or above 165	g/L g/L
Red Cell Count	M F	4.5 - 5.3 4.1-5.1		$x10^{12}$/L
Haematocrit	M F	0.40 - 0.50 0.36 - 0.46	If >0.52 If >0.47	L/L
Mean Cell Volume	B	80-100		fL
Platelet Count	B	140 – 400		$x10^{9}$/L
White Cell Count	B	4 – 11		$x10^{9}$/L
Neutrophils	B	2.0 - 7.0 (Black Africans: normal down to 0.8)	If persistently <1.0	$x10^{9}$/L
Lymphocytes	B	1.0 – 3.0	If persistently >4.0	$x10^{9}$/L
Monocytes	B	0.2 – 1.0		$x10^{9}$/L
Eosinophils	B	<0.5		$x10^{9}$/L
Basophils	B	<0.1		$x10^{9}$/L
Reticulocytes	B	25 – 80		$x10^{9}$/L
ESR	 M F	17-50yrs 51-60yrs >60yrs >70yrs 0 -10 0 - 12 0 – 14 <30 0 -12 0 - 19 0 – 20 <35		mm/hr
Plasma viscosity	B	1.5-1.72		mPa/secs
Malaria Positive		Reported as 'No malarial parasites seen' or 'Malaria parasites seen and species (including parasite count in the case of Falciparum malaria'.		
Glandular Fever Screen		Reported as Negative or Positive		
Foetal Hb	B	<1		%
Haemoglobin A2	B	<3.5		%
Sickle Screen		Reported as Negative or Positive		
Coagulation				

Test	Sex	Reference Range	Consider further investigations	Units
INR	B	0.8– 1.2	If >1.3 not on warfarin	
PT	B	12-16		sec
APTT Ratio	B	0.8 - 1.2	If >1.3 not on heparin	
Fibrinogen	B	1.5 - 4.5		g/L
D-Dimer Assay	B	<0.5 mg/L FEU		
Factor II	B	>40		IU/dL
Factor V	B	>50		IU/dL
Factor VII	B	>50		IU/dL
Factor X	B	>50		IU/dL
Factor VIII:C	B	>40		IU/dL
vWD Factor Ag	B	>50		IU/dL
vWD Factor Activity	B	>40		IU/dL
Factor IX	B	>40		IU/dL
Factor XI	B	>60		IU/dL
Factor XII	B	>40		IU/dL
Anti Thrombin	B	80 – 125		%
Protein C	B	80 – 140		%
Protein S activity	B	65 - 140		%
APC Resistance	B	Negative		

For therapeutic INR ranges please refer to British Committee for Standards in Haematology Guidelines on oral anticoagulation (warfarin): Fourth edition update 2011.

Haematology reference ranges obtained from -
Bain, B., Bates, I., Laffan, M. and Lewis, S., 2017. Dacie And Lewis Practical Haematology. 12th ed.

Telephoning Results

On the first occasion, the following critical results will be automatically communicated by telephone to the requesting Clinician as soon as they are available:-

Criteria	Action/Exceptions
Hb <70 g/L Hb >200 g/L	Unless renal patients / other patients with known low Hb Unless SCBU (only phone if Hb $\geq$ 250 g/L)
Platelets < 50 x 10^9/L Platelets > 1000 x 10^9/L	Unless previously known. (If Platelets >1000 x 10^9/L
Neutrophils < 1.0	Exceptions – known haematology/oncology patients (all haem/oncology patients- not just in patients) African-Caribbean people (unless <0.8)
Malaria positive	
Presence of blasts / features of HUS/TTP/DIC	Urgent review by on call haematology SpR/Consultant - call medical team after film review.
Sickle screens - preoperative results	Only in pre-operative emergency situations- not for pre-planned screens
INR > 6.0 (Out of hours) INR > 5.0 (9-5)	Phone medical team Alert local anticoagulation clinic (working hours). Out of working hours - alert on call haematologist
APTT ratio > 3.0	Contact ward and confirm if patient on heparin infusion. If not on heparin infusion request repeat peripheral sample - ?heparin contamination from a line.
Fibrinogen <1.0 g/L	
D dimers > 0.5 mg/L FEU	

OVER ANTICOAGULATION CORRECTION

1. University Hospitals Coventry and Warwickshire

Please refer to the following guidelines on the Trust Intranet e-Library:-
Warfarin Guidelines,
Overanticoagulation by warfarin in Adults and Oral Vitamin K, British National Formulary

2. South Warwick Hospital

Please refer to the following guidelines on the Trust Intranet:-

Anticoagulant Treatment Guidelines SWFT 00253

Anticoagulant guidelines for peri-operative management of patients on warfarin SWFT 00167

Anticoagulant thromboprophylaxis guidelines for adults SWFT 00496

3. George Eliot Hospital

Please refer to the following guideline on the Trust intranet:-

Anticoagulant Treatment Guidelines

Coventry and Warwickshire Pathology Services

BLOOD TRANSFUSION

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2. Site Specific Information
3. Availability of blood
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6. Transfusion Request form & Sample
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9. Mandatory Haemovigilance Reporting
10. Other investigations available via the Blood Transfusion Laboratory
11. Product Recall

1. GENERAL INFORMATION

1.1 This section should provide you with all the information you need so you can utilise your local Blood Transfusion Laboratory service.

1.2 Within the Coventry and Warwickshire Pathology Services (CWPS) there are Blood Transfusion Laboratories situated in all 3 Trusts.

1.3 Blood Transfusion is aiming to work to the same policies and procedures across the Pathology Network; however, there may be some site specific differences. This section will, where possible sign post you to those differences.

1.4 For more information on the principles of transfusion applicable in your own Trust, please refer to your local 'Administration of Blood and its Components Policy'.

For national transfusion guidelines and advice see The Handbook of Transfusion Medicine www.transfusionguidelines.org.uk.

1.5 For more information on the general principles of 'Collecting Blood from the Blood Fridge' refer to your local trust policies.

2. SITE SPECIFIC INFORMATION

For individual Blood Transfusion Laboratory contact please refer to the following appendices:-

For UHCW see appendix 1

For GEH see appendix 2

For SWFT see appendix 3

3. AVAILABILITY OF BLOOD

If a patient is known to have atypical blood group antibodies, provision of blood **will be delayed**. Patients with rare and/or multiple antibodies may need to be referred to the National Health Service Blood and Transplant (NHSBT). Please contact your local Blood Transfusion Laboratory for advice.

3.1 Emergency Blood (Immediately Available): O RhD Negative blood is available immediately for clinical emergencies. Telephone your Trust's Blood Transfusion Laboratory ASAP if emergency blood is required. See appendix 1, 2, or 3 for contact numbers.

In clinical emergencies when blood is required in less than 20 minutes, uncross-matched O RhD Negative blood is available for immediate use from blood refrigerators at:

UHCW

Blood Transfusion Laboratory, Fourth floor, West wing - 8 units + 4 O RhD Positive units (access via Blood Transfusion Laboratory Staff)

Maternity: Obstetric Theatres, First Floor - 2 Units +1 Paed Pack

Central Theatres, First floor - 4 Units

Emergency Department, First Floor - 4 Units

Rugby St Cross Hospital, Located opposite Cedar Ward at the Hospital of St Cross, Rugby : 23159 - 6 Units

GEH

In situations when blood is required in less than 15-20 minutes, uncrossmatched O Rh D Negative blood is available for immediate use from refrigerators at:

Phase III Theatre Calibration room - 4 Units
Maternity - Labour Suite - 2 Units

SWFT

In situations when blood is required in less than 15-20 minutes, uncrossmatched O Rh D Negative blood is available for immediate use from refrigerators at:

Blood Sciences Laboratory Issue Fridge - 4 Units + 2 O RhD Positive units (access via Blood Transfusion Laboratory Staff)

3.2 Urgent Requests (40 – 60 minutes):

Telephone all urgent requests to the local Blood Transfusion Laboratory. If a request is urgent from the outset, ensure you tick 'Emergency' on the Transfusion Request Form. In addition ensure the sample and Transfusion Request Form has been completed as per Trust policy.

If a cross-match or group and save becomes an urgent request a telephone call to the Blood Transfusion laboratory is critical. Once a request has been given priority status a full serological cross-match can take approximately 60 minutes from sample arrival to completion providing their antibody status is negative.

3.3 Electronically issued blood:

If the patient has no record of any antibodies and two antibody-negative 'Group & Save' samples taken at different times have been received from a patient, then they may be suitable to have blood issued by electronic issue'. This means that blood can be issued without a cross-match; and, this can be made available within 10-15 minutes of telephone request depending on the workload in Blood Transfusion Laboratory at the time of the request (Providing the group and save has been completed).

To check if a patient is suitable, you should ring local Blood Transfusion Laboratory. If a patient is suitable for electronic issue, then blood may not need to be issued pre-operatively, as you can call your Blood Transfusion Laboratory when it is required.

3.4 Non-urgent Requests:

Samples and requests for blood/products should normally arrive at the laboratory 48 hours prior to the time of the transfusion and routine requests for blood should be made by 3pm on the day before elective procedures.

For patients with antibodies, the request and sample should arrive between 72 and 48 hours before the planned transfusion.

3.5 Maximum Surgical Blood Ordering Schedule (MSBOS):

MSBOS is a table of elective surgical procedures, which lists the maximum number of units of blood that should be routinely requested for each procedure. **It is important that the name of the operation, as specified on the MSBOS is given, when ordering blood.** Please refer to your local MSBOS for further information. If you wish to request more units than specified in the MSBOS, the clinical reason must be shared on the request form.

The MSBOS is agreed locally by the Hospital Transfusion Committee. This schedule will be reviewed periodically, and appropriate adjustments will be made to the schedule. Please refer to the site specific MSBOS.

4. CONTACT NUMBERS

For UHCW see appendix 1.

For GEH see appendix 2.

For SWFT see appendix 3.

5. HOSPITAL TRANSFUSION PRACTITIONERS (HTP)

5.1 The HTPs are the link between the laboratory and users of blood in the clinical areas of the Trusts. Their role includes monitoring blood usage and wastage; training and competency assessments of all clinical staff involved in the transfusion process; and, developing and revising transfusion related policies.

5.2 Blood Transfusion training is a mandatory requirement and Trusts should provide regular (Annual) documented training for all staff involved in the transfusion process. It is also a requirement for these staff to be competency assessment every 2/3 years.

Please refer to your Trusts local Mandatory Training Policy for information on how this training will be delivered in your Trust. If you are still unsure, contact your HTP.

6. TRANSFUSION REQUEST FORM AND SAMPLE

6.1 Sample type and volumes required:

To adhere to national guidelines, Blood Transfusion samples MUST be handwritten and all sections completed.

Sticky addressograph labels ON SAMPLES must NOT be used and WILL be rejected.

Do NOT pre label tubes by writing on them in advance of taking the sample.

Test	Sample Type UHCW/GEH/SWFT
Group and Save / Cross match	6ml EDTA Tube
Kleihauer	4ml EDTA Tube
Direct Coombs test	4ml EDTA Tube
Antenatal serology	6ml EDTA Tube
Cold agglutinins Authorisation for tests required by Consultant Haematologist. Samples sent to NHSBT for analysis	4ml EDTA Tube
Red Cell Serology NHSBT (Positive antibody screens)	3 x 6ml EDTA tubes

6.2 Request Form and sample labelling

In order to prevent serious blood transfusion incidents due to mis-identification of samples, the Blood Transfusion Laboratory will reject samples if the following national guidance is not strictly adhered to:

6.2.1 The Request Form MUST contain the following patient identification details:

(Banda label/addressograph labels are **only** acceptable on request forms.)

1. Surname (in full, correctly spelt and in the correct position)
2. Forename (in full, correctly spelt and in the correct position)
3. Date of birth (not age or year of birth)
4. **Hospital number or NHS number or major incident number (NHS number only on request form only acceptable for antenatal requests/ CRM requests)**
5. Gender (and/or on the specimen)
6. Collector's details
7. Name/Signature of requesting medical officer (GMC stamp is acceptable)

In addition: When ordering blood products please provide the following information on the request form or during the phone call made to the Blood Transfusion Laboratory

• reason for the request
• what type(s) of blood components are required
• the number of units, or the volume of blood required
• any special requirements, e.g. irradiated, CMV negative, Sickle-ve, Rh/Kell compatible
• time/location needed and urgency

6.2.2 The Sample MUST have the following details handwritten on it:

(Banda label/addressograph labels are **NOT** acceptable on samples for Blood Transfusion)

1. Surname (in full, correctly spelt and in the correct position)
2. Forename (in full, correctly spelt and in the correct position)
3. Date of birth (not age or year of birth)
4. **Hospital number or NHS number or major incident number. If the NHS number has been used on the sample, this is acceptable providing both the NHS number and hospital number of the patient are on the request form. (Exceptions are antenatal request/CRM requests)**
5. Gender (and/or on the request form)
6. Collector's details
7. Date and Time specimen collected

There will be no exceptions to this, and when a sample is rejected the patient will have to be bled again, and the new sample sent to the laboratory with a new form.

6.3 Cross-match Sample Validity

Each sample taken has a finite Sample validity which is calculated using the date and time when the sample is taken; and, when the patient was last transfused.

Planned Transfusions:

Patients will need to have 2 samples before blood is issued. The 1st sample gives a baseline blood group (Taken anytime in the past). Second; and subsequent, samples confirm the blood group and must be completed prior to the issue of blood.

As a consequence of taking 2 samples more patients will be eligible for electronic issue; therefore allowing the quicker issue of compatible blood.on the sites where this is available

The number of days for which a cross-match sample is valid is dependent on when the patient was last transfused. This reflects the time taken for red cell antibodies to develop after a blood transfusion. The planned transfusion must be started before the sample validity expires. The schedule is summarised in the following table:

Sample Validity for the second sample:

The 2nd sample requirement will not be enforced in an clinical emergency situation, however a second sample should be sent ASAP to confirm the blood group

PERIOD SAMPLE IS VALID FOR RED CELL ISSUE*	TRANSFUSION HISTORY
72 HOURS	Pregnant
	Transfused in last 3 months
7 DAYS	Patients with antibodies or positive DAT
	Pregnant patients with placenta praevia
	Multi-transfused patients with no allo-antibodies
28 DAYS	Any patient suitable for electronic issue (UHCW only)

*From the time and date the sample is taken.

If in doubt please ring the local Blood Transfusion Laboratory

7. MASSIVE HAEMORRHAGE POLICY/PROCEDURE (MHP)

The successful treatment of massive haemorrhage depends on early recognition; linked with the timely issue of blood and blood products, prompt action, good communication and the involvement of senior clinicians with the necessary expertise.

Please refer to the local Trust policies for Massive Haemorrhage.

8. TRANSFUSION REACTIONS REQUIRING INVESTIGATION

Transfusion reactions can range from mild and minor complications, which can be alleviated with the use of drugs, to severe life threatening complications and even death. It is often difficult to distinguish which type of reaction is taking place as the initial signs and symptoms of the reactions are very similar. It is essential to begin investigation of a suspected reaction immediately to prevent the continuation of a potentially fatal transfusion e.g. ABO incompatibility. The time taken to complete all investigations will depend on the clinical emergency and the nature of the reaction. Where an adverse reaction is observed or suspected, staff must:

- Stop transfusion immediately and maintain venous access.
- Inform clinician responsible for the patient in line with the workflow for the recognition and management of suspected acute transfusion reactions.
- Perform checks to ensure that the unit being transfused is intended for that patient.

Please refer to your Trust 'Administration of Blood and its Components Policy'.

9. MANDATORY HAEMOVIGILANCE REPORTING

External reporting – SHOT/SABRE

All transfusion laboratories are legally obliged to report Serious Adverse Reactions (SAR) and Serious Adverse Events (SAE) to the 'Medicines and Healthcare Products Regulatory Agency' (MHRA) and/or 'Serious Hazards of Transfusion' (SHOT) via the Serious and Adverse Blood Related Events reporting system (SABRE).

Following the event if you believe your patient has had a reportable reaction to a blood component please report this to your local Blood Transfusion Laboratory or local Transfusion Practitioner immediately; and, raise a CAE on the Datix system (within 24hrs). The reaction will be investigated by both parties and the necessary reports made to SABRE and/or SHOT.

The following has been identified as externally reportable:

- Incorrect /inappropriate blood component transfused
- Avoidable unnecessary or delayed transfusions
- Handling and storage errors
- Near miss events
- Acute Transfusion Reaction
- Acute and Delayed Haemolytic Transfusion Reaction
- Transfusion Related Acute Lung Injury
- Post Transfusion Purpura
- Transfusion-associated Graft-versus-Host Disease
- Transfusion Transmitted Infections

- Anti-D anomalies
- Transfusion-associated Circulatory Overload
- Cell salvage adverse events
- Transfusions which have taken > 5 hours to transfuse
- Wrong Blood In Tube (WBIT)
- Transcription errors with mother and baby samples

Further information regarding reporting can be found on the following website:
https://www.gov.uk/guidance/blood-authorisations-and-safety-reporting

10. OTHER INVESTIGATIONS PROVIDED VIA THE BLOOD TRANSFUSION LABORATORY

a) NHSBT provides a reference service for the identification and quantitation of antibodies and is also closely involved in the provision of blood for patients with complicated red cell antibodies. If a patient has antibodies and the request has been referred to NHSBT the blood may not be available for up to 3 days. Please ensure you contact your Blood Transfusion Laboratory to check blood availability. NHSBT will only perform cross-matches out of hours in a clinical emergency.

b) Leucocyte and platelet antibody investigations are also provided by NHSBT.

c) HLA and tissue typing is also provided by NHSBT. For further information please see the H&I user guide:

https://hospital.blood.co.uk/diagnostic-services/user-guides/

11. PRODUCT RECALL

The purpose is to prevent exposure of patients to potentially dangerous or defective blood components by removing the products from use and rendering such units unavailable for subsequent issue. Clinical review of the patient will be required if the unit has already been transfused. Clinical action may be required, e.g. if microbiological contamination of the blood component is suspected.

The Recall procedure may be activated by the laboratory for two reasons:

1. When an internal error has been detected that brings into question the suitability of a product or products which have already been issued

2. When instructed to do so by NHSBT.

References

1. Handbook of Transfusion Medicine www.transfusionguidelines.org.uk
2. SABRE - '**User guide for mandatory Haemovigilance reporting in the UK**' https://www.shotuk.org/reporting/

3. UK Blood Safety and Quality Regulations (BSQR) 2005 as amended.

APPENDIX 1: SITE SPECIFIC INFORMATION UHCW NHS TRUST

Contact Numbers

Blood Transfusion Manager	Tina Taylor	024 76965512 Tina.taylor@uhcw.nhs.uk

UHCW	**External**	**Internal**	**Bleep**
Blood Transfusion Requests	024 76965322	25322	
Blood Transfusion **Emergency** Telephone	024 76965398	**25398**	2169
Senior Staff			
Dr Maria Mushkbar, Consultant Haematologist and Transfusion Lead	024 76965531	25531	4872
Haematology Registrar on call (day time)			1316
Maxine Herbert, Modern Matron for Transfusion and Haematology Day Unit	024 76965470	25470	5918
Sarah Aston, Transfusion Practitioner	024 76965436	25436	2280
Michelle Brazier, Patient Blood Management Practitioner	024 76966911	26911	4730
Katie Mofid, Patient Blood Management Practitioner	024 76966911	26911	4730

APPENDIX 2: SITE SPECIFIC INFORMATION GEORGE ELIOT NHS TRUST

Contact Numbers

George Eliot	External	Internal
Blood Transfusion Enquiries/Urgent Requests	024 76863558	3558
Senior Staff		
Dr J Muddana, Consultant Haematologist	024 76865176	Speed Dial 2276
Dr Imran Manjra, Consultant Haematologist	024 76863555	Speed Dial 2104
Emma Sharrod, Transfusion Practitioner	024 76865599	Speed Dial 2281
Pina Edwards, Assistant Transfusion Practitioner	024 76863563	Speed Dial 2184

APPENDIX 3: SITE SPECIFIC INFORMATION SOUTH WARWICKSHIRE NHS FOUNDATION TRUST

Contact Numbers

South Warwick Hospital	External	Internal	Bleep
Blood Transfusion Requests	01926 495321	4184	
Senior Staff			
Dr Katie Randall, Consultant Haematologist	Contact via SWFT switchboard		
Mrs S Sandhu, Blood Transfusion Practitioner	01926 495321 Ext 4490	4490	

MOLECULAR PATHOLOGY LABORATORY

The molecular lab at UHCW is multi-disciplinary department carrying out molecular diagnostics in microbiology (virology), histopathology and blood sciences.

Contact Details

	External	Internal
Molecular Virology Laboratory	024 76965465	25465
Chlamydia/GC Laboratory	024 76965461	25461
Molecular Pathology Manager, Tina Wotherspoon	024 76965465	25465
Molecular Virology Clinical Advice		
Dr Lisa Berry, Consultant Virologist and Molecular Pathology Clinical Lead	024 76965473	25473
Virology Clinical Scientists	024 76965471/3	25471/3
Blood Sciences Clinical Advice		
Prof. Dimitris Grammatopoulos, Consultant Clinical Biochemist and Professor in Molecular Medicine	024 76965477	25477

Blood sciences

Molecular Biology techniques are used to detect DNA abnormalities leading to genetic disorders.
An **EDTA** containing blood specimen is required to extract genomic DNA for analysis.

ALPHA-1 ANTITRYPSIN (AAT) GENOTYPING

Alpha-1 Antitrypsin deficiency is believed to affect as many as 100,000 people in Northern America and Europe. The deficiency is most common among Caucasians of Northern European descent. In the UK, the incidence is about 1:2000.
AAT deficiency causes a lack of alpha-1 antitrypsin level in the blood. In children, AAT deficiency is the most common cause of hereditary liver disease, in adults, it is the most common cause of hereditary emphysema.

There are over 59 different AAT alleles identified, although most are very rare. In addition to type M (normal) allele, the two most common abnormal alleles in Caucasians are type S and type Z.

Detection of these 3 alleles is carried out by using the Amplification Refractory Mutation System (ARMS) PCR method, which can detect point mutation or small deletion in the DNA sequence. As this test is reflexed based on total A1AT level, analysis will only be performed if informed patient consent.
Testing is performed weekly.

Testing procedure for AAT genotyping

Low A1AT Level (<1.4 g/L)
↓
Genotype for S or Z mutation

↓ ↓
POSITIVE Genotype **NEGATIVE Genotype**
SS ↓
SZ AAT ≤ 1.0 g/L
MZ ↓
Discussed at A1AT MDT
Decide if Mmalton and I testing indicated
(and sequencing if these Negative)

HFE GENE MUTATION

Hereditary Haemochromatosis (HH) is the most common autosomal recessive disorder, with prevalences ranging from 1:200-1:400 in the European population. It is more common in people of Northern European descent.

Two point mutations in the haemochromatosis gene are considered important in the pathogenesis of hereditary haemochromatosis. One of these mutations produces a Cysteine to Tyrosine amino acid substitution at position 282 of the HFE protein (C282Y), caused by G->A substitution at nucleotide position 845. A second mutation, which changes histidine at position 63 to aspartic acid (H63D), is also considered to be clinically relevant in the diagnosis of hereditary haemochromatosis.

HFE gene mutation testing will only be performed if there is a family history of Haemochromatosis, transferrin saturation is >40% or Ferritin is >650 ug/L.

Detection of the HFE gene mutation is carried out by PCR using specific primers followed by DNA melting curve analysis using appropriate software

Testing is performed fortnightly

FACTOR V LEIDEN

The term ‘Factor V Leiden’ refers to the specific G->A substitution at nucleotide 1691 in the gene for Factor V. A single point mutation in the gene results in a form of factor V that is resistant to degradation by Activated Protein C, resulting in increased thrombin generation. This leads to the risk of venous thrombosis 3-8 fold for heterozygous and
30-140 fold for homozygous individuals.
Factor V Leiden mutation is more prevalent in individuals of Northern and Western European decent; the mutation is very rare in Asians and African population.

Detection of the Factor V Leiden mutation is carried out by PCR using specific primers followed by DNA melting curve analysis using appropriate software.

Testing is performed fortnightly

PROTHROMBIN GENE MUTATION ANALYSIS

Prothrombin 20210 mutation is the second most common inherited clotting abnormality. Prothrombin is the precursor to thrombin in the coagulation cascade and required for converting fibrinogen to fibrin.
Prothrombin mutation is more common in Caucasians of Southern European population and also in Middle East and Indian Sub regions, however it is virtually absent in individuals of African and Eastern Asian backgrounds.
Detection of the Prothrombin mutation is carried out by PCR using specific primers followed by DNA melting curve analysis using appropriate software.

Testing is performed weekly

JANUS KINASE 2 ACTIVATING MUTATION ANALYSIS

A Janus Kinase 2 (JAK) V617F point mutation can be found in 97% of patient with polycythaemia vera and in 50% of patients with chronic idiopathic myelofibrosis or essential thrombocythamia which leads to the conclusion that JAK2 V617F can be an important marker for these group of chronic myeloid disorders.
Detection of the JAK2 mutation is carried out by PCR using specific primers followed by DNA melting curve analysis using appropriate software.

Testing is performed weekly

FAMILIAL HYPERCHOLESTEROLEMIA MUTATION ANALYSIS

Familial hypercholesterolemia (FH) is an autosomal dominant disorder that causes severe elevation in total cholesterol and low-density lipoprotein cholesterol (LDLc). Although moderate hypercholesterolemia is common finding in industrialised countries, heterozygous FH occurs in approximately 1 per 500 persons worldwide.
Familial hypercholesterolemia (FH) has been identified as a major risk factor for coronary vascular disease and is associated with mutations in the low-density lipoprotein receptor (LDLR), apolipoprotein B (APOB) gene and PCSK9 gene.

The initial screen is performed by next generation sequencing and sent to Bristol Genetics laboratory for analysis. Cascade testing of relatives of affected patients is by mutation specific testing at UHCW by Quantitative PCR.

Tested on an ad hoc basis when requested.

Cellular Pathology

For any enquiries regarding UHCW's Molecular Oncology service, please contact the histology secretaries on pathologysecretaries@uhcw.nhs.uk or molecularoncology@uhcw.nhs.uk.

EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR)

EGFR investigation identifies mutations in the Tyrosine Kinase Receptor (TKR) Epidermal Growth Factor Receptor. This test is performed on patients with Non-Small Cell Lung cancer, and can highlight mutations that will make the tumour either susceptible or resistant to EGFR inhibitors. The same EGFR test screens for susceptibility (e.g. L858R) and resistance (e.g. T790M) mutations. Results will be released as part of the histopathology report. Testing is performed throughout the week, and the turnaround time is 10 days from receipt of test request.

RAS

RAS testing is undertaken in patients with metastatic colorectal adenocarcinoma, and is used to detect mutations in the signalling molecules KRAS and NRAS. These molecules act downstream of EGFR to drive cell proliferation, and so tumours with activating mutations in RAS will be resistant to anti-EGFR antibodies. Results will be released as part of the histopathology report. Testing is performed throughout the week, and the turnaround time is 10 days from receipt of test request. NRAS is also tested in malignant melanoma, where the presence of a mutation indicates a poor response to BRAF inhibitors.

BRAF

BRAF is a signalling molecule that is frequently mutated in malignant melanoma. Mutations identified in BRAF by in-house testing indicate susceptibility of the tumour to BRAF inhibitors. BRAF is also tested in colorectal adenocarcinoma, where mutations indicate a poor prognosis and resistance to anti-EGFR antibodies. BRAF mutations in colorectal cancer are also closely linked to the function of Mismatch Repair (MMR), and their presence indicates that any loss of function to MMR is likely sporadic in nature, rather than linked to hereditary conditions (such as Lynch Syndrome). Results will be released as part of the histopathology report. Testing is performed throughout the week, and the turnaround time is 10 days from receipt of test request.

Virology

Please refer to page 145 of the Microbiology section of the handbook for molecular virology investigations.

BACTERIOLOGY, VIROLOGY/SEROLOGY, PARASITOLOGY, MYCOLOGY

MICROBIOLOGY SERVICES

The Microbiology laboratory service at George Eliot Hospital and South Warwick Hospital is now at the single-site laboratory at University Hospital, as part of the Coventry and Warwickshire Pathology Services. While the laboratory service is centralised, there is still a consultant service at each Trust. Trust clinicians and General Practitioners previously using the laboratory at an individual Trust are encouraged to maintain the same clinical links with the consultant microbiologists based at that Trust.

The Microbiology Laboratory is located on the fourth floor of the West Wing, University Hospital, Coventry. The following services are provided:

Bacteriology
Mycology
Virology/serology
Parasitology

Hyperimmune Immunoglobulins

The laboratory authorises the issuing of hyperimmune immunoglobulin for the prophylaxis of specific infections (Hepatitis B, Varicella Zoster) after prior discussion with medical virologist (or medical microbiologist after hours).

Clinical Advice

The medical staff, accessible on the numbers below, provide clinical advice covering all aspects of the service. In the event of a microbiologist not being directly available either leave a message with the secretary, or where required more urgently contact by long range bleep / mobile phone via University Hospital switchboard (024 76964000).
UHCW routine call times are 11.00-12.30, 15.00-16.00.
This does not affect GPs, urgent hospital calls and advice provided by medics.

Multidisciplinary Team (MDT) jointly run by Microbiology

MDT	Day	Time
TB/Infectious Disease	Monday	12:30-13:30
Renal	Tuesday	09:30-10:30
Bone and Joint Infection Group (BIGCOW)	Alternate Tuesdays	1pm 3pm
Haematology	Thursday	13:30-14:30
Infective Endocarditis	Thursday	10:00-11:00
Neurosurgery	Friday	10:30-13:00

Coventry and Warwickshire Pathology Services

Senior Staff Telephone Numbers

UHCW (Note for direct line use 024-7696XXXX, where XXXX is the last four digits of the number below).

Microbiology

Consultant Microbiologist/Clinical Lead Dr Steven Montgomery-Laird	Ext: 25451
Consultant Microbiologist Dr Natasha Ratnaraja	Ext: 25452
Consultant Microbiologist Dr Peter Gayo Munthali	Ext: 25472
Consultant Microbiologist Dr Nurfarah Sabtu	Ext: 25470
Consultant Microbiologist Dr Dushyanthie Athukorala	Ext 25452

Other Clinical staff at UHCW

Specialty Doctor Dr Chidi Onwukwe and Dr Chinagozi Edwin	
Microbiology Duty office (UHCW)	Ext: 24750/25455/24688
Microbiology Secretaries	Ext: 25446/25487

Virology

Consultant Virologist/Clinical Lead Virology and Molecular Pathology Dr Lisa Berry	Ext: 25340
Virology Clinical Scientist(s) Johnathan Taylor Megan Goddard Harry Thynne Karen Barclay-Elliott	Ext: 25471/25349

For Technical advice

Microbiology Manager Victoria Longthorne	Ext. 25467

Virology and Molecular Pathology Manager
Mrs Tina Wotherspoon Ext. 25468

Telephone enquiries/results
Reception takes calls for Bacteriology from 08:30-17:00 (M-F) Ext.25428
Serology/Virology Ext.25468

George Eliot Hospital (024 76865325)

Consultant Microbiologist
Dr Samita Majumdar (Mon-Wed)

Please contact:
Secretary Direct: 024 76153081 Ext. 3081

South Warwick Hospital (01926 495321)

Consultant Microbiologist
Dr Natasha Ratnaraja 01926 495321 Ext. 4185

Secretary Direct: 01926 495321 Ext. 4227

Complaints

All initial contacts raising concerns/complaints should be brought to the attention of the Clinical Lead Dr Steven Montgomery-Laird Steven.laird@uhcw.nhs.uk

Routine Service

The Bacteriology laboratory is open between 0800 and 2100 7 days per week including bank holidays. The Virology laboratory is open between 0800 hours and 1800 hours and the Molecular laboratory between 0800 and 1700 from Monday to Friday for the examination of routine specimens. There are regular transport links between George Eliot Hospital and South Warwick Hospital to the UHCW laboratory 7 days a week.
On weekends and bank holiday only the more significant specimens, that cannot wait until the next working day will be processed. For urgent samples a member of the laboratory staff must be informed that such a specimen is being sent. The accompanying request forms must be marked 'urgent'
Microbiology should be telephoned on Ext 25426 to inform them of urgent specimens.

Emergency Service

During Laboratory hours

The service is initiated by the medical officer telephoning the laboratory to discuss nature of the specimen. Internal telephone number: Bacteriology 25426, Virology 25468. Personal contact is necessary and specimens and request forms must be marked "Emergency specimen". Specimens for departments other than Microbiology must be separately labelled. The labelled specimen and completed request form are then forwarded as follows (directly or through): -

Pathology Reception, UHCW

Phlebotomy/Pathology Reception, St Cross Hospital
George Eliot Hospital, Blood Sciences Reception, Pathology
South Warwick Hospital, Blood Sciences Reception, Pathology

Outside Laboratory hours

Medical advice is always available 24 hours a day 365 days of the year via the University Hospital switchboard (024 76964000).

A Biomedical Scientist (BMS) is available for processing specimens and can be contacted via the same number above. The on call BMS will advise on the most suitable specimen(s) and its (their) preservation during transport to the designated collection point**. Please note ALL on-call specimens are processed at University Hospital, and are sent there.**

Special points

1. It is the responsibility of the clinician to contact the on call BMS to process specimens, required for the immediate management of the patient. Give details of any antibiotic therapy that is to be started.

2. Non urgent specimens that have to be collected before antibiotic therapy is instituted, may be preserved by placing them in an appropriate transport medium (swabs), container with preservative (urine) and in a refrigerator until the laboratory is open.

BACTERIOLOGY

Information required on request form

It is essential that all sections of the request form are completed.

The tests performed on specimens depend on the patient's clinical details provided on the form; if these are incomplete then appropriate tests may fail to be performed. For example, *Vibrio cholerae* is not routinely examined for in stool specimens, the investigation being dependent on, for example, a relevant travel history.

Specimen collection

Specimens must be taken using steps to minimise contamination and delivered to microbiology as soon as possible. Specimen containers must be labelled with patient's name, hospital number or date of birth and specimen type.
Specimen containers must be approved containers only

Staff should wash their hands before and after taking specimens and take appropriate safety precautions.

1. Pus, Swabs, Aspirates, Biopsies

a. Pus; NB where there is both histopathological and microbiological examination required, a portion of the sample for Microbiology must be collected into a white-topped sterile container <u>WITHOUT FORMALIN</u>.

Pus should be sent in preference to a swab and in some cases e.g. suspected tuberculosis or actinomycosis, pus should always be sent if

present. Samples are sent in sterile universal containers. DO NOT ADD FORMALIN.

b. Swabs

Where there is insufficient material to send pus, the site may be sampled using a swab. As much material as possible should be taken up on the swab by rubbing it gently over the affected area and rotating it at the same time. The swab should then be placed in a tube of transport medium, which allows the survival of the more delicate organisms that might otherwise be missed. (Dry swabs are not used).
Do NOT send swabs for TB culture.

c. Nose swabs

When sampling the anterior nares i.e. a suspected MRSA carrier, it is important that the swab should be pre-moistened in sterile saline.

d. Fluid aspirates, biopsy specimens etc

Aspirated fluids, such as bursa/synovial fluids etc, should be sent in a sterile Universal container, separate from the portions set aside for histological, cytological or biochemical investigation. If tuberculosis is a possibility this should be stated on the request form, so that TB culture may be performed.
Biopsy specimens should be sent similarly. It is most important that the portion for microbiological examination is received FRESH AND FREE FROM FORMALIN. The same consideration about possible tuberculosis applies as above.
Joint fluids may also be sent in Paediatric blood culture bottles.

e. Pernasal swabs

Pernasal swabs should be used for the investigation of whooping cough to isolate Bordetella pertussis. The organism is present in the mucous membranes of the posterior nasopharynx, a fine flexible Pernasal swab should be used which gives the best chance of recovery,

2. High vaginal/Endocervical swabs

A high vaginal swab is satisfactory in most situations, but please note the following exceptions:

a. *Neisseria gonorrhoeae*

Patients in whom an STD is suspected are best referred to the Genito-Urinary Medicine clinic. Aside from providing a full diagnostic and follow up service, plates are inoculated at the bedside for *N. gonorrhoeae* culture. *N. gonorrhoeae* is a fragile organism and often will not survive transportation on a swab.

Neisseria gonorrhoeae culture is not routinely performed in the laboratory.
For NAAT Gonorrhoeae testing please see the Virology section.

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b. Actinomyces

Please send an endocervical swabwhen actinomyces investigation is required.

c. Chlamydia

Refer to Virology/Serology section

d. Medico legal cases

For medico legal cases i.e.: rape, sexual abuse etc, specific protocols have to be followed in order for any evidence to be accepted as genuine. In these circumstances please discuss with either GUM consultant, or consultant microbiologist before submitting any specimens.
A chain of evidence must be used for these samples.

e. Trichomonas vaginalis

T vaginalis is a fragile organism and may not survive transportation on a swab
T vaginalis culture is not routinely performed in the laboratory

3. Sputum

a. Sputum samples for C&S

These are collected by expectoration directly into screw capped universal containers. A good quality specimen is essential i.e. purulent material, salivary samples may be rejected for routine culture. BAL specimens should be clearly marked as such.

b. Sputum for TB

Three consecutive early morning samples should be sent to the laboratory together with a request form indicating that processing for TB is required.

4. Blood Culture

A set of two 'BacT/Alert' bottles (aerobic/anaerobic) is required for adults and a single bottle for paediatric. When investigating Pyrexia of Unknown Origin or suspected endocarditis, three sets should be taken over a period of time. For example in the case of “sub-acute endocarditis”, three sets should be collected over several hours before a suitable antibiotic regime is started. For suspected line infections a peripheral culture as well as line culture is recommended (ensure bottle(s) and form are labelled clearly line or peripheral culture). Any relevant clinical details such as foreign travel should be stated.

How to collect blood for culture

The blood should be collected before antibiotic therapy is begun and preferably while the patient has a rising temperature.

Strict asepsis must be observed. Remove plastic flip-top from each culture bottle and disinfect with an alcohol pad. Treat the skin with alcohol. Allow to dry for at least one minute, collect up to 20mL of blood by venepuncture. Change needles and dispose the needle into Sharpsafe container. Inject up to 10mL into each bottle, inoculating the anaerobic bottle first. Mix gently and label all bottles with the patient's details. Transfer both bar-code strips from the bottles to the front of the request form**. DO NOT COVER the bar-code on the bottle with the patient label**.
Blood cultures should be delivered to the laboratory as soon as possible. They should not be refrigerated or incubated other than in the bacT/Alert analyser.

Tuberculosis

In cases where "miliary" tuberculosis is suspected, two sodium citrate tubes (light blue) can be collected for liquid TB culture.

Laboratory Procedure

Blood cultures are examined visually on arrival and thereafter monitored constantly by machine. If growth is detected, Gram films and subcultures are done to identify the organism and significant results are reported by telephone.

5. Cerebrospinal Fluid (CSF)/Ascitic fluids/CAPD fluids

Sterile universal containers MUST be used for microbiological examination, including the cell count. (See also under Biochemistry). Please be aware that cell counts reported are estimates and do not represent the precise number of cells present.
Cerebrospinal fluids will also be analysed for viral PCR, as indicated by the cell count or requested by the clinician.

Direct examination for acid-alcohol-fast-bacilli will not be made routinely, but only if requested or indicated by the findings. If tuberculosis meningitis is suspected, the possibility should therefore be clearly indicated on the form. If cerebral abscess or trauma, either surgical or traumatic, are known or suspected, this also must be made clear on the request form as anaerobic cultures are indicated.

It is important that tests requested are prioritised. Stating "PCR" is not acceptable, and these tests should be discussed with the medical microbiologist.

Requests for meningococcal/pneumococcal/TB PCR or where cell count indicates bacterial meningitis must be approved by medical microbiologists and will usually be sent if after discussion with clinical team managing patient it will change management due to strong suspicion of meningitis and where culture is negative.

Please note viral PCR alone is sent to a different reference laboratory than when both viral and bacterial PCR is required. Turnaround times will be slower than when both are sent

6. Urine

Mid-stream, clean-catch specimens are obtained to avoid contamination. For some patients it may be necessary to collect a 'catheter specimen' or 'bag urine' and this must be clearly stated on the request form.

a. Collection of Mid-stream specimens of urine

The genitalia should be washed thoroughly with soap and water and dried. The labia should be separated or the foreskin drawn back, far enough to expose the urethral opening.
The first urine passed should NOT be collected. The middle part of the urine stream should be collected in a sterile container. This should then be placed in a sterile universal container containing **boric acid (red or green top)** and filled to the level indicated. Screw cap on tightly and mix with boric acid powder thoroughly with the urine. Boric acid stabilises the bacterial

population until the specimen is processed in the laboratory, but the specimen MUST BE SENT TO THE LABORATORY WITHOUT DELAY.

When only a small amount of urine can be obtained from a patient less than 16 years old, place in a sterile universal container without boric acid. Send to the laboratory as soon as possible or refrigerate until the specimen is sent.

Urine samples which are NOT received in boric acid container will be rejected unless they meet the following criteria:

- Nephrostomy, urostomy, cystoscopy, ileal conduit samples
- Any child <16 years old
- Schistosoma investigation
- Supra-pubic aspirate
- Samples for TB investigation

Please see Urine collection guide:

NHS
Coventry and Warwickshire
Pathology Services

A Quick Guide to urine samples for microbiological culture

- ***Please refer to urine flowchart***

Urine samples are often collected in attempts to microbiologically confirm the diagnosis of a lower or upper urinary tract infection. There is little value in performing a dipstick on urine samples in the > 65 years age group due to a high false-positive rate caused by the presence of non-pathogenic bacteria. Therefore, we have to rely on culture to produce a result.

When to send urine samples for microbiological culture

Signs and symptoms of UTI: Dysuria, frequency, urgency, suprapubic pain, polyuria.
Signs and symptoms of upper UTI (UUTI): As per UTI, plus loin pain, flank tenderness, fever, other manifestations of systemic inflammatory response.

How to collect urine samples for mycobacterial culture[1]

- Send mid-stream urine samples if possible, and *prior* to commencing antimicrobial therapy.
- Fill to the fill line wherever possible
- The container MUST BE LABELLED with the patient's details and placed in a clear plastic bag accompanied by a completed blue microbiology request form then delivered to the laboratory.

Do not:
Use dipstick in the diagnosis of UTI in older people >65 years or catheterised patients.

Completing the request form

- Clinical details MUST state:
- Symptoms with date of onset
- Any antimicrobial therapy
- Request for microscopy, culture & sensitivity
- **Plus (if required):**
- Chlamydia/gonorrhoea
- Acid fast bacilli/TB- send 3 consecutive early morning urine Samples ***in white topped containers only***
- Schistosomiasis- send midday urine sample in a white-topped Universal tube

Box 1. Containers for collecting urine samples for microbiological culture.

Ideal container type containing boric acid: collect the whole first void sample
NB: Do not use for schistosoma investigation

Non-ideal container type for most samples due to possibility of bacterial overgrowth.

ONLY USE FOR:

- Small volume (<5ml) urine samples in any patient cohort.
- Nephrostomy, urostomy, cystoscopy, ileal conduit samples
- Any child <5yrs old
- Schistosoma investigation
- Supra-pubic aspirate
  Samples for TB investigation

Reference

1/PHE (2019). Investigation of urine.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770688/B_41i8.7.pdf
2/ PHE (2017). Investigation of specimens other than blood for parasites
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/622944/B_31i5.1.pdf

Version 1 09/02/2022
Dr Natasha Ratnaraja

b. Catheter specimens of urine

In most circumstances, such specimens should only be taken when the patient is systemically unwell, e.g. pyrexial. Urine should be collected directly via the catheter tubing via the aspiration port. Swab port with 70% alcohol swab allow to dry, and then aspirate urine using needle and syringe (taking care to avoid sharps injuries). DO NOT collect urine from the catheter bag.

c. Culture of urine for *Mycobacterium tuberculosis*

The first 30ml or so of the first morning specimen of urine passed by the patient should be obtained by a clean catch technique on each of three successive days. The urine should be transferred to a plain sterile screw capped sterile universal container (DO NOT USE BORIC ACID CONTAINER), filling it to the shoulder. The lid should be screwed on tightly. The request form and specimen should be clearly marked according to the day of collection; e.g. EMSU 1st day for TB culture.

7. Faeces

Plastic disposable screw capped containers with enclosed spoon are used. Two spoonfuls will suffice for most microbiological investigations, but don't fill more than 1/3rd. Special care should be taken with fluid stools to ensure that the container is securely closed. Rectal swabs should only be sent for multiresistant/ CPE organism screen as a negative routine culture result is not as reliable.

a. Faecal culture

Specimens from the community and all "admissions" units are routinely examined for *Salmonella, Shigella, Campylobacter* and Verotoxogenic *E coli* 0157. Further investigations will be guided by clinical details. All specimens from adults are tested for *Clostridium difficile* toxin (see below).

b. Parasitology investigations

Specimens are not routinely examined for parasites. Where indicated please request parasitology on the form and give supporting clinical details. As excretion of parasites may be intermittent three separate stool specimens may be required and it is essential that they are collected on different days. If amoebic dysentery suspected, a "hot stool" specimen is required. For the detection of S. haematobium;
A complete urine sample collected between 10am – 2pm should be submitted.

c. Threadworm investigation

An anal swab in saline is now preferred over a sellotape slide. The anus should be swabbed, and the swab then placed in a sterile universal container half filled with normal saline.

d. Clostridium difficile

Clostridium difficile may produce a wide spectrum of diarrhoeal illness through to life threatening pseudomembranous colitis. Infection is almost always associated with antibiotic use (a significant percentage of cases arise after stopping the antibiotics). *C. difficile* is a predominantly hospital

associated organism, but with shorter hospital stays more cases are likely to arise in the community. All stools from adult patients are routinely tested for the toxin of *Clostridium difficile* (CDT).
Only samples which take the shape of the container will be tested for C-diff in line with national guidance.

e. Viral diarrhoea

For investigation of viral causes of gastroenteritis in children under 5, (Rotavirus/Adenovirus), submit a stool specimen as described above requesting viral investigation.

f. CPE/CRO screening

Double headed rectal swabs are required for CRO PCR. The swabs should not be heavily soiled but should have some visible faecal material.
Rectal swabs in charcoal media and faeces samples are unsuitable for CRO PCR and will be cultured.

MYCOLOGY

Fungal Infections of the Body Surface

These are diagnosed by direct microscopy and culture, the latter being more sensitive.

Skin scrapings, nail parings or depilated hairs should be sent in a small sheet of clean paper, preferably black, folded three times, marked with the patient's details, and attached to the request form. If it has to be sent from outside the hospital, the form and attached packet of material should be put in an envelope. For thrush, throat swabs may be used as for Bacteriology.

Systemic Fungal infections

Please contact the microbiologist for advice on diagnosis and treatment.

Antibiotic dosing / levels (please see the UHCW Trust intranet)

NB. All antibiotics are now analysed by the Biochemistry department. Please use biochemistry request forms, clearly marking the antibiotic assay(s) required. Please also use the standard biochemistry clotted tube and if other biochemistry tests are required, a separate sample tube is not required.

Gentamicin

In most cases, Gentamicin does not need to be given for more than 24-48 hours. If gentamicin needs to be given for longer than this, please discuss with a microbiologist.

ONCE DAILY DOSING OF GENTAMICIN IN ADULT PATIENTS
The safe and effective way of using and assaying gentamicin!

The main use of an aminoglycoside is to kill susceptible gram-negative organisms in a bacteraemia or septicaemia.

IT IS **THE FIRST DOSE** THAT IS PROBABLY **THE MOST EFFECTIVE** IN THIS KILLING PROCESS.

Apart from frequency, ONCE DAILY **DOSING OF** Gentamicin has advantages over the traditional **tds** regimen.
These are: **Guaranteed high peak level at the first dose (= effective killing**)

No need for post-dose levels; assay pre-dose only before second or third dose initially

The standard dose is 5mg/kg estimated lean body mass given as a 30 minute infusion (never as a bolus). Gentamicin is not taken up by fat tissue and so an estimate of the lean body mass should be made.
THE MAXIMUM DOSE SHOULD NOT EXCEED 400mg.

Application

1. Estimate lean body mass and prescribe gentamicin at 5mg/kg as a THIRTY MINUTE infusion.
   There are now at least 22 hours or so to obtain the patient's serum creatinine and calculate creatinine clearance to determine the interval between doses.

The formula below is suitable and safe to use:

2. Creatinine clearance (ml/min):

$$\frac{(160 - \text{age of patient in years}) \times \text{weight in kilograms}}{\text{serum creatinine } (\mu\text{mol/l})}$$

3. The dosing interval between doses is then estimated:

Creatinine Clearance	Dosing Interval
61-100 ml/min	**24 hours**
41-60 ml/min	**36 hours**
21-40 ml/min	**48 hours**
<21 ml/min	**Check a random level @ 48h**

4. A pre-dose level should be checked before the second (or third) dose and thus the pre-dose specimen should be collected and the 2nd (or 3rd) dose given. Do not wait for the result now; if the correct interval has been calculated the Gentamicin dose must be given.

   The assay result will be available before the next dose. if this is less than 1.0 mg/l the regimen can be continued.

   If the level is greater than 1.0 mg/l the interval between doses should be increased and creatinine clearance re-calculated. This is usually discussed when the microbiologist phones the assay result.

There is usually little reason to continue Gentamicin longer than 24-48 hours.

Vancomycin

Simple to use, this formula is also ideal for estimating the interval between doses when using Vancomycin. The standard adult dose of Vancomycin is 1g b.d.

Therefore calculate the creatinine clearance and space the doses as the following examples show: Clearance is 50ml/min: give 1g 24 hourly; Clearance is 25ml/min: give 1g 48 hourly

Check a pre-dose Vancomycin level before the 4th or 5th dose. The standard pre-dose range is 10-20 mg/l. No post dose levels please.

By regular use of the simple formula, Gentamicin (and other aminoglycosides) and Vancomycin can be safely and effectively used. By abandoning post-dose level determination the number of venepunctures the patient has to endure is reduced.

Bacteriology Turnaround Times

Turnaround time is the time from date of receipt into the laboratory to the issue of the final report. Microbiology aim to achieve the quoted turnaround time for 85% of samples received.

Turnaround time will be extended for samples received after 4.00pm (Mon-Fri), samples received on Saturdays, Sundays or Bank Holidays, samples requesting complex investigations or additional tests and samples which are referred to other laboratories for testing.

Final results are reported electronically by GP Link or to the electronic ward reporting system (CRRS/Cerner/Review/ICE) as soon as they are available. Some preliminary results are also delivered electronically. Significant results, where early diagnosis would be beneficial to the management of the patient, are telephoned immediately by the Duty Microbiologist.

Further advice on sample collection and types of sample required is available elsewhere in this User Guide, or by contacting the laboratory.

Factors Affecting Results

The following are important considerations when submitting samples for bacteriological investigation:

Specimen collection: Samples and request forms should be labelled with sufficient information to allow identification of the patient and requester. Relevant clinical details should be provided. Unlabelled or mis-labelled samples may not be examined. Incomplete requester detail will result in no report being received. Incomplete request forms or incomplete clinical details may lead to inappropriate tests being performed.

Delay in transport:	Samples for bacteriological investigation should be transported without delay to the laboratory. Delayed transport may affect the viability of pathogens and allow overgrowth of normal flora. Morphological appearance of cells may also be affected.
Transport medium:	Swab samples for bacteriology should be sent in charcoal transport medium. Urines for bacterial culture (not TB) should be sent in a sterile universal container with boric acid (red top). Pus, aspirated fluids and urine for TB culture should be sent in a sterile universal container. Tissues and biopsies should be free from formalin. Use of dry swabs affects the recovery of fastidious organisms. Use of non-sterile containers can allow overgrowth of contaminating organisms. Use of formalin affects the viability of bacteria.
Temperature extremes:	Samples for bacteriology should be kept cool if not transported immediately to the laboratory. High temperature can lead to overgrowth of normal flora and may kill the target organism. Low temperature can affect recovery of some susceptible organisms.
Measurement of uncertainty	Measurement of uncertainty (MU) information is available for users on request from the laboratory.

Additional tests

Additional requests for bacteriology specimens already received are not permitted unless specifically agreed with the Microbiology clinical staff.

Test	Sample Type	Notes	Turnaround time
Acanthamoeba culture from keratitic eye lesions	Corneal scrapings Contact lens/case	Contact laboratory for supply of agar plates.	10 days
AAFB/TB culture	Broncho-alveolar lavage	Interim microscopy report issued at 1 day. Positive culture result notified immediately. Identification and sensitivity testing sent away.	Up to 10 weeks for culture.
AAFB/TB culture	Urine White top universal (early morning samples)		
AAFB/TB culture	Sputum (early morning samples)		
AAFB/TB culture	CSF (suspected TB meningitis only)		
AAFB/TB culture	Tissue or aspirate Pleural fluid Ascitic fluid.		
AAFB/TB culture	Venous blood.	2 Sodium citrate tubes (light blue) required.	Sent away
AAFB/TB PCR	Sputum		1 day
T spot for latent TB	3 Lithium Heparin tubes (green)	To reach Laboratory by1200hrs. **Only request if Quantiferon test not suitable, i.e. T-cell lymphopenia, immunosuppressed, neonates/paediatrics.**	2 days
Actinomyces culture	Endocervical swab Intra-uterine device	Specify on request form	10 days
Blood culture	Venous blood. Set of 2 BactAlert Bottles for adults (1 red, 1 blue),single bottle for paediatric (1 yellow).	Positive microscopy notified immediately.	5 days
Bordetella pertussis culture	Pernasal swab		7 days
Campylobacter culture	Faeces	Part of routine screen.	3 days
CDT	Faeces	All adult patients	1 day
Cerebro-spinal fluid culture	CSF	Microscopy result telephoned to requester.	2 days
Cryptosporidium microscopy	Faeces	Part of routine screen	3 days
Diphtheria culture	Throat swab	Charcoal swab. Specify on request form.	Sent away
E.coli O157 culture	Faeces	Part of routine screen. Toxin test sent away.	3 days

Test	Sample Type	Notes	Turnaround Time
Fluids for bacterial culture	Joint aspirate in sterile universal	Direct and enrichment culture performed.	3 days
Fluids for crystals	Joint aspirate in sterile universal		1 week
Fungal culture (mycology)	Skin scrapings Nail parings Depilated hairs	For thrush investigation throat or mouth swabs may be used.	Microscopy 3 days Culture 2 weeks
Genital swab culture	HVS Endocervical Penile	Charcoal swab	3 days
GUM clinic N.gonorrhoeae culture	Urethral Cervical Directly inoculated onto GCVCAT agar	Test available to GUM clinic patients only	3 days
GUM clinic Candida culture	HVS Penile Directly inoculated onto SABC agar	Test available to GUM clinic patients only	2 days
Infection screen (MRSA + ESBL)	Nose/Groin/Axilla/other site	Swabs are pooled for culture.	2 days
Legionella culture	Sputum	Specify on request form.	10 days
MRSA screen	Nose/Groin/Axilla/other site	Swabs are pooled for culture.	2 days
Multi-resistant organism screen (for CPE/CRO,MRAB or other MRO)	CPE/CRO- Double headed swabs Rectal swab or faeces MRAB-Surface Swabs- refer to local protocols Other- Discuss with microbiologists or Infection control		CPE/CRO: 1 day PCR 2 days (Negative cultures) 3 days (Positive cultures) MRAB screen: 2 days (Negatives) 3 days (Positives)
Mycobacterium tuberculosis (TB) PCR	Sputum Other specimens	Performed in house on request Sent to reference laboratory	1 day 2 days
Nose swab culture	Nasal swab	Charcoal swab	2 days
Ophthalmic cultures	Corneal scrapings Contact lens/case		3 days

Test	Sample Type	Notes	Turnaround time
Ova, cysts & parasites	Faeces Jejunal aspirate (Giardia) Urine (Schistosomes) Anal swab (Enterobius) "Hot stool" (Amoebic dysentery)	Specify on request For detection of S. haematobium; A complete urine sample collected between 10am –2pm should be submitted.	2 days
Pus for bacterial culture	Aspirated pus in sterile universal	Preferred sample for infected wounds.	3 days
Salmonella culture	Faeces	Part of routine screen.	3 days
Semen culture	Semen		3 days
Shigella culture	Faeces	Part of routine screen.	3 days
Sputum for respiratory pathogens	Expectorated sputum	Salivary samples are not examined.	3 days
Sputum – Cystic Fibrosis patients	Sputum	Specify CF on request form	4 days
Stool culture	Faeces	Screen for Salmonella, Shigella, Campylobacter, E.coli O157 and Cryptosporidium Provide any history of travel.	3 days
Throat swab culture	Throat swab	Charcoal swab	2 days
Tips	Line tip (2-5cm length) in sterile universal		2 days
Tissues for bacterial culture	Tissue portion in sterile universal	DO NOT ADD FORMALIN Direct and enrichment culture performed.	3 days
Urine for bacterial culture	Mid-stream, clean-catch urine in Boric Acid. Catheter specimen collected via aspiration port.	Microscopy performed on all samples and. culture done on "microscopy significant" samples.	2 days
Wound swab culture	Swab of wound site	Charcoal swab. Pus preferred if available.	3 days

Coventry and Warwickshire Pathology Services

VIROLOGY AND MOLECULAR PATHOLOGY (INCLUDING SEROLOGY)

Virology and Molecular Pathology (VAMP) provides an accredited service for the diagnosis and clinical management of viral infections. VAMP offers a comprehensive range of serological and molecular diagnostic assays to users across the Coventry and Warwickshire region. Serological testing is carried out on the George Eliot hospital site, whereas molecular diagnostic testing is provided at the University Hospital Coventry and Warwickshire site.

Departmental hours

Sample Reception (UHCW) and Serology Laboratory (George Eliot)	
Monday to Friday:	08:00 to 18:00
Saturday:	09:00 to 17:00
Sunday/Bank Holidays:	Urgent samples only

Molecular Laboratory (UHCW)	
Monday to Friday:	08:00 to 18:00
Saturday/Sunday/Bank Holidays:	09:00 to 17:00

Clinical Service	
Monday to Friday:	09:00 to 17:30
Saturday/ Sunday/Bank Holidays:	09:00 to 17:00

Contact Details

	Internal	External
Result queries	25468	02476 965468
Clinical advice	25471 25473 25349	02476 965471 02476 965349 02476 965473

Clinical Details

Precise clinical information is very important for determining which test to perform; vague information is unhelpful and will delay processing of samples.

Clinical details should include (where relevant):

- Concise clinical summary of symptoms
- Significant past medical history
- Date of onset of illness,
- Contact with other infected individuals and date of contact
- Previous vaccination
- Travel history

Specimen requirements according to syndrome

Infections of the skin and mucous membranes

Herpes Simplex (HSV), Varicella Zoster (VZV), and Enterovirus

PCR is the test of choice to determine viral causes of infection of the skin or mucous membranes. For a vesicular rash, where skin infection caused by HSV, VZV or enterovirus is considered, a swab should be used to sample the opened lesion and placed in a sterile universal container. If the lesion is dry, pre-moisten the swab with sterile saline before swabbing in the normal way. If moist, gather as much exudate as possible on the swab. Please use sterile swab. **DO NOT SEND CHARCOAL SWABS**. Please notify Virology if VZV is suspected so that appropriate infection control measures can be implemented.

Measles

Measles PCR can be performed for inpatients, but this is usually limited to infection control risks (including outbreaks), and resolving diagnostic conundrums only. Please contact the duty Virologist and Infection Control or email ClinicalVirology@uhcw.nhs.uk to arrange. Measles is a notifiable infection and any suspected/confirmed cases should be notified to the local health protection unit.

Respiratory infections including COVID-19

Viral respiratory infection

If infection with a respiratory virus is suspected, please send a nose or throat swab in a sterile universal container (White lidded pot) or viral transport media (Green lidded tube) for PCR. **DO NOT SEND CHARCOAL SWABS**. NPAs, BALs and sputum samples can also be tested.

All tests for COVID are carried rapidly on a separate analyser to routine full respiratory virus screening. The same sample can then be used for full respiratory virus screening.

Where an atypical viral pneumonitis is suspected e.g. CMV, HSV, VZV, contact the duty Virologist to discuss and arrange testing.

Atypical bacterial pneumonia

If atypical bacterial pneumonia is suspected in a patient, please submit urine for Legionella urinary antigen testing. Please note, complement fixation testing is no longer available for the investigation of atypical pathogens as it has been withdrawn by our reference lab providers. Please contact Virology or Microbiology to discuss investigation of atypical pathogens.

Gastroenteritis

Investigations of sporadic viral gastroenteritis including Adeno/Rotavirus in children less than 90 days old and outbreaks; Norovirus (winter vomiting disease) diagnosis is largely restricted to outbreak investigations, in all age groups where clinically indicated in outbreaks. Faeces samples or vomit specimens can be used. Swabs from faeces or vomit will not be accepted. Please coordinate with Infection Control when testing for Norovirus is required.

Viral infections of the eye

Excess pus should be removed. The eyelid must be inverted and the swab pressed firmly along the inside of the lower lid. Diagnosis is dependent on obtaining a

satisfactory number of cells. Place swab into a sterile universal. **DO NOT SEND CHARCOAL SWABS.**

Viral infections of the central nervous system e.g. meningitis, encephalitis

CSF will be tested for viruses by PCR where this is indicated by the cell count or requested by the clinician. PCR testing for viral pathogens such as HSV, VZV, enterovirus, and parechovirus, and bacterial pathogens such as meningococcus or pneumococcus are available as reference laboratory tests. An expanded panel of pathogens including CMV, EBV and JC virus can be requested if clinically indicated. Please ensure a separate CSF sample is sent specifically for virology if possible. If enterovirus is suspected a throat swab and stool sample may also be sent for PCR.

If Lyme disease, syphilis, toxoplasmosis, cryptococcus and leptospirosis are being considered, send CSF with a paired blood sample. Negative blood serology for the above infections essentially rules out neurological disease.

Foetal abnormalities

Viral infections in pregnancies may cause developmental abnormalities or harm to the foetus, e.g. interurterine growth retardation, ventriculomegaly, or foetal death. Requests for investigation of viral infection when investigating foetal abnormalities or loss *must* include precise details of the abnormality or specific the virus under investigation. “TORCH” screening should not be requested; this is an antiquated term and is no longer used in Virology. Rather, specific testing should be guided by foetal abnormality and/or clinical signs. Requests for “TORCH” screening will only delay investigation as this will prompt a clinical discussion.

Congenital CMV

The best sample type to send is urine or saliva, preferably within the first three weeks of life, for CMV PCR. Where congenital CMV is suspected after three weeks, submit urine, and if after 12 months, send serum only for CMV IgG. Investigations carried out after three weeks of age may require confirmation by testing the Guthrie card. Please contact the duty Virologist or email ClinicalVirology@uhcw.nhs.uk if further advice is required.

Blood borne virus infections including needlestick/splashes – HIV, HBV, HCV

To diagnose potential blood borne virus (BBV) infection, please send serum (clotted blood) for HIV/HBV/HCV serology. Molecular methods (i.e. PCR) are not appropriate for the routine diagnosis of blood borne virus, except in the case of hepatitis C where it is used to diagnose active infection following positive serology.

In patients who have been diagnosed with a blood borne infection by serology, viral load monitoring may be indicated to monitor response to treatment. Please send 3 x EDTA bloods. Note, a minimum of 1.5 mL of plasma is required.

Please be advised, requesting viral load testing instead of blood borne virus screening can result in 9x EDTA bloods being taken from the patient, where only 1x Serum sample is required.

If urgent BBV diagnosis is required (e.g. on a needlestick injury donor) it is *essential* that the laboratory be notified *before* sending samples. Please contact the laboratory or Clinical Virology to notify and supply appropriate clinical details.

Routine monitoring of immunosuppressed patients

Certain patient groups (e.g. renal transplant, haematology/oncology) are vulnerable to reactivation of viruses such as cytomegalovirus (CMV), Epstein-Barr virus (EBV),

and BK virus. These can cause considerable morbidity and mortality, therefore blood samples should be monitored for the presence of these viruses during periods of immunosuppression. Please send EDTA blood to determine viral loads.

High consequence infectious diseases (HCID)

Specimens from patients suspected of suffering from a Hazard Group 4 infection e.g. a viral haemorrhagic fever, Smallpox or Rabies, will not be processed in this laboratory. They MUST only be processed in a designated high security laboratory. **Virology will arrange for transportation of these samples. PLEASE PHONE THE CLINICAL VIROLOGIST IF ANY OF THESE ORGANISMS ARE SUSPECTED TO ARRANGE FOR CORRECT AND SAFE TRANSPORTATION. If out-of-hours, please contact the Consultant Microbiologist about such patients prior to taking any specimens.**

Other specimens

Aspirated fluids, biopsy specimens, products of conception and other fluids - see under Bacteriology.

Accepted Specimen Types

For serological investigations, clotted blood in gel tubes (serum) is required for every test; **this is the only sample type included in the UKAS accreditation scope**. Depending on the investigation and timing of blood samples a second blood sample may be required. The laboratory will request a further blood sample(s) where appropriate. This will be stated on the report issued for the first test.

Please see the table below for accepted sample types when carrying out Virology investigations on blood or blood components

Type of investigation	Accepted sample type(s)		Comments
Serology e.g. VZV IgG, CMV IgM, HIV-1/2 antibody & antigen	**Serum separating tube (PREFERRED)** 	**Serum** 	Other sample types may also be accepted if they have been validated by the manufacturer, however CWPS may not have independently verified performance claims and therefore they are not within UKAS accreditation scope.
Molecular (PCR) tests on blood e.g. CMV, HIV, EBV, HCV quantitation	**EDTA whole blood** 		Ensure samples are delivered to the laboratory promptly. Certain tests require samples to be centrifuged within set timescale e.g. HIV viral loads need to be centrifuged within 6 hours.

Please see the table below for accepted sample types when carrying out molecular testing for *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, or genital HSV.

Chlamydia trachomatis **and** ***Neisseria gonorrhoeae*** **molecular testing**	**Aptima® Urine Specimen Collection Kit** For the collection and transport of male or female urine specimens.	
	Aptima® Unisex Swab Specimen Collection Kit For the collection of female endocervical or male urethral swab specimens	
Chlamydia trachomatis, Neisseria gonorrhoeae **and genital HSV molecular testing**	**Aptima® Multitest Swab Specimen Collection Kit** For the collection of the following swab specimen types: vaginal, rectal, throat, penile meatal, nasal and anogenital lesions.	

Coventry and Warwickshire Pathology Services

Routine Diagnostic Virology: Summary of Specimen Requirements

Investigation		Test	Specimen requirements	Turnaround*	Comments
ASO Titres		ASO immunoassay	1 × 5 mL clotted blood	8 days	
Varicella zoster	Acute chickenpox/shingles	VZV PCR **(R)**	Dry swab of vesicle fluid	2-10 days	Charcoal swabs not accepted
	Immunity	VZV IgG	1 × 5 mL clotted blood	2-10 days 1-3 days	
Conjunctivitis and ophthalmia neonatorum	Diagnosis	Chlamydia NAAT **(U)**	Aptima(R) Multitest Swab Specimen Collection Kit	3-5 days	Charcoal swabs not accepted
COVID-19 *(SARS-CoV-2)*	Acute COVID-19	SARS-CoV-2 PCR	Throat/nose swab(s), NPA	<1 day	SARS-CoV-2 testing is available at UHCW, SWH, and GEH 24/7. Interim results are automatically issued electronically upon test completion.
			Sputum/BAL	7 days	
	Exposure to SARS-CoV-2 or SARS-CoV-2 vaccine	Anti-SARS-CoV-2 spike immunoassay	1 × 5 mL clotted blood	3 days	
Chlamydia trachomatis	Diagnosis	Chlamydia NAAT **(U)**	Aptima(R) Urine Specimen Collection Kit or Aptima(R) Unisex Swab Specimen Collection Kit or Aptima(R) Multitest Swab Specimen Collection Kit	3-5 days	Charcoal swabs not accepted
Hepatitis A	Acute viral hepatitis	Hepatitis A IgM	1 × 5 mL clotted blood	3 days	IgM testing is only available on patients with an ALT of >100 U/L. Contact Clinical Virology to arrange testing in the absence of a transaminitis.
	Immunity	Hepatitis A IgG	1 × 5 mL clotted blood	3 days	

Hepatitis B	Acute/chronic Hep B infection	Hep B surface antigen + other markers as appropriate by immunoassay	1 × 5 mL clotted blood	3 days	If screening for Hepatitis B prior to biologics / immunosuppression, ensure that **both** Hep B surface antigen and Hep B core antibody are requested.
	Immunity	Hep B surface antibody (and Hep B core antibody if appropriate) by immunoassay	1 × 5 mL clotted blood	3 days	
	Monitoring chronic infection/response to treatment	HBV DNA PCR	3 × 5 mL EDTA (min. 1.5 mL plasma)	10 days	
Hepatitis C diagnosis and monitoring	Diagnosis	HCV total antibody	1 × 5 mL clotted blood	3 days	
	Monitoring chronic infection/response to treatment	HCV RNA PCR	3 x 5 ml EDTA (min. 1.5 mL plasma)	10 days	If hep C re-exposure and reinfection is a concern send samples for RNA testing and state this in the clinical details.
Hepatitis E	Acute viral hepatitis (immunocompetent)	Hepatitis E IgM	1 × 5 mL clotted blood	8 days	
	Immunity	Hepatitis E IgG	1 × 5 mL clotted blood	8 days	
HIV-1/2	Diagnosis	HIV 1 and 2 immunoassay	1 × 5 mL clotted blood	1-3 days	For diagnosis in babies only at least 1.5 mL EDTA whole blood required at birth, 6 and 12 weeks for HIV RNA PCR. Serum at 18 months for HIV antibody
	HIV-1 only Monitoring	HIV-1 PCR	3 x 5 ml EDTA (min. 1.5 mL plasma)	5 days	Specimens must be centrifuged within 6

	infection/response to treatment **HIV-2 only** Monitoring infection/response to treatment	HIV-2 PCR	3 x 5 ml EDTA (min. 1.5 mL plasma)	7-10 days	hours of collection HIV-2 viral load testing must be clearly specified on the request form.
Measles	Immunity	Measles IgG	1 × 5 mL clotted blood	1-3 days	
	Outbreak/infection control risk	Measles PCR **(U)**	Oral swab	1-2 days	Swab entire oral cavity for min. of 2 minutes
Mumps	Diagnosis (acute)	Mumps PCR	Mouth swab - UKHSA supply test kit on notification	8 days	
	Immunity	Mumps IgG	1 × 5 mL clotted blood	1-3 days	
Neisseria gonorrhoea	Diagnosis	Gonorrhoea NAAT	Aptima(R) Urine Specimen Collection Kit or Aptima(R) Unisex Swab Specimen Collection Kit or Aptima(R) Multitest Swab Specimen Collection Kit	3-5 days	Charcoal swabs not accepted
Parvovirus	Acute parvovirus infection Immunity	IgM IgG	1 × 5 mL clotted blood	1-3 days	
Respiratory infections e.g. Influenza, RSV, Rhinovirus, Adenovirus etc	Diagnosis	Cepheid 4plex (SARS-CoV-2/Flu A/Flu B/RSV) Multiplex PCR	Throat/nose swabs or NPA's BAL or sputum (Not validated for 4Plex)	1-2 days	Charcoal swabs not accepted
Legionella	Atypical pneumonia	Legionella serogroup 1 antigen immunoassay	Urine (White Top Container)	1 day	
Rubella	Acute rubella infection	Rubella IgM	1 × 5 mL clotted blood	1-3 days	
	Immunity	Rubella IgG	1 × 5 mL clotted blood	1-3 days	
***Treponema pallidum* (Syphilis)**	Primary, secondary or tertiary syphilis	Total antibody screening immunoassay then further tests as appropriate **(U)**	1 × 5 mL clotted blood	3 days	
	Neurosyphilis	Total antibody screening	1 × 5 mL clotted blood	3 days	CSF will only be

		immunoassay then further tests as appropriate **(U)**			processed if patient is syphilis seropositive. Please note CSF is not a UKAS accredited sample type.
		RPR only (U)	CSF (min. 500 µL)	3 days	
Toxoplasma	Past infection	IgG screening test	1 × 5 mL clotted blood	1-3 days	
CMV	Diagnosis (immunocompetent)	CMV IgM/IgG	1 × 5 mL clotted blood	1-3 days	Viral load samples to lab at UHCW ASAP
	Diagnosis (immunocompromised)	CMV PCR	1 x 5 ml EDTA (min. 1.5 mL plasma)	1-4 days	
	Viral load	CMV PCR	1 x 5 ml EDTA (min. 1.5 mL plasma)	1-4 days	
	Immunity	CMV IgG	1 × 5 mL clotted blood	1-3 days	
Cryptococcus	Diagnosis	Cryptococcal antigen	1 × 5 mL clotted blood	8 days	Please note CSF is not a UKAS accredited sample type.
EBV	Diagnosis (immunocompetent) (	EBV VCA IgM & IgG	1 × 5 mL clotted blood	1-3 days	Viral load samples to lab at UHCW ASAP
	Diagnosis (immunocompromised)	EBV PCR	1 x 5 ml EDTA (min. 1.5 mL plasma)	1-8 days	
	Viral load	EBV PCR	1 x 5 ml EDTA (min. 1.5 mL plasma)	1-8 days	
	Immunity	EBV VCA IgG	1 × 5 mL clotted blood	1-3days	
Congenital infection screen		Test as appropriate to clinical presentation	1 × 5 mL clotted blood	1-3 days	
Viral Gastroenteritis	Diagnosis	Rota/adenovirus antigen (children > 90 days < 5 years only). Norovirus PCR (children <90 days old)	Faeces	1-2 days	Vomit is not a UKAS accredited sample type.

	Outbreak	Norovirus PCR	Faeces/Vomit	1-2 days
	Children <90 days old	Norovirus PCR	Faeces/Vomit	3-4 days
BK virus nephropathy	Diagnosis	BK PCR	1 x 5 ml EDTA (min. 1.5 mL plasma)	1-8 days
Genital herpes	Diagnosis	HSV NAAT **(U)**	Aptima® Multitest Swab Specimen Collection Kit	5 days

Table 1: *Turnaround times may be extended over the weekend and bank holidays. If urgent testing is required contact the 'on-call' Microbiologist. (U): pending UKAS accreditation but has been validated to UKAS standards.

Referred Serology and Virology Tests

Investigation		Test	Specimen	Turnaround*	Special precautions
Eye infection		HSV, VZV, and Adenovirus PCR	Eye swab	5 days	
Amoebic serology		IFAT antibody	1 × 5 mL clotted blood (serum)	7-10 days	
Aseptic meningitis		HSV, VZV, Enterovirus and Parechovirus PCR	CSF (min. 0.5 mL in a separate tube for virology)	3-5 days	If additional viruses are required, please discuss with the duty Virologist
Bacterial 16s rRNA gene		PCR	Any tissue sample or swab	2 days	
Bilharzia (Schistosoma)		Antibody	1 × 5 mL clotted blood	7-10 days	
Borrelia burgdorferi	Lyme Disease	EIA and/or immunoblot	1 × 5 mL clotted blood	2-10 days	
	Neuroborreliosis	EIA and/or immunoblot PCR	1 × 5 mL clotted blood CSF (min. 0.5 mL)	2-10 days	Paired serum and CSF are required
Campylobacter		IgM/IgG/IgA	1 × 5 mL clotted blood	7-10 days	
CMV	Pneumonitis	CMV PCR	Bronchoalveolar lavage min. 200 µL	2-5 days	
	Congenital	CMV PCR	Urine min. 200 µL	2-5 days	
	Encephalitis	CMV PCR	CSF min. 300 µL	2-5 days	
	Other end-organ disease	CMV PCR	Biopsies in saline	2-5 days	
COVID-19 *(SARS-CoV-2)*		SARS-CoV-2 PCR	BAL, sputum	1-3 days	
Cysticercosis		Immunoblot Antibody	1 × 5 mL clotted blood	7-10 days	

Dengue fever	Acute	Dengue IgM Dengue virus PCR	1 × 5 mL clotted blood or 1 × 5 mL EDTA (min 1.5 mL plasma)	7-10 days	PCR only available if <10 days after onset
	Past infection	Dengue IgG	1 × 5 mL clotted blood		
EBV	Encephalitis	EBV PCR	CSF min 300 µL	2-5 days	
E. coli 0157		Antibody	1 × 5 mL clotted blood	7-10 days	
Echinococcus serology		Antibody	1 × 5 mL clotted blood	2-10 days	
Entamoeba histolytica		IFAT Antibody	1 × 5 mL clotted blood	2-10 days	
Enterovirus RNA		Enterovirus RT-PCR	Swab	2-5 days	
Fascioliasis		IFAT Antibody	1 × 5 mL clotted blood	2-10 days	
Filariasis		Antibody	1 × 5 mL clotted blood	2-10 days	
Giardiasis		IFAT Antibody	1 × 5 mL clotted blood	2-10 days	
Haemorrhagic cystitis	Diagnosis	BK PCR	Urine	1-8 days	
Hantavirus		Antibody	1 × 5 mL clotted blood	2-10 days	Please contact Clinical Virology to discuss if testing is required
Hepatitis C genotyping		HCV sequencing	3 x 5 ml EDTA (min. 1.5 mL plasma)	14 days	
Hepatitis D	Current infection	Hepatitis D IgM	1 × 5 mL clotted blood	2-10 days	
	Past Infection	IgM/IgG	1 × 5 mL clotted blood		
	Monitoring	Hepatitis D PCR	1 × 5 mL EDTA (min 1.5 mL plasma)	2-10 days	
Hepatitis E RNA	Diagnosis/monitoring in immunocompromised	Hepatitis E PCR	1 × 5 mL EDTA (min 1.5 mL plasma)	2-10 days	

HIV-1/2	ARV susceptibility	Sequencing	1 × 5 mL EDTA (min 1.5 mL plasma)	7-10 days	
	HIV-2 only Monitoring infection/response to treatment	HIV-2 PCR	1 × 5 mL EDTA (min 1.5 mL plasma)	7-10 days	
Herpes 1/2 acute illness	If unable to take swab	IgM	1 × 5 mL clotted blood	7-10 days	
Herpes simplex virus DNA		HSV PCR	Swab	7-10 days	
HTLV-1 **HTLV-2**		Antibody	1 × 5 mL clotted blood	7-10 days	
Human Herpes virus 6 (HHV6)/ **Human Herpes virus 7 (HHV7) DNA**		HHV6 PCR HHV7 PCR	1 × 5 mL EDTA blood (min 500 µL) CSF min 300 µL	2-10 days	
Human Herpes virus 8 (HHV8) DNA		HHV8 PCR	1 × 5 mL EDTA (min 1.5 mL plasma)	2-10 days	
JC Virus DNA for PML		PCR	1 × 5 mL EDTA (min 1.5 mL plasma) or urine CSF min 300 µL	7-10 days	
Legionella PCR		PCR	Urine or sputum	8 days unless urgent	
Leishmania		Antibody to K39 Culture	1 × 5 mL clotted blood Tissue biopsy	2-10 days	
Leptospirosis		IgM and IgG	1 × 5 mL clotted blood	2-10 days	
LGV		Chlamydia PCR	2 x rectal swab	2-10 days	
Malaria (under special circumstances)		PCR	1 × 5 mL EDTA (min 1.5 mL plasma)	7-10 days	
Measles	Diagnosis of acute infection	Measles IgM	1 × 5 mL clotted blood	5-8 days	Contact Clinical Virology before sending samples
Meningococcus		Meningococcal PCR Antibodies	EDTA/CSF 1 × 5 mL clotted blood	2-10 days	
Mumps	Diagnosis of acute infection	Mumps IgM	1 × 5 mL clotted blood	5-8 days	Contact Clinical Virology before sending samples

Non-genital vesicular eruptions of skin	Diagnosis	HSV and VZV PCR	Skin swab (vesicle fluid)	5 days	Do not send charcoal swabs
Parvovirus		DNA	1x 5 ml clotted blood (NOT lithum heparin bottle) Amniotic fluid/placenta/foetal tissue	10 days	
Pneumococcal		PCR	1 × 5 mL EDTA (min 1.5 mL plasma)	2-10 days	
PJP – Pneumocystis (PCP)		Microscopy PCR PCR (> 500uL sample)	Bronchoalveolar lavage Sputum (contact lab) EDTA blood	2-10 days	NB: Optimum specimen is BAL> sputum > blood
Polio Immunity		Antibody	1 × 5 mL clotted blood	7-10 days	
Rabies		Antibody	1 × 5 mL clotted blood	7-10 days	Routine testing of rabies antibodies is not offered in England. If required please discussed with UKHSA Rabies and Immunoglobulin Service
Rickettsia		Antibody	1 × 5 mL clotted blood	2-10 days	
Schistosomiasis		Antibody	1 × 5 mL clotted blood	2-10 days	
Strongyloidiasis		Antibody	1 × 5 mL clotted blood	2-10 days	
Toxocara		Antibody	1 × 5 mL clotted blood	2-10 days	
Toxoplasma	Toxoplasmosis	Toxoplasma dye test Toxoplasma IgM	1 × 5 mL clotted blood	7-10 days	
	Cerebral toxoplasmosis	PCR	1 × 5 mL EDTA (min 1.5 mL plasma) CSF min. 300 µL	7-10 days	
Trichiniasis		IFAT Antibody	1 × 5 mL clotted blood	2-10 days	
Trypanosomiasis		IFAT Antibody	1 × 5 mL clotted blood	2- 10 days	
Varicella zoster DNA		PCR	Swab	2-7 days	

Viral Encephalitis (v)	HSV, VZV, Enterovirus and Parechovirus PCR	CSF (min. 0.5 mL in a separate tube for virology)	3-5 days	If additional viruses are required, please discuss with the duty Virologist
Whipples	PCR	1 × 5 mL clotted blood CSF 100-500 ul	2-10 days	
Yersinia	Antibody	1 × 5 mL clotted blood	7-10 days	

Table 2: *Turnaround times may be extended over the weekend and bank holidays. If urgent testing is required contact the 'on-call' Microbiologist.

Guidance on Test Usage

A wide array of serological tests are available, and their correct utilisation is highly dependent on clinical information. There is not the scope to discuss every test, but highlighted below are some common investigations. Please ring for advice if in doubt.

Antenatal Infectious Diseases Screening

CWPS supports the Infectious Diseases in Pregnancy Screening Programme by providing the laboratory component of the screening pathway for pregnant women in Coventry and Warwickshire. The UK National Screening Committee (NSC) policy for the IDPS programme is to offer and recommend screening to all eligible women for HIV, hepatitis B and syphilis. This is to enable early detection and treatment for infections in pregnancy in order to significantly reduce the risk of vertical transmission. A secondary benefit is the identification of women with these conditions who can be offered appropriate care for their own health needs.

Laboratory testing is provided in-house and results are reported within 8 days (IDSP standard) with positive screens notified directly to the local screening teams.

Varicella-zoster – Management of chicken pox/zoster contacts

Varicella may occasionally produce severe disease in non-immune contacts. Following assessment, such contacts should be offered post-exposure prophylaxis (PEP) either in the form of aciclovir, or varicella zoster immunoglobulin (VZIG) to attenuate the disease course, provided that it is administered within the appropriate time period following contact. UKHSA have implemented the following guidelines on the use of VZIG. Currently, VZIG is only indicated for:

1. Neonates whose mothers develop chickenpox (but not shingles) in the period 7 days before to 7 days after delivery.
2. VZV antibody-negative infants under 1 year who have remained in hospital since birth who are born before 28 weeks gestation OR weighed less than 1000g at birth
3. VZV antibody negative infants who have severe congenital or other underlying condition that require prolonged intensive or special care during the first year of life.
4. VZV susceptible neonates exposed to chickenpox or shingles (other than in the mother) in the first 7 days of life.

If an individual at high risk of severe VZV infection is exposed to chickenpox, contact the duty Virologist or Consultant Virologist to carry out a risk assessment, and arrange antibody testing/issue of PEP (if appropriate). Note, in general if a pregnant contact gives a definitive history of chicken pox, then she may be reassured, as she will be immune. For other pregnant contacts and immunocompromised patients antibody levels need to be measured (approx. two thirds of patients who give no history of Varicella will be shown to be immune on serological testing).

To ensure timely reporting of results: -

1. Ring laboratory and inform Clinical Scientist or senior BMS that blood is being sent for Varicella Zoster IgG. Give full details of the nature and date of contact. Alternatively clear details should be written on the request form.
2. Please provide a contact number for result to be telephoned to the following day (necessary for weekends/bank holidays) Results for a blood sample received Friday will be available Saturday morning. The patient's contact telephone number is useful.

VZIG is obtained from the UKHSA Rabies and Immunoglobulin Service, and issue with be co-ordinated by the Clinical Virology team if deemed clinically appropriate.

Hepatitis Serology

Requesting 'Hepatitis serology' or 'Liver screen' is insufficient as it does not provide adequate information to guide testing. There are a large number of tests available and often differing tests for each virus. Please provide:

1. Full clinical information including risk factors, results of LFTs, vaccination history. The laboratory can then decide on the relevant tests.
2. Additionally request specific tests as appropriate.
3. Where Hepatitis A IgM is requested, this test will only be processed if the patient has a recent LFT indicating an ALT or >100 U/L. If this is not the case but acute Hepatitis A is still suspected, please contact Clinical Virology to arrange testing.

SARS-CoV-2 Antibody Testing

CWPS offers testing for antibodies to SARS-CoV-2 spike protein only.

SARS-CoV-2 anti-spike (anti-S) can be used to investigate previous exposure to SARS-CoV-2 virus, or vaccination with any of the currently licensed SARS-CoV-2 vaccines which are based upon spike-protein. It is not possible to distinguish between exposure to SARS-CoV-2 or vaccination on the basis of anti-S status alone.

Investigation of Genitourinary Infection

The laboratory offers open access to chlamydia investigation. Chlamydia collection kits are available from the laboratory on request (extension 25468).

Sample requirements for investigation of genitourinary infection

Current methodology uses nucleic acid amplification techniques for the detection of DNA. Whilst all tests are subject to specimen quality, this is especially so with chlamydia. Chlamydia are intra-cellular pathogens, and good quality cellular material is required as opposed to pus.

It is recommended that all patients who are positive for Chlamydia are referred to the Genito-urinary Medicine Clinic.

Female genital tract

Chlamydia primarily infects the endocervix, and hence an endocervical swab is required. Excess mucous/pus should be removed from the cervix prior to taking the endocervical swab for chlamydia. Self-taken vaginal swabs may be used for chlamydia screening but in symptomatic patients full examination and endocervical swabs are recommended.

Male genital tract

Infection in males produces a urethritis, although the symptoms may be mistaken for a urinary tract infection. In sexually active men with sterile pyuria, chlamydia urethritis should be considered a possibility. For men collect either:

a) chlamydia urethral swab

Or

b) First catch urine. The <u>first</u> 20 mL of urine voided should be placed in a sterile universal container, and preferably aliquoted into a urine preservative tube. The form should be clearly marked for chlamydia investigation. Patients should not have passed urine for at least two hours before the test.

CELLULAR PATHOLOGY

CELLULAR PATHOLOGY

There is a Histology laboratory located at UHCW and SWFT. Non-gynae cytology is received and processed at the UHCW laboratory.

MORTUARY

There are Mortuary facilities located at UHCW, SWFT and Rugby.

Local contact details, opening times and service needs are described separately below.

CERVICAL CANCER SCREENING

Samples collected for Primary HPV cervical screening testing are all sent to the West Midlands Cervical Cancer screening service at Wolverhampton Hospital.

Samples from primary care across Coventry and Warwickshire are collected by the QE Facilities courier service and transported to CWPS laboratories with other Pathology samples. The courier from Wolverhampton then collects any samples from primary or secondary care directly from pathology and transports to the regional screening lab.
Electronic reports are sent directly to GP surgeries from Wolverhampton.

For more information please see:
https://www.royalwolverhampton.nhs.uk/services/service-directory-a-z/pathology-services/departments/cytology/

https://www.england.nhs.uk/midlands/information-for-professionals/information-for-professionals-west-midlands-screening-and-immunisation-team-sit/west-midlands-screening-information/west-midlands-cervical-screening/

CELLULAR PATHOLOGY – UHCW

Location

The Histopathology (including non-gynae cytology) Laboratories are located on the fourth floor of the West Wing, University Hospital, Coventry.
There is a Mortuary on both of the Trust's hospital sites – University and St Cross Hospitals.

Service

There is a routine laboratory service Monday - Friday between 7am and 7pm, and Saturdays between 7am – 3pm.

Enquiries and Contact Numbers

	External	Internal
Reports and Post Mortem Requests		
Histology Reports and Post Mortems	024 76965443	25443
Cellular Pathology Office Manager	024 76968320	28320
Consultant Histopathologist Advice		
Dr Elaine Blessing	024 76965400	25536
Dr Hesham El-Daly	02476 968650	28650
Dr Kishore Gopalakrishnan	024 76965479	28650
Dr Aneeshya Kandiyil	02476 965475	25475
Dr Paul Matthews	024 76965434	25434
Dr Manju Nerudu	024 76965432	25432
Dr Sarah Read-Jones **(Clinical Lead)**	024 76965476	26060
Dr Shatrughan Sah	024 76965236	25236
Dr Emma Simmons	024 76965437	25437
Dr Bidisa Sinha	024 76965430	25430
Dr David Snead	024 76968649	28649
Dr Alica Torres-Rendon	024 76967259	27259

Dr Yee Wah Tsang	024 76965474	28650
Dr Cate Wight	02476964788	24788

	External	Internal
Scientific and Technical Advice		
Cellular Pathology Manager Clare Wood	024 76965140 02476965343	25140 25343
HISTOLOGY and NON GYNAE CYTOLOGY Histology Senior Biomedical Scientists	02476965443/8320	25443 /
Secretaries		28320
MORTUARY Mortuary Manager Marianne Stocking	024 76967519/20	27519/20

Contact email addresses for Enquiries

UHCW Histology Secretaries: pathologysecretaries@uhcw.nhs.uk

SWFT Histology : swg-tr.swfthistologyoffice@nhs.net

UHCW Histology Laboratory: uhc-tr.histologylaboratory@nhs.net

SWFT and GEH Histology Laboratory: swg-tr.SWFTHistologyLab@nhs.net

Histology Cut Up: uhc-tr.histologydissection@nhs.net

Histology MDT Team: uhc-tr.histomdt-team@nhs.net

Histology Molecular: molecularoncology@uhcw.nhs.uk

Histology Mortuary: mortuary@uhcw.nhs.uk

Histology Send aways: uhc-tr.uhcwsendaway@nhs.net

General advice on Specimens and Reports

Specimens

Enquiries regarding collection, fixation and processing should be directed to the scientific staff.

Containers

Containers for Histology and non-gynae Cytology are available in ward or theatre stores; or by contacting the appropriate laboratory.

University Hospital:
Histology Ext 25341

South Warwick:
Histology – 01926-495321 (Ext 4334)

Forms

An appropriate form must accompany all specimens:

Histology Use special white histology request form only

Cytology (non-gynae) use white non-gynae request form only

Details on the request form must include:

- Patient's name / hospital number / date of birth / address / post code
- Referring consultant's name
- Ward
- Date
- Specimen type(s)
- Clinical details
- Private patients must be clearly identified

Infectious Cases

Samples from known/suspected infectious cases must be labelled DANGER OF INFECTION particularly those from TB, HIV or Hepatitis cases.

Availability of Reports

Histology and Cytology (non-gynae) - The department aims to have 80% reported within 7 calendar days and 90% reported within 10 calendar days, following Royal college of pathologist guidance. Due to the complex interpretive nature of histopathology and cytology specimens this may not always be achievable.

HISTOLOGY – SPECIAL REQUIREMENTS

Fixation of routine surgical specimens

Specimens for routine histological examination should be sent in pots provided by Histology containing formalin, unless other arrangements have been made.
The pots may also be labelled as:
10% Formalin; 10% Formal saline; 4% Formaldehyde

***Please note that formalin is a HAZARD.** *It is harmful by inhalation and swallowing. Contact with skin and eyes should be avoided. There is a risk of sensitisation and suitable gloves should be worn. There is a possible risk of irreversible effects.*

Specimens must be handled with care to avoid crushing or squeezing when in the fresh state and should be placed in fixative immediately after excision. Adequately sized containers should be used, with at least 5 times the volume of formalin to the specimen to ensure adequate fixation. Please do not force large specimens into small containers as this distorts the specimen which can impact diagnosis.

Please ensure that the **specimen containers are properly tightened** and are kept in an upright position, to prevent leakage. Tissues and tumours are best left whole, multiple incisions into tumours should be avoided as they make the completeness of excision difficult or impossible to assess.

Identification

All containers must be labelled with the following:
- *Hazard warning indicator for formaldehyde* (Irritant)
- *Address / Contact No. of Laboratory* (in case of accident or spillage)
- *Patient's Name*
- *Hospital No.*
- *Date of Biopsy*
- *Hospital / Ward / Clinic*
- *Tissue*
- *Requesting Consultant / GP*

The specimen pot MUST be labelled, not just the lid.

Histology request form: all specimens must be accompanied by a histology request form, and the minimum information given should be:
- *Full Patient ID include DOB*
- *Hospital No*
- *Date of Biopsy*
- *Ward / Clinic*
- *Tissue*
- *Requesting Consultant / GP*
- *Precise details of tissue sent including site of biopsy and relevant clinical details*

If any sample is incorrectly or inadequately labelled, and/or does not have an adequately completed request card, then the sample will not be processed until this is corrected.

Transport

- Specimen pots should be placed in a sealed plastic bag together with the accompanying form in a separate pocket.
- If transporting several specimens, please use appropriate transport containers to reduce the risk of a formalin spill. Further Health and Safety information sheets are available from Histology cut-up laboratory (extension 25341).
- Specimens should be delivered to the Histology Specimen Reception in the Pathology Department, Fourth Floor, West Wing University Hospital. Outside of normal hours (after 18:30-07:00 Monday to Friday), the samples can be left at the General Pathology Specimen Reception at University Hospital.

Tissues Requiring Special Treatment

Some tissues for specific techniques may require treatment other than formalin fixation. Some of the more common examples are listed below:

1. Frozen Sections

   Frozen section service operates 09:00 – 17:00 Monday to Friday only.

All samples must be booked with the histology laboratory at least 24 hours in advance. Although efforts will be made to accommodate specimens sent without adequate notice, there is no guarantee that a frozen section diagnosis can be provided for these cases.
All samples for frozen section must be sent fresh (unfixed).
Please advise the laboratory if there is any suspicion of infection, as the laboratory may need to adopt special procedures in order to handle the material. Contact cut up on 25341.
Please include a contact telephone number on the request form.

These **MUST be delivered directly to Histology cut up laboratory room ACC44033** and not main specimen reception.

2. Lymph nodes fresh tissue in a dry pot urgently sent to the laboratory.

3. Skin biopsies for immunofluorescence in normal saline

4. Muscle and neurological biopsies

   By prior arrangement, send directly to:
   Department of Neuropathology
   Queen Elizabeth Hospital
   Edgbaston
   Birmingham
   B15 2TH

Tel: 0121 472 1331 Ext.8601

If any sample is incorrectly or inadequately labelled, and/or does not have an adequately completed request card, the sender is contacted, and the sample returned to be adequately labelled.

NON-GYNAECOLOGICAL CYTOLOGY - SPECIAL REQUIREMENTS

Follows RCPath Guidance 2010

Identification

- All requests for non-gynaecological cytology specimens should be made on the white UHCW Non -Gynaecological Cytology Request forms.
- In all cases please ensure that full clinical details are given or the form may be returned and the specimen remain unreported until these are provided.
- Please ensure the correct PID is included on the form usually by fixing a patient label onto the form.
- Please ensure the hospital number is included.

Package and Transport of Non-Gynaecological Samples

Non-Gynaecological Cytology samples requiring transport on the public road must be packaged and transported in compliance with “The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (ADR Regulations) 2011”.
Specimens must be packaged according to P650 instructions with a UN3373 diamond point label indicating Biological Substance, Category B.
See below:

P650 instructions require 3 layers of packaging:

1. Primary Container e.g. Universal tube, Vial

2. Secondary container e.g. Specimen Bag
3. Outer packaging e.g. Rigid transport box

The Non- Gynaecological sample must be individually bagged in a secondary bag and sealed.
If the sample is liquid, enough absorbent material must be added to the secondary bag to absorb a potential spillage of a sample.
The accompanying request form must be placed in the specimen bag's separate pouch.
Specimens must then be placed in a rigid transport box and closed.
The box transport box must comply with Transport Regulations and the outside must be clearly labelled Biological Substance Category B and have a UN3373 diamond label.
If a sample is sent by post please note that Royal Mail will only carry UN3373 Diagnostic specimens if they are packed following Packaging Instruction P650 and are sent by First class post or Special Delivery and the package is marked with the Senders details.
All specimens must be delivered to the laboratory as soon as possible so that cell preservation is not compromised and cell deterioration is minimised. This is particularly important for CSF samples which are liable to degenerate rapidly.
If there is a delay in delivering the sample to the laboratory then the sample should be kept refrigerated at 4˚c. Note: The sample should not be frozen.

Sample Type	**Container Required**	**Packaging Guidelines (P650/UN3373)**
SPUTUM	Sterile, dry, white topped universal available on wards.	Sealed plastic transport bag with spillage absorbance and the request form in the separate pocket within the bag.
URINE	Sterile, dry, white topped universal available on wards.	Sealed plastic transport bag with spillage absorbance and the request form in the separate pocket within the bag.
SEROUS FLUID: e.g. Pleural, Bronchial, Ascitic/Peritoneal, Cyst Fluid, Synovial, and Pericardial.	Sterile, dry, white topped universal available on wards.	Sealed plastic transport bag with spillage absorbance and the request form in the separate pocket within the bag.
BRONCHIAL ASPIRATE: e.g. Lavage, Trap and Broncho alveolar lavage.	Sterile, dry, white topped universal available on wards.	Sealed plastic transport bag with spillage absorbance and the request form in the separate pocket within the bag.
ENDOSCOPIC BRUSHINGS e.g. Bronchus, Bile	Preservcyt vials or universals containing Cytolyt. These are	Sealed plastic transport bag with spillage absorbance and the request form in the separate pocket

duct.	available upon request from the Cellular Pathology laboratory	within the bag.
ENDOBRONCHIAL ULTRASOUND FNA (EBUS)	Plain universals containing Cytolyt fluid. These are available upon request from the Cellular Pathology laboratory	Sealed plastic transport bag with spillage absorbance and the request form in the separate pocket within the bag.
FINE NEEDLE ASPIRATION (FNA) e.g. Thyroid, Breast, Axilla, Lymph nodes, Neck, Pancreas, Salivary.	Plain universals containing Cytolyt fluid. These are available upon request from the Cellular Pathology laboratory.	Sealed plastic transport bag with spillage absorbance and the request form in the separate pocket within the bag.
CEREBROSPINAL FLUID (CSF)	Sterile plain white topped universal available on wards.	Sealed plastic transport bag with spillage absorbance and the request form in the separate pocket within the bag.

Sputum

This is recognised to be a specimen of limited or no clinical value, and hence should be rarely received. Where patients are unfit for bronchoscopy, three separate sputum samples collected on different days should be sent for cytological examination. Nebulised saline may be used to induce sputum production in appropriate clinical circumstances.

Guidance should be given to the patient on producing a deep cough sample. A salivary sample is inadequate for cytology. The whole of the expectorated sample should be submitted.

Urine (RCPath Guidance 2010)

Freely voided, catheter, ileal conduit specimens or bladder/ureteric washings may be collected. It is essential that the specimen collection method is documented on the request form. Preservative may be used. A maximum of 20 ml of fresh sample is required.

The first urine passed in the morning should be avoided. A mid-stream specimen is sub-optimal. For voided urine, an aliquot of the whole voided sample should be submitted.

Samples may be taken from the upper tract by clinicians experienced in the technique and should be handled in the same way as urine specimens.

Body Cavity Fluids, Cyst Fluids etc

Collect aspirated fluids into plain universal container (white cap).

Red cap universal containers with boric acid must not be used for these specimens.

Collection of the sample may require image guidance. The sample should be removed into a sterile container. 20 ml of fresh sample is required for cytology.

Endoscopic Brushings

Brushes should be rinsed into CytoLyt solution. Special containers are available from the laboratory. Endoscopic brushings may be obtained from a variety of sites. Common sites include bronchus and common bile duct. Ideally the material should be placed into transport medium for liquid-based cytology (LBC). The literature indicates that better results are achieved with this approach than with direct smears prepared at the bedside.

Synovial fluid

Aspirated fluid should be sent for cytology and microbiology.

Fine Needle Aspirations (FNA)

Material must be expelled from the syringe into CytoLyt solution. Wash out the syringe and needle gently in this fluid. FNA containers are available on request from the cytology laboratory.

SWFT FNA Clinic - The FNA thyroid clinic is in the radiology department (scanning room) in the main hospital. The service is provided by South Warwickshire NHS Trust. An aspirate sample is taken by the Radiologist and processed by SWFT Histology lab staff. The clinic takes place every Tuesday from 10am to 1pm, with 5 patients being seen in the clinic. Patients are requested by Head and Neck consultants, and patients are seen by the radiologist.

Breast Cyst aspirates

Clinically benign breast cysts which aspirate to dryness, where the aspirate is not blood stained, may be discarded. Otherwise up to 20 ml of the specimen should be submitted in a sterile container. Imaging guidance may be required to successfully target some lesions.

CSF

Collect fluid into a sterile plain universal container and **deliver to histology immediately.**

Please note that the non-gynae cytology laboratory is open for receipt of specimens Monday - Friday between 9.00 and 5.00pm.

Separate specimens must be taken for biochemistry and/or microbiological examinations. Obtained by lumbar puncture. Ideally, the submitting clinician should ensure a sample is submitted to clinical chemistry and microbiology as well, if appropriate. If a central pathology reception is to be responsible for dividing the specimen, this should be done promptly. A 2 ml sample is ideal for cytology, but examination of smaller amounts can be attempted and is often successful.

* ***Industrial Methylated Spirit is a HAZARD****. It is harmful if inhaled or ingested and is irritating to eyes. It is highly flammable.*
* ***CytoLyt and PreservCyt fluid is a HAZARD.*** *It is harmful by inhalation and ingestion. Avoid contact with skin and eyes. It contains ethanol and is highly flammable.*

Non-Gynae Samples taken out of hours

Fresh unfixed Non-Gynae/Fluid specimens taken outside these times should be kept refrigerated before being sent to the laboratory as soon as possible on the following working day.
Samples in CytoLyt fixative can be kept at room temperature before sending to the laboratory.

MORTUARY SERVICE

All Coroners post-mortems, Forensic and hospital post-mortems (including Rugby St Cross Hospital) are carried out at the UHCW NHS Trust Mortuary.
The mortuary at St Cross Hospital is used for body storage only.
Operating times for UHCW NHS Trust mortuary: 08:00-16.30 hrs Monday – Friday
Operating times for Rugby St Cross: The portering supervisors will receive and release deceased patients according to departmental and trust policy and procedure.

There is a 24/7 365 day service provided by the on-call Technician contactable through switchboard. Mobile number: - Tel 07900 223134 (see: - Out of Hours on-Call Service).

Hospital Post Mortems

Relative's information sheets, advice for doctors and the hospital post mortem consent form are all available in the Bereavement Office Ext. 25838. Pathology staff will advise and assist with consent if this is needed, see numbers above. Send a completed ‘Consent Form’ and ‘Post Mortem Request Form’ with the hospital notes to the Histology office. GPs can use the hospital post mortem service but must fill in the appropriate request and consent forms and liaise with the undertakers to transfer the body to the relevant hospital mortuary.

NOTE:
A hospital post mortem cannot be performed if the cause of death is unknown or uncertain or the death certificate has not been issued.
If the cause of death is uncertain then the case MUST be referred to H. M. Coroner who may decide that a coroner’s post mortem is necessary (see below).

Coroner’s Post Mortems

A case should be referred to the coroner if:
- the cause of death is unknown/uncertain

Or if the patient has:
- recently had a surgical operation/procedure
- recently sustained trauma injury
- died within 24 hours of admission and where the cause of death is in doubt

Or if the death was related to:

- violence
- industrial disease
- suicide

Coroners' officers (Coventry) Tel: 02476 831328
Tel: 02476 833652
Tel. 02476 833345
Fax. 02476 834922

Coroner's officer (Rugby) Tel: 01788 541111 Ext 3749
Mobile: 07775 817 382
Fax: 01926 415752
F.A.O Vivien Hughes, Coroner's Officer

If the death involves violence or is unnatural and of an unknown cause then the relevant Coroner should be informed immediately (day or night time).

For Coventry patients, the fax at the main reception at University Hospital should be used in conjunction with the proforma sheet.

If the Coroner decides a post mortem is required, the hospital notes should initially be sent to the main reception desk, from where they will be taken to the Histology office.

NOTE
If there is potential danger of infection, both the body and the request form should be clearly labelled with the appropriate danger of infection labels.

Post Mortem Reports

Hospital post mortem reports (and copies of Coroner's reports) will automatically be sent to the admitting consultant and the GP. For enquiries regarding post mortem findings or report content please contact the consultant pathologist who issued the report.

Foetal and Neonatal Post Mortems

If specialist perinatal examination of foetuses, still births and perinatal deaths is required, the case should be referred to the Birmingham Women's Hospital. The foetus, still born or neonate should be sent fresh (i.e. without fixative) to the mortuary and, dependent upon size, should either be wrapped or placed in an appropriate container. If the placenta is available, it should be placed in a labelled container of 10% formalin and should accompany the foetus/still birth.

The yellow sticker should be placed on the body/container and the appropriate boxes ticked – for more details see Women's and Children's Directorate policy document 'Policy for the Transfer of Foetuses and Placentas between the Maternity Hospital and the Mortuary/Histopathology'.

Send a completed 'Consent Form' and 'Post Mortem Request Form' with the mother's hospital notes (still births and neonatal deaths) to the Histology office. If neonatal notes are available these should also be sent to the Histology office.

Cytogenetic Studies for Non-Viable Foetuses

Samples for Cytogenetic studies or infection screen **should be taken by the clinician** as soon as possible after birth. Placental tissue is useful for Cytogenetic studies but this must be fresh. Arrangements should be made direct with the Cytogenetic laboratory:

West Midlands Regional Genetics Laboratory
Birmingham Women's Hospital NHS Trust
Metchley Park Road
Edgbaston
Birmingham
B15 2TG
Tel: 0121 627 2710

Burial Arrangements for Non-Viable Foetuses

This service is provided by the Chaplaincy team in conjunction with the UHCW Funeral officer.

The Trust offers a service for the burial of non-viable foetuses (those less than 24 weeks' gestation born without signs of life).

Foetuses will be buried in the Baby Garden at the London Road Cemetery in Coventry or in the Cloverleaf Garden at the Winfield Cemetery in Rugby following a short service conducted by a minister of religion. Parents will be informed of the date and time of the service should they wish to attend. Full verbal and written details of the service will be given to all bereaved relatives.

The Trust is able to assist and/or advise on alternative arrangements. Information can be obtained from nursing staff and the Chaplaincy.

CELLULAR PATHOLOGY – GEORGE ELIOT HOSPITAL

Location

Cellular Pathology is centralised on the SWFT site for Histology and non-gynae Cytology. For further information, please see section for SWFT.

CELLULAR PATHOLOGY- WARWICK HOSPITAL and GEH

Location

The Histopathology Laboratory is located in the Pathology Building on Lakin Road opposite the main Warwick Hospital building.

Service

There is a routine laboratory service Monday-Friday between 7:00 to 19:00 and 8:00-11:45 on Saturdays.

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Enquires and Contact Numbers

	Ext
Telephone 01926 495321 (SWFT switchboard)	
General Enquiries	
Histology Main laboratory	4211/4334
Mortuary Office	4236
Specimen Reception	4223
Peter Everitt – Pathology Porter	8345
Histology Secretaries	4232
Scientific and Technical Advice	
Lead Biomedical Scientist	4208
Consultant Histopathologist Advice	
Dr Richard Carr	4226
Dr Naresh Chachlani	6564
Dr Sri Mallur	4210
Dr Scott Sanders	4212
Dr Farah Sandhu	4253
Dr Amgad Youssef	8186

Histology specimens

Outpatients

60 cm^3 and 20 cm^3 plastic pots containing 10% formaldehyde in 8.5% saline (formalin) are supplied from the laboratory for specimen collection.

NB Formaldehyde is an irritant and may cause dermatitis. Splashes should be washed off with copious water.

The pots bear a label and the patient's details should be filled in as appropriate.

Theatres

A variety of different sized pots are supplied with label (specimen container should be appropriate in size to the specimen).

Formalin is supplied separately in 10 litre containers. When a container needs replenishing, it must be returned to the laboratory for refilling and returning to theatres. Formalin containers **must not** be replenished by theatre staff.

Do NOT wait for all aspirators to be empty before returning. Ensure taps are closed when returning aspirators to the laboratory.

Recharged aspirator will be returned within 24 hours via the Path Lab porter.

Non-Gynae Cytology Specimens

Sputum

Collect in dry sputum pots on 3 consecutive days. The laboratory should receive each specimen on the day it is collected.

Serous Fluid/Pleural Fluid/Ascitic Fluid

Collect in either a plain universal bottle ($20cm^3$) or a universal bottle labelled "FNA CYTOLOGY". It must be sent immediately to the laboratory.

Urine

Collect in a dry 20 cm^3 Universal bottle. The specimen should not be an early morning specimen or a sample from a 24-hour container. It must be fresh and sent to the laboratory as soon as possible.

Fine Needle Aspirate

Collect in 20 cm^3 Universal bottles labelled with a white and orange label marked "FNA Only". It is not necessary to make direct smears from aspirates: simply wash out the cellular contents of the needle into a transport medium. Material must be expelled from the syringe into the CytoLyte solution. Wash out the syringe and needle gently in this fluid. FNA containers are available on request from the histology laboratory.

Cyst aspirate/Hydrocele fluid/All others

Collect in dry 20 cm^3 Universal bottle and send to the laboratory as soon as possible or, if unavoidable, keep refrigerated overnight.

Request forms

Histology and non-gynae Cytology utilise a PS2 form. Supplies of these forms are available from the Pathology Laboratory Porter. Also available are a variety of transport bags. All specimens and their accompanying request forms must be contained in a transport bag prior to despatch top the laboratory.

Please ensure that all request forms include the following information and that the accompanying sample is fully labelled as stated below:

Request Form:

- Surname and forename
- Hospital number
- Date of birth
- Clinical details
- Special factors (e.g. risk of infection Category of patient, NHS Private etc)
- Requesting Doctor
- Consultant
- Source (location of patient which defines where the paper report will be sent)
- Specimen type
- Date and time collected

Sample:

- Surname and forename
- Hospital number
- Date of birth
- Ward/GP practice code
- Date
- Signature of person taking sample

Unlabelled specimens will **not** normally be analysed. They will either be returned for completion, or the requesting clinician will be asked to come to the laboratory to fill in the details on the form or container as appropriate.

Transport of Specimens to the Laboratory

Surgeries
A courier service collects specimens from General Practice surgeries, clinics and other sites. Times of these collections should be available locally. If in doubt, consult laboratory admin or service manager.

Wards
Monday to Friday 09:00 – 17:00, collections are made every 75 minutes. Wards have been notified of times.

N.B. All specimens should be placed in plastic transport bags prior to transportation.

Pathology reports

Please follow these guidelines to reduce the burden of unnecessary telephone calls.

Please ensure that the location and requestor are filled out clearly on the form, so that we are able to return reports, and contact the requestor if necessary.

Ward and Outpatient Reports
Ward and Outpatient reports are delivered to the consultants' secretaries
.
Electronic reports are available in all ward and outpatient areas via the Anglia ICE reporting system. They are available within a few minutes of authorisation which should mean there is very little need to telephone for results. All clinical staff who require access to electronic reports must receive training in the system from the Trust's IT department.

GP Reports
Reports produced on one day are delivered by the courier service the next working morning. Electronic reporting is available for those practices wishing to receive it. Transmission times can be arranged to suit surgery requirements.

Specimen Handling and Collection

High Risk specimens should be identified on the request form and the sample container. Stickers for this purpose are available from the laboratory.

Porters should not accept specimens unless they are in sealed in a plastic transport bag.

Specimens must not be carried in a coat pocket.

MORTUARY SERVICE

All hospital, Coroners including Rugby St Cross Hospital deaths are carried out at the SWFT Mortuary.
Operating times for SWFT mortuary: 07.30-16.30 hrs Monday – Friday.
There is a 24/7 365 day service provided by the on-call Technician contactable through switchboard.
The mobile number for the technician is Tel. 07833 482385

Care after Death

The Trust's policy document 'Guidelines for Practice (Nursing): CARE AFTER DEATH' gives detailed advice on actions after the death of a patient. This document should be consulted for further general information.
It describes the roles/responsibilities of the bereavement service, medical and nursing staff in preparing the body and sending it to the Mortuary. Advice is also given on the special customs and requirements of various faiths.

Viewings

Viewings can be arranged during normal working hours by contacting:
Bereavement Co-ordinator
South Warwickshire NHS Foundation Trust
Tel: 01926 495321 extension 8131
Website: https://www.swft.nhs.uk/our-services/adults-out-hospital-services/bereavement-service

Out of hours viewings are at the discretion of the hospital bleep holder.

ADDRESSES OF REFERRAL LABORATORIES

BIOCHEMISTRY AND IMMUNOLOGY

Clinical Biochemistry
Clinical Laboratory Services
Queen Elizabeth Hospital
Mindelsohn Way
Edgbaston
Birmingham B15 2WB

Department of Chemical Pathology
Sandringham Building
Leicester Royal Infirmary
Leicester LE1 5WW

Biochemical Genetics
Paediatric Laboratory Medicine
Birmingham Children's Hospital
Steelhouse Lane
Birmingham B4 6NH

Department of Clinical Biochemistry and Immunology
Heartlands Hospital
Birmingham B9 5SS

Clinical Biochemistry Department
City Hospital
Dudley Road
Birmingham B18 7QH

Supraregional Protein Reference Unit
Department of Immunology
PO BOX 894
Sheffield S5 7YT

SAS Laboratory
Pathology Centre
Area G
Hammersmith Hospital
London W12 0HS

West Midlands Regional Genetics Laboratory and Clinical Chemistry
Birmingham Women's Hospital NHS Trust
Edgbaston, Birmingham B15 2TG

Clinical Biochemistry Department
UCL Hospitals
3rd Floor, 60 Whitfield Street

London W1T 4EU
Purine lab/Nutristasis Unit/Immunodermatology
5th Floor, North Wing
St Thomas' Hospital
Lambeth Palace Road
London SE1 7EH

Biochemistry
Manchester Royal Infirmary
Oxford Road
Manchester M13 9WL

Department of Clinical Biochemistry
Wythenshawe Hospital
Southmoor Road
Wythenshawe
Manchester M23 9LT

Department of Immunology
Cambridge University Hospitals
Box 109 Cambridge University Hospitals
Hills Road
Cambridge, CB2 0QQ

The Porphyria Service
Department of Medical Biochemistry
University Hospitals of Wales Healthcare NHS Trust
Heath Park
Cardiff CF14 4XW

Toxicology Laboratory
The Academic Centre
University Hospital Llandough
Penarth CF64 2XX

iQur Ltd. (ELF Testing Laboratory)
UCL Institute for Liver & Digestive Health Laboratory
University College London, Division of Medicine
Royal Free Hospital
Rowland Hill Street
Hampstead
London NW3 2PF

Therapeutic Drug Monitoring Unit (TDM Unit), Epilepsy Society
Chalfont St Peter
Chesham Lane
Buckinghamshire, SL9 ORJ

Clinical Biochemistry Department and Haematology
King's College Hospital
Denmark Hill
London SE5 9RS

Immunosuppression monitoring Laboratory
Heart Science Centre
Harefield Hospital
Hill End Road
Harefield Middlesex UB9 6JH

SAS Laboratory
Department of Clinical Biochemistry
Royal Victoria Infirmary
Newcastle Upon Tyne NE1 4LP

Clinical Immunology Service
University of Birmingham
Vincent Drive, Edgbaston
Birmingham B15 2TT

Department of Immunology
Churchill Hospital
Old Road, Headington
Oxford OX3 7LJ

Department of Blood Sciences, Area A2
Royal Devon and Exeter NHS Foundation Trust
Barrack Road
Exeter, EX2 5DW

Clinical Laboratory
Royal Surrey County Hospital
Egerton Road
Guildford GU2 7XX

Biochemistry
Charing Cross Hospital,
Fulham Palace Road,
London W6 8RF

Department of Clinical Biochemistry and Antimicrobial Reference Laboratory
Department of Medical Microbiology
Southmead Hospital
Bristol BS10 5NB

Department of Neuroimmunology and Neurometabolic Laboratory
National Hospital for Neurology
Queen Square
London WC1N 3BG

Laboratory Medicine
Norfolk and Norwich University Hospitals NHS Foundation Trust
Colney Lane
Norwich NR4 7UY

Department of Clinical Pathology, Nottingham University Hospital NHS Trust
City Campus
Hucknall Road
Nottingham, NG5 1PB

Department of Clinical Biochemistry
Rotherham Hospital
Moorgate Road
Rotherham S60 2UD

Department of Clinical Chemistry
Sheffield Children's NHS Trust
Western Bank
Sheffield S10 2TH

Protein Reference unit and Immunology Laboratory
South West London Pathology
St George's Hospital
London, SW17 0QT

The National Creutzfeldt-Jakob Disease Research & Surveillance Unit
Western General Hospital
Crewe Road
Edinburgh EH4 2XU

Chemical Pathology
Great Ormond Street Hospital
Great Ormond Street
London, WC1N 3JH

G23-1C, Biochemistry Department
UCL Institute of Child Health
30 Guilford Street
London, WC1N 1EH

Lysosafe Service
Laboratoire Biologie du médicament et Toxicologie
Hôpital Cochin, 27 rue du Faubourg Saint Jacques
75014 Paris, France

Department of Biochemistry
John Radcliffe Hospital
Headley Way
Headington
Oxford, OX3 9DU

HAEMATOLOGY

Haematology laboratory, Clinical Laboratory Services
Queen Elizabeth Hospital
Mindelsohn Way
Edgbaston

Birmingham B15 2WB

The National Haemoglobinopathy Reference Laboratory.
Oxford Haemophilia Centre
Churchill Hospital
Oxford, OX3 7LJ

Haematology Department, Birmingham Childrens Hospital
Steel House Lane
Birmingham

Haematology Department, Leicester Royal Infirmary
Leicester LE1 5WW

NHSBT Filton (Bristol) , 500 North Bristol Park
Northway
Filton
Bristol, BS34 7QH

Cell Markers Laboratory
Heartlands Haematology Diagnostic Service
Birmingham Heartlands Hospital
Bordesley Green East
Birmingham, B9 5SS

BLOOD TRANSFUSION

Red Cell Immunohaematology Department
National Blood Service
Edgbaston
Birmingham

MICROBIOLOGY

PHE West Midlands, Birmingham Laboratory,
Heart of England NHS Foundation Trust,
Bordesley Green East,
Birmingham B9 5SS

PHE South West, Bristol Laboratory,
Myrtle Road,
Kingsdown,
Bristol BS2 8EL

PHW Microbiology Cardiff,
University Hospital of Wales,
Heath Park
Cardiff CF14 4XW

PHE South East, Epsom Collaborating Centre,
West Park Hospital,
Epsom,

Surrey KT19 8PB

PHE Yorkshire and Humberside, Leeds Laboratory,
Bridle Path,
York Road,
Leeds TS15 7TR

PHE Colindale,
61 Colindale Avenue
London NW9 5HT

PHE North West, Manchester Laboratory,
Manchester Royal Infirmary
Oxford Road
Manchester M13 9WZ

PHE North West, Preston Laboratory,
Royal Preston Hospital,
PO Box 202,
Sharoe Green Lane,
Fulwood,
Preston PR2 9HG

PHE West Midlands, Shrewsbury & Telford Laboratory,
Princess Royal Hospital,
Apley Castle,
Telford TF6 6TF

CELLULAR PATHOLOGY

Histopathology laboratory, Heartlands Hospital
Bordesley Green East
Birmingham, B9 5SS

Histology laboratory, QE Hospital Birmingham
Mindelsohn Way
Edgbaston Birmingham B15 2GW

Dermatopathology laboratory, St John's Institute of Dermatology
St Thomas' Hospital
Westminster Bridge Road
London, SE1 7EH

Source Bioscience
1 Orchard Place
Nottingham Business Park
Nottingham, NG8 6PX

Electron microscopy
Level 3, Sandringham Building
Leicester Royal Infirmary Hospital
Leicester, LE1 5WW

Health Services Laboratories Advanced Diagnostics
19 Fitzroy Street,
London, W1T 4BP

Histology laboratory, Newcastle-upon-Tyne Hospitals NHS Foundation Trust
Queen Victoria Road
Newcastle Upon Tyne, NE1 4LP

Histology Laboratory, Oxford University Hospitals NHS Foundation Trust
Oxford OX3 9DU

Histology Laboratory, Cambridge University Hospitals NHS Foundation Trust
Hills Road
Cambridge, CB2 0QC

Department of Molecular Pathology
University Hospital Southampton NHS Foundation Trust
Duthie Link Building, Mailpoint 225
Hampshire SO16 6YD

Micropathology Ltd, Venture Centre
University of Warwick Science Park
Sir William Lyons Road
Coventry, CV4 7EZ

Redwood City California USA
301 Penobscot Dr
Redwood City, CA, 94063-4700
United States

Histopathology, University Hospitals of North Midlands NHS Trust
Royal Stoke University Hospital (RSUH)
Main Building –floor 2
Newcastle Road
Stoke-on-Trent, ST4 6QG

Histology laboratory, Royal Brompton Hospital
Sydney Street
London, SW3 6NP