Sheffield Children's NHS
NHS Foundation Trust

LABORATORY HANDBOOK

APRIL 2023 EDITION

Reference:	CG1043 v14
Written by:	Laboratory Handbook Group
Peer reviewer:	Camilla Scott
Approved:	February 2023
Review Due:	March 2024 (do not use this edition after this date)

Purpose

This handbook gives pre-analytical information and guidance to laboratory service users when requesting tests and includes:

- Details of services provided
- Laboratory contact details and opening hours
- Details of phlebotomy services
- Instructions for completing sample and request form information
- Arrangements for transporting samples to the laboratories
- Point of care testing

Note: This handbook **does not** contain specific test and sample type information – this can be found in the test directories on the relevant section of the webpage https://www.sheffieldchildrens.nhs.uk/laboratory-medicine/

Intended Audience

All users of Laboratory Medicine services at Sheffield Children's NHS Foundation Trust (SCFT)

Contents

GENERAL INFORMATION

INTRODUCTION

Laboratory Medicine forms part of the Pharmacy, Diagnostics and Genetics Care Group at SCFT. There are four laboratory specialities (listed below) and a mortuary service.

- Clinical Chemistry (includes Inherited Metabolic Disease and Newborn Screening)
- Haematology and Blood Bank
- Histopathology and Mortuary
- Sheffield Diagnostic Genetics Service

This handbook has been prepared following consultation with users of Laboratory Medicine services to give pre-analytical information and guidance to Laboratory Medicine service users when requesting tests. Any comments or suggestions for improvement should be directed to the Laboratory Medicine Quality Manager.

INTENDED AUDIENCE

This handbook is for the use of all users of Laboratory Medicine services at Sheffield Children's Hospital. This edition of the handbook should not be used after the stated review date.

Before requesting tests, regard should also be given to Asher's Criteria (BMJ 1954, ii-460)

1. Why am I ordering this test?
2. What am I going to look for in the result?
3. If I find it, will it affect my diagnosis?
4. How will this affect my management of the case?
5. Will this ultimately benefit the patient?

REFERENCES

In addition to the information provided in this handbook the Trust provides Clinical and Medical guidelines for use within SCFT. These are available on the Trust intranet

http://nww.sch.nhs.uk/documents/3-clinical-guidelines
http://nww.sch.nhs.uk/documents/24-medicine-handbook

QUALITY

Quality Commitment
Provided that the guidelines as detailed in this handbook are followed all service users, including referring laboratories, can expect a commitment to continued quality from Laboratory Medicine for all work and services that are provided on their behalf. Laboratory Medicine will also proactively engage with service users and institutions that refer tests and will notify them of any significant issues or changes (including issues with EQA performance and turnaround times) that can affect results or interpretations that are given to them or that may impact on patient management and care.

External Quality Assessment and Laboratory Accreditation
We have an established quality management system and all our laboratories participate in regular audit and external quality assessment schemes such as the United Kingdom Accreditation Service (UKAS) for ISO15189, Medicines and Healthcare products Regulatory Agency (MHRA), the Human Tissue Authority (HTA) and the Joint Accreditation Committee-ISCT (Europe) & EBMT (JACIE). ISO 15189:2012 is an international standard which specifies the requirements for quality and competence for medical laboratories. The accreditation process involves annual visits by the United Kingdom Accreditation Service (UKAS) to ensure compliance against the standard. Accreditation provides assurance to users of the Laboratory Medicine service that we are providing the best quality service.

A full list of all accredited tests provided by our laboratories are detailed in their Schedule of Accreditation. Each Schedule of Accreditation can be viewed by entering the UKAS Reference Number in the search field at the link below:

https://www.ukas.com/search-accredited-organisations

Laboratory	UKAS Reference
Clinical Chemistry	10139
Haematology	8091
Histopathology	8093
Sheffield Diagnostic Genetics Service	8652

Some tests provided by our laboratories are not included within the Schedule of Accreditation. These tests are identified in the separate lists of laboratory investigations and/or are identified in the test report and are managed within the Laboratory Quality Management System. If further information is required please contact the laboratory via the contact details in their section of this handbook.

Further information regarding UKAS accreditation can be found on the website **http://www.ukas.com**

Quality Assurance
All our laboratories participate in national external quality assurance schemes to monitor the accuracy and precision of its analyses. Internal quality control is used to check the validity of results on a day-to-day basis.

Quality Indicators
The laboratories have established a selection of key quality indicators to monitor and evaluate performance throughout critical aspects of pre-examination, examination and post-examination processes. Primarily we monitor these quality indicators to evaluate the laboratory's contribution to patient care. This monitoring process is planned, which includes establishing the objectives, methodology, interpretation, limits, action plan and duration of measurement. To ensure their continued appropriateness, we review the quality indicators at least annually as part of our Laboratory Medicine Annual Management Review process.

Quality Concerns and Complaints
If you have any issues about the quality of service you receive please contact the Laboratory Medicine Quality Manager, the appropriate Laboratory Manager, the Associate Director or a Clinical Director. Contact names and numbers are given in the Contact Details sections of this handbook.

Alternatively health professional service users who wish to make any comments or suggestions may use the feedback form on the Trust website

https://www.sheffieldchildrens.nhs.uk/laboratory-medicine/

CHANGES IN PRACTICE IN RESPONSE TO THE COVID-19 PANDEMIC

- For all samples from patients who have tested positive for Covid-19, or are suspected as being Covid-19 positive, the accompanying request should clearly indicate the patient's Covid-19 status.

Please also check each departmental section for notice of other important changes of practice during the Covid-19 pandemic.

LABORATORY MEDICINE CONTACT DETAILS

Sheffield Children's Hospital		
Hospital switchboard		0114 271 7000
Laboratory Medicine		
Clinical Director	Prof Marta Cohen marta.cohen@nhs.net	Ext 17486
Associate Director	Trevor Taylor trevortaylor@nhs.net	Ext 53615
Deputy Associate Director	Dan Bower **daniel.bower1@nhs.net**	Ext 58425
Laboratory Medicine Quality Manager	Heather Da Costa **Heather.dacosta@nhs.net**	Ext 53885
Laboratory Medicine Quality Assistant	Joanne Castelhano j.castelhano@nhs.net	Ext 53884
Care Group IT Manager	Tahir Mahmood scn-tr.pdqadmin@nhs.net	Ext 53064
Care Group IT Administrator	Position Vacant	Ext 53064

PHLEBOTOMY SERVICES

A phlebotomy service is provided for capillary blood sample collection on the wards.

1. Collection of capillary blood samples on wards

Samples are collected by laboratory staff according to the following schedule.

VENUE	DEPT RESPONSIBLE	COLLECTION TIME (Monday to Friday)
Ward 1-6	Clinical Chemistry &	09.30

	Haematology	
NSU & PCCU	Clinical Chemistry	13:30

N.B. On Saturdays, Sundays and bank holidays a collection at 09:30 is made at the Children's Hospital for urgent Clinical Chemistry and Haematology requests. Laboratory staff are unable to carry out capillary collections at any other time, and venous samples will therefore be required if request forms are not left out for this round before 9 am.
It is important that request forms are written up *before* these rounds commence or phlebotomy requests may be missed.

The weekday 09:30 round is carried out by a team of 4 staff. The other rounds (including the weekend rounds) are carried out by a maximum of 2 staff, and **therefore requests should be limited to emergencies and new admissions only**.

It is the requester's responsibility to consider the impact and safety of the patient on the volume of blood withdrawn by phlebotomy. Please be aware that the amount of blood collected is always matched to the tests or profiles requested. It therefore may not be possible to add on extra tests by subsequently phoning the laboratory.

2. Thumb Prick Sample Collection for Blood group and Save Serum/Cross Match

Blood Bank testing of capillary samples is carried out provided the following are observed. Exceptions may be discussed with the Consultant Haematologist.

1. Patient must be aged eight years old or under.
2. The patient's expected potential requirement for blood must be one unit or under.
3. The patient must have a fully completed and signed blood bank request form.
4. Collection of blood for other tests at the same time is limited to a FBC. Deferring tests for later occasions may be considered after discussion with parents and ourselves.
5. Should serological problems be encountered a venous blood sample will be needed urgently.
6. Performing a group and save while the patient is an outpatient is to be encouraged. It will forewarn of problems before admission.
7. 1ml EDTA sample should be obtained

SPECIMEN COLLECTION BY CLINICAL STAFF

Clinical staff are responsible for collecting blood samples themselves in the following instances.

1. If laboratory staff are not available
2. If venous or arterial blood samples are required
3. If samples are required from patients who are distressed, who carry serious risk of infection or who refuse a capillary sample
4. Any circumstances where procedures other than straightforward capillary blood collection might be involved
5. If checking a high or low potassium result (Venous or arterial blood required)

Blood Sampling from Lines and Catheters

Samples collected from lines are often contaminated with the stagnant or infused fluid in the line. The results of tests may be so extreme as to be obviously in error. Contamination of a lesser degree is more likely and may be impossible to spot.

Skin Biopsies This title needs moving onto next page

Requests for skin biopsy cultured fibroblasts from SCH patients must be accompanied by a consent form. Guidelines for sample collection and consent forms are available on request (contact Joanne Croft (joanne.croft4@nhs.net) by email or on 0114 271 7267 (answer phone).) For further information and details of arrangements for skin biopsy requests from external hospitals please refer to the Skin Biopsies section of the separate test directory.

PHLEBOTOMY AND PATIENT IDENTIFICATION

When taking blood or any other pathological samples the instructions provided in sections 3.1, 4.2 and 4.4 of the Trust's Patient Identification Policy must be observed.

In observation of the Trust's Control of Substances Hazardous to Health Policy (HS790) personal protective equipment appropriate to the patients clinical indication, including, but not limited to, gloves and protective clothing, shall be used while handling biological specimens. Such protective equipment shall not be worn outside the work area.

Laboratory personnel who take capillary blood samples from in-patients follow the procedure given below. It is equally applicable to other staff groups who take pathological samples.

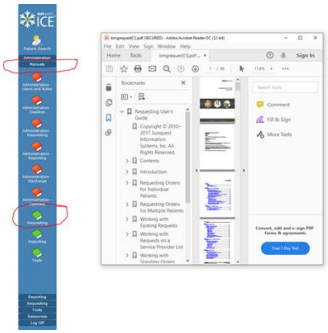
- Specimen containers **must not** be labelled in advance of receiving the specimen.
- At the bedside, obtain the patient's name and date of birth by asking the patient/parent carer to state it (do not merely get confirmation of a name you state). Check this information is compatible with the patient identification band on wrist or ankle.
- If the patient is unable to tell you their name, refer to the identification band and, if possible verify the information by asking the parents/carer or another member of the clinical staff who knows the patient.
- If the patient is unable to tell you and they do not have an identification band, ask the patient's parent/carer if present or another member of the (clinical staff who knows the patient to identify the patient by name, and date of birth). **An identification band should then be generated and secured to the patient as soon as possible. Collection cannot go ahead if the band is absent,** and phlebotomists are not obliged to wait until this is completed.
- Check that the details on the identification band match the details given with those provided on the request form.
- The patient must not be bled in the absence of a request form or an alternate agreed test request arrangement.
- Proceed with the collection if all is correct. **Note:** For patients who cannot wear identification bands on wrist or ankle it is acceptable to have the band pinned to their clothing. **Collection cannot go ahead if the band is absent.**
- Once the specimen is received into the container, the patients identification band must be re-checked before completing the details on the container to ensure the correct details are matched to this specimen.
- The absence of an identification band, or the presence of conflicting details on the band and request form, are considered as breaches of Trust policy. Incidents of this nature should be referred to the Ward Manager and the patient must not be bled. Datix incidents will be recorded for investigation at ward level.
- The sample must be labelled at the bedside. This is Trust policy and is audited.

Sample and request form information must relate to the person from whom the sample was taken. Samples labelled with 'mother of', 'father of' or 'baby of' etc

will not be accepted. The only exceptions to this are solid tissue samples for pre-natal cytogenetic analysis, and fetuses up to 18 weeks gestation that are for post mortem examination.

REQUESTING LABORATORY TESTS USING THE ICE REQUESTING SYSTEM (INCLUDING SAMPLE LABELLING AND PACKAGING)

Test requests for the Clinical Chemistry, Haematology and Blood Bank, Histopathology, Microbiology, Virology and Immunology laboratories are now made using online access to the ICE Requesting System.



Details on how to use this system are contained in the appendices at the end of this handbook.

In the case where ICE Requesting is unavailable for a particular laboratory i.e. Blood Bank, Sheffield Diagnostic Genetics Service, or in the event of ICE Requesting downtime, the process is to use the paper request form option as follows.

REQUESTING LABORATORY TESTS USING PAPER REQUEST FORMS (INCLUDING SAMPLE LABELLING AND PACKAGING)

Please use the correct request form specified as follows:

Green Clinical Chemistry request form	SCH requests for Clinical Chemistry
Pink Haematology request form	SCH requests for Haematology (NOT for Blood Bank – see below)
White Blood Bank request form	Essential for requests for group, group and save serum, group and cross-match, DCT
Yellow Histopathology request form	SCH requests for Histopathology (except Gastrointestinal Biopsies - see below)
White A4 Gastrointestinal Biopsies request form	SCH requests for Gastrointestinal Biopsies (Histopathology) only
White A4 Request for Placental Histology form	Requests for Placental Histology
Post Mortem Consent form	Requests for Hospital Post Mortems
Record of Parents Wishes form	Request for Coroners Post Mortems
Blue Microbiology, Immunology, Virology request form	SCH requests for Microbiology, Immunology and Virology
Sheffield DiagnosticGenetics Service request forms	Requests for Sheffield Diagnostic Genetics Service tests (select relevant request form from the Trust website https://www.sheffieldchildrens.nhs.uk/sdgs/)

If exceptional circumstances dictate that a test request is made verbally or by letter, then this request must be followed by a completed request form or electronic equivalent within 7 days.

All request forms *must* contain a minimum of the following essential information:

Request Form Essential Criteria
Full name (initials will be classed as missing information)
DoB (age only will be classed as missing information)
At least one of the following

• Hospital number • A/E or Major Incident Number • NHS number. • Clinical Genetics Family ID
Name of the requesting consultant (initials or full name) or location (ward/department) to which results are to be sent. Name and location is required for Sheffield Diagnostic Genetics Service requests.
Test required
Blood Bank request forms must be signed by the requesting clinician and also include details of any special requirements the patient may have i.e. irradiated (see back of request form), or details of any underlying conditions that mean the patient could need special products (see back of request form), and state if the patient is pregnant. Details of any recent transfusions (including those performed elsewhere) are also required.
Histopathology request forms must also include clinical details for all specimens sent

The following information is also highly desirable:

Request Form Desirable Criteria
Name of the person collecting/obtaining the sample.
Date & time sample(s) taken (where relevant)
Sample type
Clinical details (full and appropriate clinical details including circumstances that may increase the risk of infection e.g. relevant travel history must be included. Not including clinical details may affect the meaningful interpretation of results)
Patient's address including postcode
Patient's sex
Clinician's bleep number

Clinical details and the patient's age are particularly important in paediatric requesting so that laboratory staff may:

1. Understand the reason for the request
2. Interpret the results

3. Consider the need for further investigations
4. Advise and assist the clinical staff concerning the results obtained.

Additional information may be appropriate for specialised metabolic. toxicological or blood bank requests. For genetic testing please include any known, relevant family history.

It is the responsibility of the requestor to ensure that a **completed** laboratory request form accompanies **every** sample for which an analysis is required. The only exemptions to this rule are:

1. When more than one tube is required to provide sufficient sample for the test.
2. Routine Newborn screening where a completed Guthrie card is sufficient
3. Tissue Culture tests where details of the request are provided in a covering letter.

High Risk Samples
Medical staff must also indicate on the request form if the sample to be sent to the laboratory might carry a risk of Category 3 infection (using the yellow Cat 3 labels on both the request form and sample), and the nature of the infection should be stated in the clinical details section of the request form. An indication should also be made on the form if the patient has a communicable disease such as rubella, for the protection of any laboratory staff who might attend the patient. A Datix incident will be raised for investigation at clinical area where a high risk sample is not identified appropriately to laboratory staff.

Please alert the histopathology laboratory prior to sending any high risk samples to them if possible. Such samples must be placed in 10% neutral buffered formalin and transported to the laboratory by hand. The request form for these samples must also identify the biohazard within the clinical details. Samples for other reference labs related to the same case, should be sent directly to the appropriate laboratory.

Labelling of Pathological Samples
When collecting and labelling samples, the criteria for patient identification (outlined earlier) must be followed. **Sample and request form information *must* also be compatible**. Samples will only be accepted for analysis if the following minimum criteria are met. **This responsibility lies with the person collecting the sample.** Failure to meet these requirements may result in the sample being rejected.

Minimum Criteria for Blood Bank and Histopathology Samples
Patient's full name (if forenames have not been given use Baby, Twin One/Two, Triplet One/Two/Three, etc. Initials will be classed as missing information)
Date of birth (age only must be classed as missing information)
Any of the following • Hospital registration number • A/E or Major Incident number • NHS number • PM Number (for Histopathology samples if applicable)
For Blood Bank requestes the sample must be signed and dated by the staff member taking the sample.

Ideally Blood Bank samples should also be signed/initialled by the primary sample taker.

N.B When cross matching for infants up to 4 months of age the laboratory prefers to use maternal plasma in addition to the baby sample. Maternal samples must be labelled with the mother's surname, forename, and DoB. Such maternal samples should not be labelled with the child's hospital number.

Minimum Criteria for Newborn Screening (Guthrie) Cards
Patient's surname
Date of birth
Location

Minimum Criteria for Other Laboratory Samples
Patient's full name (if forenames have not been given use Baby, Twin One/Two, Triplet One/Two/Three, etc. Initials will be classed as missing information)
At least one of the following: • Date of birth (age only must be classed as missing information) • Hospital registration number • A/E or Major Incident number • NHS number
Location

The Clinical Genetics Family ID number must also be present on samples sent from Clinical Genetics.

And ideally for samples being tested for patient monitoring purposes the following should also be included:

- Date sample taken
- Sample type

N.B. In the event of an unconscious child being admitted via casualty or during a Major Incident laboratory staff will accept a sample clearly labelled with a unique identifier i.e. A&E number/ Major Incident number, child's sex.

Packaging Samples
In signing a request form the person making the request assumes responsibility under Section 7 of the Health and Safety at Work Act and must adhere to the following guidelines regarding the labelling and packaging of samples to minimise the danger of infection.

- Every sample must be enclosed in a suitable, leak proof, primary container.
- The sample must be contained in a transparent leak proof plastic transport bag.
- Containers for large specimens, such as some Histopathology or 24-hour urine specimens, may be enclosed in individual clear plastic sacks, sealed to contain any leakage.
- The request form must be separated from the specimen. Please place the specimen inside the plastic transport bag attached to the request form. For larger containers the request from should be securely taped to the outside of the transport sack containing the specimen.
- The request form should not be attached to the sample container or be used as a sample label.
- For Category 3 risk patients the requester must include full and appropriate clinical details, nature of the infection/risk, and danger of infection labels **on both request form and sample.**
- Any labels and stickers used must be self-adhesive.
- Pins, staples, and heat sealed bags should not be used.
- Plastic transport bags must not be re-used.

If any samples are to be transported by postal, courier or taxi service directly from the clinical area to locations outside the Trust, they must be packed and labelled according to the regulations for the transport of dangerous goods.
Please contact the laboratory for details of this requirement. Specimens for transport by post should always be labelled as 'First Class – Royal Mail only'.

SAMPLE TRANSPORTATION

On-site Sample Transportation
Primary sample transportation to SCH laboratories is the Pneumatic Tube System (PTS) and Stations are located in A&E, PCCU Ward 6, CF Unit, OPD, Ward 3, Ward 7, Theatres, Oncology/Haem OPD, Theatre Assessment unit, Ward 3, Ward 4, and Ward 5, Clinical Chemistry, Histopathology, Haematology and SDGS. Samples can be sent directly to all laboratories from any of these stations. Copies of operating and breakdown instructions for the pneumatic tube system (PTS) can be found in each of these areas. Please ensure that the transport pods are properly closed, and do not attempt to send samples via the pneumatic tube system (PTS) unless they are in a pod.

N.B Urgent frozen sections from theatre and specimens for histopathology that have a high risk of infection must not be sent via the pneumatic tube system (PTS).

If the pneumatic tube system (PTS) is not working there will be a sample collection round of ward and clinic areas carried out by the Medical Laboratory Assistant (MLA) at the following times 11:30 13:30 and 15:30 Monday - Friday**.** These rounds take about 15 minutes. All samples for collection must be properly packaged and left at the agreed point on each ward or clinic area. If there is visible leakage of the specimen prior to transport, this must be reported to the nurse in charge and it be requested that the specimen is placed in an additional sealed transport bag.

Specimens fixed in formaldehyde should have the lid securely closed and contain sufficient formaldehyde to keep the sample moist during transit to keep the risk of spillage to a minimum. They should have a formaldehyde hazard label attached to the outside of the container and be placed into a secondary leak proof bag. If there is leakage of formalin, the formalin spillage procedure must be followed; in these cases please contact the Histopathology Laboratory on 01142717264 for advice.

Specimens can also be taken to the relevant laboratory during working hours and handed to a member of the laboratory staff. If an incident occurs during transit, it should be immediately reported to the laboratory and if necessary ask for assistance. Please note that **urgent and fresh Histopathology samples *must* be taken by hand to the department and handed directly to a member of staff.**

Some samples will need special requirements for transport e.g. should be transported on ice, for specific requirements please refer to the test directories available on the intranet.

Samples suspected of biohazard category 4 organisms e.g. Ebola virus, viral hemorrhagic fever etc, must not be sent via the pneumatic tube system (PTS). Prior to sending, contact must be made with the Consultant Microbiologist and the laboratories..

N.B. Health and safety regulations for on-site transport stipulate that when carrying specimens, staff must use secure specimen transport carriers. For occasions when the MLA is not utilised, it is the responsibility of the person carrying samples to the laboratory to ensure that samples are carried in the green sealable sample transport bag. Under no circumstances should anyone transport specimen containers in their hands or pockets.

Transport of urgent samples
The pneumatic tube system (PTS) is the preferred mode of transport for urgent samples and for transporting samples out-of-hours, **with the exception of Histopathology samples** – see previous information. Urgent specimens **must** be arranged with the laboratory before dispatch. Do not merely write 'Urgent' on the request form and send.

Sample transport arrangements during pneumatic tube system (PTS) failure
In the event of pneumatic tube system (PTS) failure a member of the laboratory team will collect samples from the wards at the following times 09:00, 11:30, 13:30 and 15:30. Outside of these times it is the responsibility of the person taking the sample to ensure it reaches the appropriate laboratory.

Transport of samples to Sheffield Teaching Hospitals
A regular CampusLink taxi shuttle collects samples at 09:40, 11:10, 13:10, 14:40, 16:10, and 16:45 Mon-Fri from Clinical Chemistry for dispatch to the NGH and RHH laboratories; urgent samples in-between these times may also go via urgent-taxi. Outside routine working hours, scheduled couriers call into A&E reception at 18:30, 19:30, 21:30 and 23:00 on week nights and at 08:30, 11:30, 14:30, 17:30, 19:30, 21:30 and 23:00 at weekends and bank holidays.

Please note that during routine hours (09:00 -17:00 weekdays) Immunology and tests referred to STH must be sent via the SCH Clinical Chemistry department. Also please ensure that when requests for CSF protein, glucose and lactate are required alongside requests for microscopy, culture and sensitivity (M, C & S), the CSF sample **must not** be sent directly to Microbiology. The CSF sample is tested at SCH, and the sample for M, C & S is tested at STH.

REPORTS

Clinical Chemistry, Haematology, Blood Bank, Histopathology, STH Microbiology and STH Immunology Reports

No printed reports are sent out from Clinical Chemistry, Haematology, Blood Bank, Histopathology, Microbiology or Immunology, with the exception of post mortem reports, reports to external purchasers, dynamic function tests reports and reports for samples referred to external laboratories. Printed post mortem reports are sent to the appropriate requesting consultant/coroner, printed reports for other exceptions are delivered by hand to the wards and departments at approximately **09.15 and 15.45.**

Urgent reports will be telephoned if requested. Each laboratory also has limits outside of which the results are telephoned automatically. Authorised Clinical Chemistry, Haematology, Blood Bank, Histopathology, Microbiology and Immunology results are electronically accessible via ward/office computers through the hospital network or directly from the PC desktop 'ICE' icon. ICE passwords can be obtained by emailing PDG IT Admin team on scn-tr.pdgadmin@nhs.net

Using ICE desktop reporting.

ICE is available on at least one PC terminal on each ward and should be used to access results prior to contacting the laboratory. The snowflake desktop icon is labelled "ICE desktop reporting."

- Upon clicking the ICE Desktop reporting icon a login screen is presented – click ***login***
- Enter **username** and **password** (not case sensitive) and click ***login***.
- Select a ward/location from the list that represents where you are.
- The system takes you straight to patient enquiry where a hospital number or name or DOB can be entered. Click on ***patient reports*** button in left panel. This query will always present **all** results available for that patient.
- If you wish to view multiple patient reports by ward then click the ***View ward report*** icon within the left hand panel.
- This will display only the **20** most recent reports for the default location. The display defaults to patient reports at the same location as your PC e.g. Ward 6 or ICU however patient's results at another location can be viewed from any workstation by selecting an alternative from the top left hand pull down list.
- To view earlier reports click ***earlier reports*.** The default number of days of previous results in the Ward view is 7 days. This can be changed by the user or just keep clicking "earlier reports" to go back in time.
- Cumulative report displays with graphical views are available and can be printed.
- An online manual is available by clicking ***manuals*** in the left hand pane.
- The colour of each report indicates the laboratory specialty.

- When leaving your workstation unattended please log off using ***log off*** button in the lower left hand panel.
- The Laboratory handbook can be accessed by entering **Resources**.
- Reports can be filtered by lab speciality and requesting clinician.
- Filing of results is audited monthly to ensure reports are viewed and acted upon as appropriate.

Users are encouraged to notify the laboratory of patient duplicates or demographic inaccuracies. The quality of report demographics is dependent upon the quality of data we receive. Consistent use of the hospital number enables cumulative reports to be created and viewed.

Genetics reports
Genetics reports are sent by first class post or email (by special arrangement). Urgent rapid prenatal results are emailed directly to the referring centres. HODS reports are transferred automatically from StarLIMS to the HODS website. Results are available by phone and urgent results can be telephoned or emailed if requested.

PROTECTION OF PERSONAL DATA AND INFORMATION

Personal data and information on request forms is required in order for the laboratories to operate and may be stored on laboratory computer files. The intent of the laboratories is to ensure that any personal data and information is treated lawfully and in accordance with the NHS requirements concerning confidentiality and information security standards. To this end we fully endorse and adhere to the Trust Data Protection Policy, the requirements of which are primarily based upon the General Data Protection Regulation (GDPR)which is the key piece of legislation covering security and confidentiality of personal information.

UNCERTAINTY OF MEASUREMENT

In clinical laboratory testing there are potential "uncertainties" that can affect test results (for example; poor specimen collection or transport, patient related factors such as biological variation and the presence of drugs, or other interfering factors).

In addition, the analytical process itself is subject to some degree of inherent variability and this is often referred to as the "reproducibility" or "imprecision" of the method. Laboratories regularly monitor this by the use of internal quality control samples within each batch of analysis and by comparing the results of

external quality assurance schemes designed to ensure that results are comparable with others laboratories using similar methods.

Despite these control measures it must be recognised that variation can occur and modestly differing sequential results may not always have clinical relevance. The relevance of a particular result or a change in value must be considered in light of both the reproducibility of the method and the biological variation within the patient. If in doubt concerning the significance of a result or a change in sequential results, a member of the laboratory or relevant clinical staff should be contacted and they can help guide interpretation.

Providing relevant clinical details at the time that the request is made can also clarify the significance of a particular result or a change in results.

Measurement uncertainty data for specific tests can be provided to service users upon request.

POINT OF CARE TESTING

All POCT equipment is to be used by **trained** users only. The blood gas analysers situated on NSU, ICU and A&E are connected to Clinical Chemistry by computer link and are for the use of **trained and certificated** operators e.g. Anaesthetists/Doctors/Nurses/laboratory staff only. Training is arranged at induction: see contact details at the end of this section.
Trust policy is that unique barcodes following training are issued to certified staff and must not be shared with others. Use of the analysers without certification or training, or the use of another operator's barcode are disciplinary offences; constituting both clinical risk , and risk to this vital patient service.

- Haemoglobin fractions, Electrolytes (Sodium, Potassium, Chloride, Ionised Calcium) and Metabolites (Glucose and Lactate) are available on each analyser.
- Capillary, venous, and arterial samples for blood gas analysis should be transported using a cardboard tray along with a completed request form or patient addressograph label which acts as the source of patient identification to key into the analyser. Samples must be mixed thoroughly by rotation immediately after collection and prior to analysis to minimise clots and the sample separating. Avoid air bubbles.
- Blood glucose testing is undertaken on the wards using Accu-chek Inform II hand held meters. An operator Identification number is required to use this meter and is issued on successful completion of training and

competency assessment. All patients being monitored for blood glucose should send a paired sample to the laboratory for analysis daily.

- POCT glucose results **less than or equal to 3.1 mmol/L** must have a corroborative sample sent to the Clinical Chemistry laboratory in case of hypoglycaemia.
- Urine Specific Gravity testing using the Atago refractometer is available on Ward 6. Staff must be trained and certificated before they use these meters.
- Urine dipstick testing is performed by trained operators using the Clinitek Status Plus analysers. A barcode is required to use this analyser and is issued upon successful completion of training and competency assessment.
- Abbott Freestyle Optium H ketone meters are available on PCCU Ward 3, Ward 4, A&E/AAU and Ward 5. Staff must be trained and certified before using these instruments.

Test	Specimen Type	Collection Type	Tube	Sample Volume	Notes / Comments
Blood Gas Siemens RAPIDPoint® 500 Blood Gas Analyser (A&E, ICU & NSU)	Whole blood	Arterial/Venous	Siemens RAPIDLyte® balanced heparin syringe (3ml)	800 µl (minimum fill volume)	Any air present must be expelled immediately after collection. Mix the sample as soon as possible after collection to distribute the heparin throughout the sample. Mix the anticoagulant thoroughly by rolling the syringe between your palms at least 20 times & gently inverting it several times. Take care to avoid warming the sample. Never analyse a clotted sample on the blood gas analyser.

		Capillary	Balanced heparinised capillary (100 µl)	100 µl	Fill the tube completely & cap it with capillary closing caps. Mix the sample as soon as possible after collection to distribute the heparin throughout the sample & again just prior to analysis as a minimum.
Glucose Accu-Chek® Inform II Glucose Meter	Whole blood	Venous, arterial, neonatal, & capillary whole blood from the finger. For neonatal patients the outer heel area may be used.	A fresh whole blood drop taken directly from the finger is the sample type of choice.	0.6 µl	All inpatients being monitored by this glucose test strip method must have a 'paired' fluoride sample sent to the Clinical Chemistry laboratory for a glucose test daily.

β-Ketone (Beta-hydroxybutyrate) Abbott FreeStyle Optium H Ketone Meter	Whole blood	Capillary	Fresh capillary finger-prick.	1.5 µl	Always calibrate the meter with each new box of test strips. Use ONLY the calibrator supplied with the test strips. Test results may be erroneously low if the patient is severely dehydrated, or severely hypotensive, in shock or in a hyperglycaemic-hyperosmolar state.
HbA1c (Haemoglobin A1c) Siemens DCA Vantage® HbA1c Analyser (Diabetic clinics).	Whole blood	Capillary	Fresh capillary finger-prick.	1.0 µl	Conditions such as haemolytic anaemia, polycythaemia, homozygous HbS and HbC, can result in decreased life span of the red blood cells which causes HbA1c results to be lower than expected.

Urine Specific Gravity Atago UG-1 Digital Urine S.G Refractometer (Ward 6)	Urine	Collect urine as per ward policy.	Z10	0.2 ml	
Urinalysis Siemens Clinitek Status+	Urine	A first voided mid-stream morning urine is best for routine analysis.	Z10	10 ml	

Reporting Point of Care Test results

Test results must be transcribed onto patient charts and/or nursing notes as follows:-

1. Transcribe blood gas reports onto ward charts/patient notes.
2. Sign off all transcribed results as checked.
3. Always include the date and time of test.
4. Always identify the operator.
5. Identify all results from POCT equipment as 'POCT' results in the patient notes, to distinguish results from those obtained by the Clinical Chemistry main laboratory analysers.
6. Attach adhesive urine dipstick reports to patient notes.
7. Highlight all abnormal results generated by POCT equipment according to local ward procedures.
8. Document all actions taken in response to POCT results in the patient notes e.g. notification to medical staff.

The Clinical Chemistry Duty Biochemist (bleep 095) is available for advice and/or interpretation of results.

The Point of Care Testing Committee, chaired by Katherine Wright, oversees all ward based testing and any concerns, queries or proposed developments should be directed to this group. Please note that POCT services are not currently accredited to ISO 15189.

POCT Co-ordinator Ext 17305 Bleep 053

RELATED LABORATORY SERVICES IN SHEFFIELD

		Telephone Ext
Laboratory Medicine Directorate Sheffield Teaching Hospitals	Dr Ravishankar Sargur (Clinical Director)	27 15704
	Olivia Hardy (PA to Clinical Director) Julie Cooper (Directorate Secretary – PA to LLMs)	14717 / 12296
Telephone 0114 2434343	Mr Dean Tazzyman (Interim Lead Lab Manager for Blood Sciences)	66454
	Ms Rachel Leff (Interim Lead Lab Manager for Histology)	13727
	Ms Leanne Tovey (Interim Lead Lab Manger for Microbiology and Virology)	14528
	Mr R Fleming (Quality Manager/Risk Lead)	15319
	Ms S Cassidy (Directorate Business Manager)	69471
	Sharon Burgin (Laboratory IT Manager)	66573
Department of Clinical Chemistry Northern General Hospital Telephone 0114 2434343	Results line & enquiries	14716
	Dr G Gillett (Consultant)	14316
	Dr H Delaney (Consultant)	14248
	Dr P Masters (Consultant)	52686
	Mr Dean Tazzyman (Interim Lead Lab Manager for Blood Sciences)	66454
	Mr Imran Jabbar (Blood Sciences Lab Manager)	66299
	Mr Michael Smith (Scientific Lead for Clinical Biochemistry)	52699

Commented [DCH(CNFT1]: Update

	Main Sample Reception	14260
	Automated Routine	14928
	Manual Immunoassay	14244
	Trace Metals	14242
	PID Area	14438
	Toxicology	67240
Department of Specialised Clinical Chemistry and Toxicology Northern General Hospital Telephone 01142267240	Results line & enquiries	67240
	Dr Stephanie Martin (Consultant Clinical Scientist)	67304
	Dr Edmund Rab (Consultant Clinical Scientist and Clinical Lead for Clinical Chemistry)	67241
	Mr Azuma Kalu (Acting Lab Manager)	67233
	Mrs Gillian Walton (Acting Deputy Lab Manger and Specialist Scientific Lead)	67240
Department of Clinical Chemistry Royal Hallamshire Hospital Telephone 0114 2711900	Results line & enquiries	12348
	Ryan Colwell (Lab Manager)	077765507 67
	Richard Eyre (Scientific Lead)	61347
	Sample Reception	12812
	Main lab	13298
	Endocrinology Clinical Chemistry	13136 68834 13298 68974
Department of Haematology Royal Hallamshire Hospital Telephone 0114 2711900	Mr Dean Tazzyman Interim (Lead Lab Manager for Blood Sciences)	66454
	Ryan Colwell (Blood Sciences Lab Manager)	077765507 67

	Theresa Barks (Routine Haematology Scientific Lead)	13333
	Results line & enquiries	12284
	Automation Laboratory / Routine Haematology	12594
	Blood Bank	12333
	Cell Markers	12801
	Haemolysis	12859
	Reception	12998
	Coagulation	12955
Department of Haematology Northern General Hospital Telephone 0114 2434343	Results line & enquiries	14304
	Dr J Van Veen (Consultant)	14394
	Mr Imran Jabbar (Blood Sciences Lab Manager)	66299
	Main Sample Reception	14260
	Haematology	14723
	Coagulation	14943
	Blood Bank	14246
	Microscope Room	14305
Department of Point of Care Testing, Royal Hallamshire Hospital	Ryan Colwell (Blood Sciences Manager)	07776550767
Telephone 0114 2711900	Leigh Manning (PoCT Co-ordinator)	13202
C Floor Phlebotomy OPD, Royal Hallamshire Hospital Telephone 0114 2711900	Ryan Colwell (Blood Sciences Manager)	07776550767
	Joseph McShane (Interim Senior Phlebotomist)	12490
	General Enquiries	12838
Department of Histology Royal Hallamshire Hospital		
(Satellite Lab only at NGH) Telephone 0114 2711900	Dr Malee Fernando (Clinical Lead)	13860

	Dr Veena Naik (Clinical Lead)	13728
	Ms J Ludlam (Service Coordinator)	11930
	Ms S Barkworth (Lab Management PA)	13111
	Mrs Rachel Leff (Lead Lab Manager)	13727
	Ms S Hibberd (Lab Manager)	13727
	Mr D Leff (Deputy Lab Manager)	68424
	Enquiries	12728
	Results line	12728
	Main Lab	12240
Department of Immunology	Results line	15552
	Enquiries	69196
Northern General Hospital Telephone 0114 2434343	Dr Evon Boules (Consultant)	69020 / 15701
	Dr D Arnold (Consultant)	15700/15701
	Clare Del-Duca (Lab Manager)	15719
	Main Sample Reception	14260
	Electrophoresis Laboratory	15724
	Immunochemistry Laboratory	15720
	Immunofluoresence Laboratory	69767
	PID Area	14438
	Pre-natal Screening Laboratory	15725
Department of Microbiology Northern General Hospital Telephone 0114 2434343	Results line & enquiries	14777
	Dr S Thompson (Consultant)	17579 (SCH)
	Dr H Parsons (Consultant)	NGH 69191
	Dr G Morris (Consultant)	NGH 14217

Dr D Partridge (Consultant)	(NGH) 14538 (RHH) 12773
Prof R Townsend (Consultant)	NGH 69140/ 52770
Dr L Prtak (Consultant)	NGH 52748
Dr G Wheldon (Consultant)	14217
Microbiology Consultants Duty Room	14527/ 14529
Mrs Leeanne Tovey (Interim Lead Lab Manager)	14528
Lisa Tilley (Bacteriology Lab Manager)	52763
Ms Charlotte O'Reilly (Bacteriology Deputy Lab Manager)	15814
Ms Rebecca Hall (Virology Lab Manager)	69494
Mr Alex Yates (Virology Deputy Lab Manager)	69494
Virology Medics	66477 Option 1 & Option 1
Main Sample Reception	14260
Automated Serology	14928
Chlamydia Laboratory	14256
CL3 Bacteriology Laboratory	15538
CL3 Virology Laboratory	14539
Enteric Laboratory	14535
Environmental Laboratory	14534
Main BacteriologyLaboratory (B/C Area)	53245

Main BacteriologyLaboratory (GUM Area)	69217
Manual Serology (Bench)	52506
Manual Serology (Samples)	14531
PCR Laboratory 3	66289
PCR Laboratory 4	52749
PCR Laboratory 4 Lobby	52720

CLINICAL CHEMISTRY

LOCATION OF DEPARTMENT

B Floor, Orange Wing
Pathology Block
Sheffield Children's NHS Foundation Trust
Western Bank
Sheffield S10 2TH

CONTACT DETAILS

Katherine Wright, Consultant Clinical Scientist, Director of Newborn Screening and Head of Department	Ext 17404
Head of Department's Secretary – Michelle Burton	Ext 17318
Laboratory Manager - Philip Craddock-Jones	Ext 17444
Laboratory Manager's PA – Alison Lenthall	Ext 17340

ENQUIRIES

Laboratory Office	Ext 17340
Duty Clinical Scientist (in hours)	Bleep 095
On-call Clinical Scientist (out of hours)	Available via switchboard

Acute Section

Routine results/Emergency requests	Ext 17305/17306/17427
Chief Biomedical Scientist – Fraser Cocker	Ext 58306
Senior Biomedical Scientist – Jennifer Webb	Ext 17134
Principal Clinical Scientist - Sharon Colyer	Ext 17307
POCT Co-ordinator - Georgina Howson	Ext 17134

Metabolic Section

Result enquiries	Ext 17445
Principal Clinical Scientist - Claire Hart	Ext 17307
Chief Biomedical Scientist - Louisa Smith / Stephen Mc Sweeney	Ext 17405

Senior Biomedical Scientist – Olivia Edmondson This needs moving so that whole name is together	Ext 17445

Tissue Culture Section

Principal Clinical Scientist - Joanne Croft	Ext 17267/60972
Prenatal diagnosis enquiries	Ext 17267

Newborn Screening Section

Newborn screening results (09.00 to 12.30)	Ext 17257
Principal Clinical Scientist & Deputy Director of Newborn Screening - Dr Lynette Shakespeare	Ext 17302
Clinical Scientist - Benjamin Sholademi	Ext 17346
Chief Biomedical Scientist - Ullas C-Joseph	Ext 17500
Senior Biomedical Scientist - Sheila Ellin	Ext 17346
Senior Biomedical Scientist - Jade Barber	Ext 17346
Clinical Liaison Nurse – Joanna Andrews	Ext 17415
Clinical Liaison Nurse - Rebecca Herbert	Ext 17415

LABORATORY OPENING TIMES

Normal laboratory opening times	Monday to Friday 9.00am- 5.00pm
Receipt of samples which require special handling (e.g. growth hormone, insulin, dynamic function tests with multiple samples or research samples)	Monday to Friday 9.00am- 4.00pm

For the analysis of urgent samples outside the above times, contact the Biomedical Scientist on call for Clinical Chemistry via the Hospital Switchboard.

SERVICES PROVIDED

A 24 hour service is provided for the Children's Hospital, Ryegate Children's Centre, and Becton Centre (CAMHS). Support is also provided for the management of ward-based blood gas analysis and glucose monitoring. Specialist paediatric advice is available to help in the interpretation and selection of tests on a 24 hour basis. Where appropriate (predominantly for immunology, toxicology and some endocrinology) samples are referred to other local hospitals.

The newborn screening section of the laboratory covers all babies born in Derbyshire, Leicestershire, Lincolnshire, Northamptonshire, Nottinghamshire, Rutland, South Humberside and South Yorkshire.

A Regional service is also provided for the investigation of children with a suspected metabolic disorder. This service is available to the Sheffield Children's NHS Trust without cross charging and to other users on a cost per test basis . Many of the more complex investigations are free for patients in the Trent Region and South Humberside as they are covered by contracts for Newborn metabolic screening.

SPECIALISED BIOCHEMICAL SERVICES

Drug Analyses
Plasma concentrations of the following drugs are measured in this laboratory for the purpose of therapeutic drug monitoring or in cases of suspected overdose:

Alcohol, Caffeine, Cyclosporin, Iron, Methotrexate, Paracetamol, Salicylate and Tacrolimus.

Samples for the measurement of other drugs will be referred.

Specimen requirements are given in the test directories available on the intranet. In some instances it may be possible to measure drug levels in other fluids such as urine by arrangement with the laboratory. A toxicology service is provided at the Northern General Hospital (ext 12046). For further information on referral services contact the Duty Biochemist (Bleep 095).

Therapeutic drug monitoring
Caffeine analyses are performed routinely. Other drug analyses are performed as required. The laboratory must be contacted for urgent results. For a valid interpretation of the results, the following information must accompany each request:

- Type of preparation
- daily dose
- time of last dose
- time blood sample taken
- other drugs being taken

Suspected overdose
For a valid interpretation of paracetamol levels, blood samples must not be taken within 4h of ingestion. After suspected overdose of theophylline, caffeine, iron, methotrexate or alcohol analyses may be available out of hours after contacting the on-call Clinical Scientist.

After suspected overdose of other drugs collect up to 10 mL whole blood in lithium heparin and as much urine as possible in a plain container. The collection of tissues or other fluids may be appropriate. Contact the Duty Biochemist (Bleep 095). Samples collected after suspected overdose must give the type of preparation taken and the estimated time of ingestion.

Post Mortem Samples
Dried blood spot and bile samples taken at post mortem will be returned to the requesting laboratory, along with the report, for disposal or storage according to the consent obtained.

Forensic Analyses
If police involvement is likely, special precautions are required for sample collection. For advice on this and other toxicology matters contact the Toxicology Laboratory at NGH via switchboard.

Sweat tests
The test is performed by laboratory staff. Please contact the laboratory (ext 17305) to arrange an appointment date for the test to be carried out and immediately forward a request form. Fully completed request forms **must** be sent to the laboratory; whilst they do not accompany the patient/carers they are the means by which the laboratory ascertains consent has been given. Up to two sweat tests can be carried out per day, therefore, it is advisable to book well in advance. Tests are booked for 2.00pm only and usually take place in Outpatients or occasionally on the wards (inpatients) or Cystic Fibrosis Unit. Urgent sweat tests will usually only be performed if certain criteria are fulfilled (bleep Duty Biochemist 095). Advice sheets, directions and map are sent to parents prior to the test and a further information sheet will also be provided on arrival. Analysis takes place each Wednesday.

Investigation of Inborn Errors of Metabolism
A service is provided for the detection, diagnosis and monitoring of patients with inborn errors of metabolism. Analyses performed are included in the test directories available on the intranet. It is important that requests for the investigation of inborn errors of metabolism are accompanied by adequate clinical information including drugs being taken at the time of sampling. If the relevant

clinical information is detailed, the laboratory should be contacted by letter or telephone. See User's Handbook for Metabolic Investigations for further details (available from the laboratory).

Skin Biopsies
Further investigation of some disorders requires the use of cultured fibroblasts. The following are routinely available:-

- Screen for disorders of long-or medium-chain fatty acid oxidation This screen will detect defects of carnitine transport and deficiency of carnitine-palmitoyltransferase types 1 and 2, carnitine acylcarnitine translocase deficiency, very-long- or medium-chain acyl-CoA dehydrogenases, long-chain 3-hydroxyacyl-CoA dehydrogenase and other disorders of the trifunctional enzyme complex and mild to severe multiple acyl-CoA dehydrogenation defects (ethylmalonic-adipic aciduria and glutaric aciduria type 2).
- Carnitine-acylcarnitine translocase
- Glutaryl-CoA dehydrogenase (for glutaric aciduria type 1)
- Palmitoyl carnitine transferase Type I and II
- Propionyl-CoA carboxylase (for propionic acidaemia)
- Pyruvate carboxylase
- 3-Methylcrotonyl-CoA carboxylase
- Release of $^{14}CO_2$ or ^{14}C-incorporation from various substrates for the detection of methylmalonic aciduria, isovaleric acidaemia, branched chain amino acid aminotransferase (BCAT) and maple syrup urine disease (MSUD), and other disorders
- Very long-chain fatty acids
- Very long chain acyl-CoA dehydrogenase
- Citrulline incorporation into fibroblasts for detection of defects of argininosuccinate synthase and argininosuccinate lyase.

Enquire for disorders not listed. In general the laboratory will advise on the need for tissue based assays and make the necessary preliminary arrangements.

Consent for skin biopsy collection is the responsibility of the requester. For skin biopsies taken in SCH within normal working hours (Mon-Fri; 9.00-17.00), a consent form and pot of sterile culture media is obtainable from the Metabolic Laboratory Ext. 17445. Please ensure the Trust's Patient Identification Policy is followed prior to sample collection (see page 10), and that a fully completed request form with full clinical details and test request is included. Samples are transported at room temperature to Clinical Chemistry Department to arrive ideally

no later than 4.30pm, Skin biopsies sent from outside of the Trust must be sent in sterile media or saline as appropriate.

For skin biopsies sent from external hospitals within the Trent Inherited Metabolic Disease Group a request form with full clinical details and test request is required. Sample transport at room temperature, normal first class post to Clinical Chemistry Department to arrive ideally no later than 4.30pm Mon – Fri. Please contact laboratory if sample to arrive on the weekend (0114 271 7445 or 271 7267).

For skin biopsies sent from external hospitals outside the Trent Inherited Metabolic Disease Group, please contact the Tissue Culture laboratory prior to sample collection to discuss sample collection details and turnaround times. A request form with full clinical details and test request is required.

Please note turnaround times (TAT) are flexible when applied to cultured cell assays. As different patient cell lines grow at different rates. In general for most assays starting from a skin biopsy the TAT is 8-12 weeks.

Muscle Biopsy/CSF Neurotransmitters
Please contact the laboratory on ext 17445 when arranging muscle biopsies and CSF neurotransmitters. The laboratory requires at least 24 hrs advance notice of these procedures, in order to commit staff. Appropriate collection medium etc will be provided by the laboratory staff as well as liquid N_2 in which to freeze the samples. All collections except those taking place in theatres will be attended by a metabolic member of staff.

Newborn Screening
Dried blood spot samples are collected on newborn babies at day 5 (5-8 days) by midwives to screen for phenylketonuria, congenital hypothyroidism, cystic fibrosis, sickle cell disease, medium chain acyl CoA dehydrogenase (MCAD) deficiency, maple syrup urine disease (MSUD), homocystinuria, iso valeric acidaemia (IVA), glutaric aciduria type 1 (GA1) and Severe Combined Immuno Deficiency (SCID). Results are sent out to the appropriate Child Health Record Department for entry into the Child Health Information System and checking against birth lists. Positive cases are referred for further investigation and treatment to designated paediatricians or haematologists. Individual negative results are NOT normally sent out to hospital doctors or Family Practitioners.
This service is largely separate from the routine analytical services offered in the hospital and in general it is NOT appropriate to enquire directly of the Newborn Screening Laboratory for a test result. If an abnormal result has been found then, as soon as it has been confirmed the patient's Family Practitioner will have been

informed. If you have clinical suspicion of ANY of the disorders screened for, it is better to initiate further investigations since these are screening assays only. Please bleep the Duty Biochemist on 095 if advice is required on further investigations. The newborn screening test for congenital hypothyroidism will not detect secondary hypothyroidism. Immunoreactive trypsin is not always abnormal in cystic fibrosis patients with meconium ileus.

URGENT REQUESTS

Requests for urgent analyses out of normal working hours should only be made if the results must be known before the next full working day and are likely to have a direct effect on patient management (see Asher's criteria in the Intended Audience section).

During normal working hours
Urgent requests must be arranged with the laboratory by telephone so that if there is any delay in receipt, steps can be taken to locate the sample. Urgent samples which arrive in the laboratory without prior arrangement may be delayed.

Outside normal working hours
The following analyses are available by contacting the Biomedical Scientist on call through the hospital switchboard.

Blood:	urea, Gentamycin, Tobramycin, creatinine & electrolytes (sodium, potassium, chloride, bicarbonate), calcium (with albumin), magnesium, osmolality, glucose, LFT, amylase, uric acid, salicylate, paracetamol, iron, alcohol, lactate, ammonia, CRP, methotrexate (if previously arranged) and Ferritin (if previously arranged)
Urine:	sodium, potassium, osmolality, protein.
CSF:	glucose and protein.

Any samples arriving in the laboratory without contacting the on-call Biomedical Scientist will be treated as non-urgent and stored for analysis the following morning.
Where possible please contact the Biomedical Scientist on call after the sample has been taken unless specific collection information is required. Please keep calls after 10 pm to a minimum. Calls between 07:30 am and 9:00 am should be avoided and may be routed via a Principal or Consultant Clinical Scientist.
Other tests may be performed out of hours after discussion with the Biomedical Scientist on-call who may refer you to the Consultant Clinical Scientist.

TELEPHONING LIMITS

The results of the following tests will be telephoned to the requesting clinician the first time any are above or below the critical limit, or where it has changed significantly. Please check doc 113002_2 for latest tables/ lmiits.

TEST	Units	BELOW (</=)	ABOVE (>/=)
Alcohol (Ethanol)	mg/dL		**50**
Ammonia	µmol/L		**40** **Neonate > 100** *Inform DB if new patient and ammonia >200*
Amylase	U/L		**500**
ALT	U/L		**750**
AST	U/L		**900**
Bicarbonate (CO2)	mmol/L	**10**	**35**
Bilirubin – conjugated	µmol/L		**25**
Bilirubin – unconjugated	µmol/L		**300** **>100 for neonates <48h old**
Caffeine	mg/mL		**35**
Calcium (plasma)	mmol/L	**2.00 (1.75 neonate)**	**3**

TEST	Units	BELOW (</=)	ABOVE (>/=)
Creatinine (plasma)	µmol/L		**>1.5 x ULN where there is no previous creatinine** **AKI 2 + AKI 3** **>200 (first time) regardless of AKI alert**
Creatine Kinase (CK)	U/L		**500** *Inform DB if CK is >5000*
C-Reactive Protein (CRP)			**150**
Cortisol	nmol/L	**160** *BMS to phone on-call DB to phone 9am-5pm. Only phone early morning or hypoglycaemic/stressed samples.*	
Cyclosporin	µg/L		**400**
Ferritin	ng/mL		**3000**
Gentamicin	µg/mL		**2**
Glucose (CSF)	mmol/L	**Glu 2.8 &/or Ratio 0.6**	**4.4**

TEST	Units	BELOW (</=)	ABOVE (>/=)
Glucose (plasma)	mmol/L	**3.1**	**11.0** (GP) **or 15.0** (inpatients) *Should be fluoride sample however also phone any high lithium heparin or serum glucose result and do not suppress the result regardless of duration between collection and analysis.*
Iron	µmol/L		**30**
Lactate	mmol/L		**4**
Lipase	U/L		**>300** *If not already phoned amylase.*
Magnesium	mmol/L	**0.4**	
Methotrexate	µmol/L	**All results**	
Paracetamol	mg/L		**Any detectable level**
Phosphate	mmol/L	**0.4**	
Potassium	mmol/L	**3**	**6 (Neonate > 7.0 and Haemolysed Samples >7.5)**
Protein (CSF)	g/L	**Age dependent – any out of range (*)**	
Salicylate	mg/L		**200**

TEST	Units	BELOW (</=)	ABOVE (>/=)
Sodium	mmol/L	**130**	**150**
Tacrolimus (FK506)	ng/mL	**2**	**12**
Tobramycin	µg/mL		**2**
Urate (Uric Acid)	µmol/L		**750 (<10y)** **1000 (>10y)**
Urea	mmol/L		**10**

REQUESTING ADDITIONAL INVESTIGATIONS

Please be aware that laboratory staff will obtain volumes of blood on capillary phlebotomy ward rounds appropriate to the tests requested when the phlebotomist first saw the form. Therefore there is no guarantee that there will be enough spare for investigations requested later. However laboratory staff will endeavour if at all possible to maximise the use of that sample.

Furthermore, samples with a high haematocrit/PCV often have much less available plasma available for analysis following centrifugation; consequently for the same tests required as another patient with normal haematocrit/PCV either more blood is required or else fewer tests can be performed.

LIMITATIONS OF RESULTS

(Also see section on Uncertainty of Measurement in the General Information)

Results may be affected by poor storage conditions, delays in sample transportation, incorrect use of sample preservatives, inappropriate collection site (e.g. drip arm), or collection time (e.g. therapeutic drugs) and analytical interferences. Consecutive sample results may be affected by biological and analytical variation. If advice is required on any of the above issues, please contact the laboratory. If any report contradicts clinical findings then please discuss the case with the Duty Biochemist.

CONSENT Title needs moving onto next page

It is the responsibility of the referring clinician to obtain consent for testing. A completed consent form should accompany all tissue culture samples.

REFERENCE RANGES

Reference ranges are provided in a separate document available on the intranet. These reference ranges should be used for guidance in clinical decision making, rather than for prescriptive use.

They are conventionally set to give the range of values which would be found in approximately 95% of a statistically 'Normal' population. They are derived from results obtained by this Department and from other sources. Reference ranges for blood refer to serum or plasma samples unless stated otherwise.

Changes during growth and development create age-related reference ranges for most analytes. Detailed ranges are kept in the Department and information upon them may be obtained from one of the Biochemists.

For the day to day interpretation of results age-related reference ranges have been condensed to cover generally recognised stages of development. These are generally added to the report automatically by the laboratory computer when the result is generated.

Newborn:	First 7 days of life for term baby.
Neonate:	First month of life for a term baby. Ranges may not apply to pre-term or small-for-dates babies.
Infant:	Normally from the second month to one year, neonates are included in these ranges if not separately quoted.
Child:	Normally one year to adolescence, neonates and infants are included in these ranges if not separately quoted.
Adult:	From the end of adolescence (>16 yr)

DEPARTMENT OF PAEDIATRIC HAEMATOLOGY AND BLOOD BANK

LOCATION OF DEPARTMENT

A Floor, Orange Wing
Pathology Block
Sheffield Children's NHS Foundation Trust
Western Bank
Sheffield S10 2TH

CONTACT DETAILS

		Tel Ext	Bleep
Dr E Astwood	Consultant Haematologist and Head of Department	67951	287
Secretary		17477	
Dr J Payne	Consultant Haematologist	17349	168
Secretary		17477	
Dr K Patrick	Consultant Haematologist	53662	249
Secretary		17477	
	Specialist Registrar		811
Philip Craddock-Jones	Laboratory Manager	17444	
SallyAnn Ridsdale	Haematology Service Lead	17230	
Michelle Scott	Blood Bank Service Lead	17230	
Amanda Baxter	Specialist Practitioner of Blood Transfusion	17107	
Ellie Nash	Data manager and Haemophilia Co-ordinator	60865	
Louise George	Clinical Nurse Specialist in Haematology	17329	123
Carly Bell			
Eleanor Leaney	HSCT Quality Manager	60865	
Sharon Barrott	Transplant Administrator	60865	
Enquiries/Results	Haematology Main Laboratory	17221/17489	
	Blood Bank	17478/58136	

ENQUIRIES

During routine hours technical or clinical enquiries may be made by visit or by telephone. Out of hours contact is via hospital switchboard.

LABORATORY OPENING TIMES

Normal laboratory opening times	Monday to Friday 9.00am- 5.30pm
Receipt of routine samples	Monday to Friday 9.00am- 5.00pm
Receipt of samples for crossmatching next day	Monday to Friday 9.00am-2.30pm

SERVICES PROVIDED

A 24-hour service is provided for the Children's Hospital and the Ryegate Children's Centre. A laboratory service is also provided for local GPs. Specialist paediatric advice is available to help in the management of patients with haematological problems and in the interpretation of results and selection of tests from consultant/SpR staff on a 24-hour basis.

The following is extra information not suitable for inclusion in the test directories available on the intranet.

Therapeutic materials available from Blood Bank.
Patients with special transfusion needs can be catered for. Please indicate on the form. It is crucial that clinical details are given to allow appropriate materials to be selected e.g. CMV seronegative and gamma irradiated following e.g. IUT, HSCT or fludarabine therapy etc.

For urgent, emergency, major incidents and complicated cases it is imperative good communication is maintained with blood bank. **For unknown patients and during major incidents follow trust patient identification policy for identifying patients.**

Red cells request - Require Blood Bank request form. User to complete usage/tracing label and return to Blood Bank lab.

Platelets, Fresh frozen plasma (FFP) and Cryoprecipitate. Requires phone call to Blood Bank and a subsequent Blood Bank request form. For elective cases also requires phone call to consultant haematologist to confirm need and dose. A group and save sample will be required if blood group is unknown. User to complete usage/tracing label on blood pack and return to Blood Bank lab.

Human albumin solution (HAS) stored in Blood Bank Laboratory (4.5%/5% 250ml, 20% 50ml). Only need to phone Blood Bank Laboratory if massive amounts are required or continuous therapy anticipated. Porter to collect from the Blood Bank Laboratory. User to complete usage/tracing label on package and return to Blood Bank Laboratory.

Clotting factor concentrates – a variety is stocked. Requires phone call to blood bank lab following approval from a consultant haematologist.

HLA/HPA selected platelets can be supplied. Requires phone call to consultant haematologist and blood bank lab and subsequent blood bank request form. May require a sample.

Sample Requirements for Blood Bank

- 2 separate samples blood grouping samples using 2 separate patient identification episodes are required to issue blood components. Check ICE for previous blood groups to help determine if 2 samples are required for transfusion requests
- 1ml EDTA (pink top) blood sample required for patients aged 4 months – 8 years.
- 2.5ml EDTA (pink top) blood sample required for patients aged 8 years or over unless unable to obtain a venous sample for clinical reason.
- For patients aged < 4 months please see below.

Baby group and crossmatch samples for Blood Bank

Complete the dedicated blood bank request form including the maternal details section.

For infants under 4 months of age we require 0.5ml EDTA (pink top) of baby blood sample (fully labelled with registration number) and 2.5ml EDTA (pink top) of maternal sample fully labelled with maternal name and DOB. Subsequent blood issues do not require further samples until 4 months of age. It is crucial we are informed of historical intra-uterine transfusions.

When a crossmatch is requested, service users are responsible for notifying the laboratory when blood transfusion has been received at another hospital after a Blood Bank sample has been taken.

Transfusion Reaction Investigation.

Inform a consultant haematologist. Require 5ml plain clotted sample (glass vial white top not sera gel) and 5ml EDTA (pink top), the remainder of all units given.

D-Dimers in the diagnosis of venous thrombo-embolism.

D Dimer testing in the SCFT Haematology laboratory is set up to detect cases of disseminated intravascular coagulation (DIC). The method used is not validated by SCH for the exclusion of deep vein thrombosis (DVT) or pulmonary embolism (PE) in children. The test must not be used for this purpose.

In general blood samples should not be sent to the Royal Hallamshire Hospital for more sensitive testing, as the protocols used there have only been validated in adult patients. For individual adolescent children with suspected VTE d-dimer measurement at STH may be useful as part of the investigative algorithm but should always be discussed with a consultant haematologist prior to sending samples.

If a DVT is suspected it should be investigated with Doppler ultrasound scan, after discussion with the Radiologist. If in doubt, please contact the on-call Haematology Consultant or SpR to discuss.

Note there is detailed guidance available in the Ward 6 Haematology/Oncology guidelines which can be found in a folder on Ward 6 above the nurses station - see Section 12- Anti-Coagulation - 1333 Acute Venous Thrombosis (Ward 6/12/1333).

The guideline can also be located in the SCFT Guidelines on the intranet.
Guidelines, minutes, policies, committees/approved clinical guidelines and protocols/ Haematology & Oncology/Ward 6/Anti-Coagulation/ 1333 Acute Venous Thrombosis (Section 11.9 reviewed by Jeanette Payne, March 2012).

Capillary sampling for coagulation tests.

Bearing in mind the need to have a free flowing and thoroughly anticoagulated sample for coagulation tests we normally require venous or arterial samples. However if venous access is unavailable the following circumstances/notes apply: -

- 0.5ml dedicated sample tube obtained from haematology on a named patient basis.
- During routine ward rounds

- Prothrombin time (PT) for paracetamol overdose. 1 other test e.g. FBC may be obtained – if this is exceeded the whole request will be left for medical staff.
- INR for monitoring of oral anticoagulants in infants and small children. 1 other test may be obtained – if this is exceeded the whole request will be left for medical staff.
- Anti-Xa for monitoring of low molecular weight heparin.
- Capillary samples are unsuitable for APTT and will give erroneous results.

Specialist Coagulation assays/studies.
The fill level in coagulation vials is crucial. Please discuss your request with the lab prior to sampling to determine exact requirements for volume and vial type. Approval with a consultant haematologist is required for factor assays, platelet function and thrombophilia tests. SCH performs assays for FII, FV, FVII, FVIII, FIX, FX, FXI, FXII, FVIII inhibitor, FIX inhibitor, lupus anticoagulant, platelet function (PFA100), Von Willebrands (vWf, Rcof) and anti-Xa assay (for monitoring Low Molecular Weight heparin and unfractionated heparin) and APTT ratio (for monitoring unfractionated heparin), and D-Dimers (for DIC/PIM-TS).

Other available tests which require approval by an SCH consultant haematologist and which we refer onto Royal Hallamshire hospital include FXIII assay, tests for thrombophilia (ATIII, protein C, protein S, FV Leiden, anti-phospholipid antibodies), Dimers (VTE) and more specialised tests of platelet function.

Bone Marrow investigations.
Discuss requests with a consultant haematologist.
The following is available on fluid bone marrow: morphology;MGG; Perl's stain for ferritin/haemosiderin (iron status); immunophenotyping by flow cytometry for classification of acute leukaemia (performed at STH); CD34 cell enumeration; (and karyotype and molecular genetic analysis by Sheffield Diagnostic Genetics Service). Please note that MGG and Perl's stain for ferritin/haemosiderin are not accredited to ISO 15189:2012.

Lymphocyte subsets.
Includes determination of total (CD3), helper/inducer (CD4), and suppressor/cytotoxic (CD8) T cells, B cells and NK cells. Requires approval from Immunology Consultant before requesting.

URGENT REQUESTS

Urgent samples that arrive in the laboratory without prior arrangement may be delayed.

- Analysis of urgent requests within normal hours must be arranged with the laboratory by telephone so that if there is any delay in receipt, steps can be taken to locate the sample.
- For the analysis of urgent samples outside normal hours, contact the Biomedical Scientist on call for Haematology/Blood Bank via the Hospital Switchboard. **Requests for urgent analyses out of normal working hours should only be made if the results must be known before the next full working day and are likely to directly affect patient management (see Asher's criteria in the Intended Audience section).**

Outside normal working hours
The following analyses are available by contacting the Biomedical Scientist on call through the hospital switchboard. **NOTE: Out of hours samples taken for FBC, film examination, ESR sickle test and slide test for infectious mononucleosis, and for which results are not required until the next working day, can be stored at 2-8°C and sent to the Haematology Department for the following morning or sent to the laboratory but indicate "not urgent" on the form. Any samples arriving in the laboratory without contacting the on-call Biomedical Scientist will be treated as non-urgent and stored for analysis the following morning.**

- Full blood count (Hb, Hct, Red cell count and indices, platelet count, total and differential white cell count).
- Examination of blood film for malarial or other blood-borne parasites/malaria rapydtest
- Sickle solubility (HbS) screening test.
- Slide test for infectious mononucleosis.
- Reticulocyte count.
- Screening test for red cell G6PD deficiency.
- Coagulation screen-prothrombin time, activated partial thromboplastin time, fibrinogen level, and D-dimers if disseminated intravascular coagulation is suspected.
- Tests for monitoring anticoagulant control can be performed if clinically urgent.
- Blood group (ABO and RhD type).
- Crossmatch.
- Direct antiglobulin (Coombs) test.
- Blood component/product issue.

The following guidelines on Haematological test choice are provided for specific clinical situations:

Children with Petechial Rash and Fever (? Septicaemia)

Full blood count only is required; coagulation screen is not, if it is being done merely to exclude the diagnosis of meningitis.

Neonates with prolonged jaundice

Prothrombin time is indicated in this situation (in practice a coagulation screen comprising PT, APTT and Fibrinogen will be performed).

FBC in children with probable bacterial infection to whom antibiotic therapy has been given

Urgent FBC cannot be justified if treatment has already been given. The sample can be obtained but sent for analysis on the next routine working day.

ESR as an urgent request

An ESR will only be performed as an urgent test in cases of suspected septic arthritis where the presentation is not clear-cut. It is not warranted when the diagnosis is obvious, or when the child can be monitored until the morning. The test is only performed when the request is made after consulting the on-call consultant orthopaedic surgeon.

Blood counts on febrile neutropenic oncology patients

These may not be necessary, depending upon the time and level of the last neutrophil count. The requesting clinician should be asked to check the last count on ICE before the on-call Biomedical Scientist agrees to the request.

Issue of blood components and products (fresh frozen plasma, cryoprecipitate, platelets, factor concentrates) - after discussion between the requesting medical officer and the on-call Biomedical Scientist.

Other tests may be performed out of hours only after reference to the Clinical Haematologist on call, who can be contacted via the hospital switchboard.

REQUESTING ADDITIONAL INVESTIGATIONS

The ability to extend original requests is dependent on having sufficient remaining sample, its storage arrangements and technical/quality constraints. Typically: -

- Glandular fever screens up to 24h
- Sickle screen up to 48hours.
- Blood films up to 24h
- Coagulation tests up to 8 hours

- Group and save samples are retained for approx 6 months.

In general contact the laboratory by telephone to determine the practicalities and then provide an additional request form to confirm the additional analysis.

LIMITATIONS OF RESULTS

(Also see section on Uncertainty of Measurement in the General Information)
The effect of storage on analyses is dependent upon the choice of analysis and storage conditions. No sample should be stored (even temporarily) at greater than room temp unless specifically requested to do so. Avoid using shelves above radiators or workstations with lamps beneath. It is best practice to forward all samples to the lab upon collection. If delay is unavoidable or analysis not immediately required see note re non-urgent FBC on call, then storage within a suitable fridge is preferable. Please ensure date and time sample collected is noted on all request forms - thus allowing the lab to judge whether to process the individual analysis.

Significant interference can occur in coagulation testing due to heparin; on Hb due to severe lipaemia and on Hb phenotype/fraction quantitation due to transfusion. Difficult sampling causing sample activation/clotting interferes with coagulation tests and platelet count and possibly other FBC parameters. Samples diluted at source with e.g. infusion liquid or line flush will influence results for all analyses and may go un-noticed.

Variability of results due to analytical imprecision is dependent upon the test, method and result value. Blood bank investigations will be influenced by previous transfusions/infusions. Users may contact the laboratory to discuss particular concerns.

REFERENCE RANGES

Reference ranges are provided on ICE and the printed laboratory report for guidance in the interpretation of results. Age related reference ranges are provided as appropriate but they do not take into account normal racial variation or differences between venous and capillary sample type. Reference ranges for factor assays do not apply for premature babies, please refer to Andrew M, et al. Development of the human coagulation system in the healthy premature infant. Blood. 1988 Nov;72(5):1651-7 for these ranges. Please seek advice from the laboratory if necessary.

HISTOPATHOLOGY DEPARTMENT

LOCATION OF DEPARTMENT

Laboratory and Office - C Floor
Mortuary – A Floor
Pathology Block
Sheffield Children's NHS Foundation Trust
Western Bank
Sheffield S10 2TH

CONTACT DETAILS

The Consultant Head of Department, Prof M Cohen	17486
Laboratory Manager - Paul Arnold	17373
Deputy Laboratory Manager - Joanne Ager	17264
Mortuary Manager - Trudy Donn	53460
PM consent advice	17246
Mortuary enquiries	17246
Reports/Results	17254
Technical laboratory advice	17264
Urgent requests	17264
On call pathologist (24 hours)	Through switchboard
On call mortuary staff	Through switchboard

LABORATORY OPENING TIMES

Normal laboratory opening times	Monday to Friday 8.00am – 5.15pm
Mortuary	8.00am to 4.15pm

Please call ext 17264 to inform the Laboratory if fresh samples (i.e. not in formalin) are to be sent after 4.30pm.

SERVICES PROVIDED

The Histopathology Department provides a specialised paediatric and neonatal biopsy service to the Surgical and Medical Directorates at the Sheffield Children's Hospital NHS Foundation Trust and provides a perinatal service to the regional Trusts. The Department also supports the provision of services for Oncology, Metabolic Disorders and Neuromuscular Disorders to North Trent, operating within the Children's Hospital Trust. Local expertise is available for special investigations in enzyme histochemistry and immunochemistry. This laboratory is accredited under the UKAS ISO 15189 accreditation scheme and holds a HTA licence.

Important Procedural Changes During the Covid-19 Pandemic
The novel pathogen, Covid-19, is classified as a Category 3 pathogen. In light of this the following procedural changes to routine histopathology have been implemented until further notice. Please note that these changes are to be used in conjunction with the more extensive information contained within this handbook.

Surgical Samples:
Frozen sections will not be undertaken unless a negative COVID result is confirmed by the requesting clinician. For urgent rectal biopsies for Hirschsprung's disease, please contact the laboratory in advance for appropriate advice. For muscle biopsy investigations, please contact the laboratory in advance for appropriate advice. All specimens received fresh, including cytology samples, but EXCLUDING cases of suspected malignancy, will be fixed in formalin for 24 hours.

Differential cell counts will not be performed on Bronchoalveolar lavage specimens

Post mortems:

- Stillborns, foetuses of less than 24 week gestation and hospital consented Post mortems of neonates - All mother's must return a negative Covid test prior to post mortem.
- Coronial Post Mortems: A negative Covid test is required before the post mortem can be undertaken.

Note: Please be aware the following tests carried out by the Histopathology laboratory are not currently accredited by UKAS:

- Engel's Gomori
- Oil Red O
- NADH-TR
- Succinate Dehydrogenase
- Cytochrome Oxidase

- Acid Phosphatase
- Acetylcholinesterase (AChE)
- Sirius Red
- PHOX2B
- Leishman
- PAX-5
- ALOX-15
- Congo Red
- COVID-19

Regular clinico-pathological conferences are held in the Department with the Oncology, Clinical Genetics, Surgical and Gastroenterology teams and the Department contributes to the monthly perinatal audit meetings at the Jessop Wing (STH).

A perinatal and paediatric post mortem service is provided to the Children's Hospital and Health Authorities throughout South Yorkshire and North Derbyshire, together with a coronial post mortem service for wider regions. Mortuary staff will provide advice on death procedures to bereaved relatives following a death (SCH only).

The Department participates in the death review panels from South Yorkshire and Derbyshire.

Consultation
We welcome telephone calls to discuss the appropriate handling of specimens and interpretation of the histological findings (Tel ext 17264).

Requests for Post Mortems
Clinical staff are welcome to attend post mortem examinations related to hospital deaths. Mortuary APTs will inform of the start time on request. (Tel ext 17246).

Requests for post mortem examination should be directed to the Consultant Head of Department. (Tel ext 17486). In certain circumstances, the death must be reported to the Coroner. The Junior Doctors' handbook gives some guidance on this issue but you may wish to discuss this with the pathologist before contacting the Coroner's Officer. Requests for post mortem examination on all other deaths must be accompanied by a completed consent form and detailed request form. Consent forms **must** accompany **all** fetuses including those < 24 weeks gestation. Attendees will be notified of the starting time of the post mortem and you are entirely at liberty to attend. Preliminary hospital post mortem findings can be made available within 48 hours, if requested. See section on Turnaround Times for details of all reporting schedules.

The mortuary staff are available between 8am and 4.15pm (ext 17246), for advice regarding consent for post mortems and can supply the consent forms and booklets to parents explaining post mortems. Doctors who obtain consent are strongly advised to read these before discussing with parents.

Regarding transportation of bodies to the Trust, babies/children <24/40 gestation may be transferred to the mortuary using the referring Trusts hospital transport system. Babies/children >24/40 gestation should be transferred using the transport services of a funeral director.

OTHER INVESTIGATIONS

NB: Clinical information must be provided on all specimens sent

Routine Histology (i.e. samples received in buffered formalin)
Fixed tissue samples (samples in 10% neutral buffered formalin) can be sent to the laboratory by the air tube delivery system or by hand to the Histopathology Specimen Reception. Samples may be placed in a plastic universal or larger container in tissue fixative (10% neutral buffered formalin), which is available from theatres. The laboratory does not supply containers with fixative. However, the laboratory can provide fixative for the larger specimens that need to be placed in a specimen bucket, please phone the laboratory to arrange. Samples should only be placed in fixative for routine histology. If in any doubt, please telephone the laboratory for advice (ext 17264).

The container should be large enough to accommodate fixative at least 10 x the volume of tissue to ensure adequate fixation and kept at room temperature. Avoid squeezing tissue specimens into small containers as this will cause distortion and result in difficulty with diagnostic interpretation. Specimens unable to be sent on the same day as removal should be left at room temperature in 10% neutral buffered formalin.

NB Please be aware of the hazards associated with 10% neutral buffered formalin (a copy of the hazards are available from the laboratory on request).

Unfixed Samples and Special Investigations
The following specimens **must not** be placed in fixative and if small must be kept moist by placing on gauze or cotton wool moistened with saline. They must be immediately transported by hand to the laboratory **and handed directly to a member of the Histopathology staff. Unfixed samples for histopathology must NOT be sent via the pneumatic tube system (PTS).** Please be aware

that if the pneumatic tube system fails during transit of a precious sample (i.e. a sample which cannot be repeated), the material may be unsuitable for histology once retrieved.

a) Rectal biopsies for the investigation of Hirschsprung's disease.
For suction rectal biopsies for Hirschsprung's investigation the biopsy should include mucosal with submucosal areas. For pull through rectal biopsies the biopsy should include mesenteric plexus with muscularis propria followed by full bowel circumferential tissue 'doughnut' specimen. The rectal biopsy should be placed onto a piece of cotton wool moistened with saline in a universal container to prevent drying. The sample must not be immersed in saline, nor should it be placed on **dry** cotton wool. The request form must clearly state if the report is for :

- Pull through (immediate report) or
- Urgent acetylcholinesterase (urgency dependent on clinical need). This technical procedure takes approximately 4 hours, if a result is required on the same day the sample should be received by the laboratory before 1.30pm.
- Next day acetylcholinesterase

Please include your bleep or extension number on which to receive the telephoned report or discussion of the case.

b) Liver biopsies
Quantities should be discussed with the pathologists beforehand as they are dependent on clinical / laboratory investigation needs. Place samples in a small amount of saline in a universal container and hand to a member of Histopathology in person. A portion can be sent away for copper measurement if requested.

c) Needle or trucut tumour samples
Quantities should be discussed with the pathologists beforehand as they are dependent on clinical / laboratory investigation needs. Place samples in Hams F10 culture medium (obtained from the Histopathology department ext 17264) in a universal container and hand to a member of the Histopathology department in person.

d) Tumour samples not requiring HAMS.
Place samples in a dry specimen container of sufficient size to prevent tissue distortion or damage and deliver to a member of the Histopathology department in person. Flow cytometry may be undertaken by the laboratory on suitable samples.

e) Renal biopsies
Please contact a Consultant Pathologist to discuss details of the case.

f) Needle biopsies of muscle
These are collected by a Biomedical Scientist who will attend the procedure and advise on the adequacy of sampling if requested by the clinician. The specimens are placed on filter paper moistened with saline in a disposable petri dish to ensure that drying does not occur.

It is important that the laboratory be given advanced warning of renal and needle biopsies of muscle in order that arrangements can be made for appropriate technical advice and assistance.

g) Open muscle biopsies
These are usually taken in Theatre. The sample should be placed in a Petri dish with moistened filter paper as above. It must be dispatched to Histopathology without delay by the Theatre porter (please handle with care and dispatch urgently to the laboratory) as tissue is required for urgent frozen section diagnosis. Biomedical Scientists do not attend open muscle biopsies in theatre.

As far as possible muscle biopsies should be taken from the vastus lateralis muscle for the purpose of standardisation to permit fibre type proportions to be assessed accurately. Fibre type proportions vary considerably between muscle groups. The sample must not be taken near the myotendonous insertion, and under no circumstances should the specimen be squeezed with forceps. The minimum size of the biopsy should be 0.5 cm^3. Please contact histopathology if further advice is required. Muscle biopsies for clinical chemistry must be frozen in theatre; please contact Clinical Chemistry in regard to this.

h) Neuropathology samples
Surgical Brain Tissue:
All paediatric brain tumours EXCEPT those requiring a diagnostic smear (see Other Neuropathology Samples below) are received within the SCH Histopathology department. Fresh samples should be placed in a universal container, transported to the histopathology department SCH and handed to a member of the department in person. Out of hours surgical brain samples should be discussed with the on-call pathologist in the first instance.

Unless otherwise stated on the request form, when received by the laboratory, a small portion of the fresh tumour will be sampled and frozen for tissue bank storage. The remaining sample will be fixed in 10% neutral buffered formalin and forwarded to the Histology department at the Royal Hallamshire Hospital for clinical investigation.

Other Neuropathology samples:
- Brain Tumours Requiring Diagnostic Smear

- CSF specimens
- Nerve biopsies

These samples must be sent directly to the Histopathology department at the Royal Hallamshire Hospital (see Sample Transportation in the General Information section - Transport of samples to STH).

i) Bone marrow trephines
The biopsy must include bone marrow tissue. Place directly in 10% neutral buffered formalin in a universal container and transport directly to the Histopathology laboratory.

j) EM samples
- Tissue samples – place directly into PG fix (available from histopathology lab) and send to the Histopathology laboratory.
- Blood for Battens – 2mls of whole blood in an EDTA (pink container) or Citrate tube (purple container) and send to the Histopathology laboratory without delay.

Please be aware of the hazards associated with PG fix (information available from the laboratory).

k) Cytology samples
All samples for cytology should be placed in a sterile container e.g. a universal (can be obtained from the Histopathology lab if required) and **handed** to a member of histopathology in person before 4.30 pm.
DO NOT place Histology specimen pots in the same bag as cytology fluid pots to avoid contamination in the event of a sample leakage.
- BAL samples should be a minimum of 2ml of fluid if possible. Please state if fat laden macrophages and / or differential counts are required. Tel ext 17264 for further information. NB; Leishman staining is undertaken at SCH, however reporting is carried by the Histopathology department at Sheffield Teaching Hospitals. Note: Leishman staining and associated differential cell count is currently suspended due to the Covid-19 pandemic. Please contact the laboratory for further clarification.
- CSF. These must be sent directly to the Histopathology department at the Royal Hallamshire Hospital.

l) Placenta specimens
The department has several Service Level Agreements in place, where service users may send placenta specimen to the department for histopathology investigation. Placenta sample request forms and information on sample requirements and sending samples safely are provided directly to these service

users. Other service users may contact the department directly for help and advice prior to sending placenta specimen for histopathology investigation.

m) Out-of-hours
When specimen is taken out of hours the Consultant Histopathologist may be contacted via the switchboard (0).

URGENT REQUESTS

Actions required for handling samples which are indicated as urgent are decided by the Pathologist and clinician on a case by case basis. Clinicians should therefore discuss requests for "urgent" samples with the Pathologist as soon as possible to agree a course of action to be taken and time scale to report.

During normal working hours (08:00 – 17:15)
Examination of **frozen sections** must be pre-arranged with a Histopathologist, preferably giving at least 24h notice. Please provide a contact phone number to which the urgent report will be telephoned to. **Rectal biopsies for acetylcholinesterase histochemistry** received before 13:30 may be reported within 4 hours of receipt when the department is specifically instructed, otherwise the procedure will be carried out the following working day. The laboratory must be informed if an urgent result is required (ext 17246).

Outside normal working hours
Frozen sections for intra-operative diagnosis or suction rectal biopsies requiring acetylcholinesterase staining during evenings or weekends can be arranged if necessary through the on-call Consultant Histopathologist via the hospital switchboard. Every effort will be made to respond to short notice/urgent requests as quickly as possible. A pathologist will telephone all urgent reports to the requesting clinician, followed by written confirmation.

HIGH RISK SPECIMENS (Infectious Disease)

All such specimens must be clearly identified with appropriate risk labels on the form and the container. High risk specimens are left to fix in 10% neutral buffered formalin for at least 24 hours. This may therefore affect the turnaround time.

LIMITATIONS OF RESULTS

(Also see section on Uncertainty of Measurement in the General Information)

The opinion described in a histopathology report must be interpreted within the clinical findings and a judgement made. If any histopathology report contradicts clinical findings, please discuss the case with the Consultant Pathologist.

TURNAROUND TIMES

The department recognises and aspires to the Royal College of Pathologists recommendations regarding turnaround times where applicable for surgical samples. The department is actively striving to improve the turnaround times for non-surgical sample requests but please note that in certain circumstances the turnaround time may be longer, and on these occasions the service user is at liberty to request an urgent report.

- Routine samples not requiring special investigations – 5 working days.
- Routine samples requiring special investigations – 10 working days.
- Muscle biopsies for enzyme histochemistry – 10 working days.
- Sample for EM – up to 8 weeks depending upon the service provider turnaround time.
- Inter-operative frozen sections – as soon as possible but between 15 and 30 minutes.
- Rectal biopsies for acetylcholinesterase – urgent samples within 4 hours of receipt if received before 1.30pm, otherwise they will be carried out the following day.
- Routine hospital post mortem reports – 60% within 6 weeks, 90% within 8 weeks
- Coroner post mortem reports – 8 weeks if requested.
- Placenta investigation reports -
  90% within 30 working days for the following:
  - Stillbirth with no PM requested/miscarriage
  - Neonatal admittance
  - Molar/malignancy in pregnancies
  - Prematurity with chorioamnionitis
  - Clinical urgency identified

  All other placental requests - 90% within 60 working days

SHEFFIELD DIAGNOSTIC GENETICS SERVICE

LOCATION OF THE DEPARTMENT

C Floor, Blue Wing
Sheffield Children's NHS Foundation Trust
Western Bank
SHEFFIELD S10 2TH

CONTACT DETAILS

Head of Laboratory	Richard Kirk richard.kirk2@nhs.net
Laboratory Service Manager	Andrew Marland andrew.marland@nhs.net
Head of Oncology	Rebecca Pollitt rebeccapollitt@nhs.net
Lead Scientists – Oncology	Mark Watson mark.watson6@nhs.net Harveer Cheema harveer.cheema@nhs.net
Head of Rare Disease	Miranda Durkie mdurkie@nhs.net
Lead Scientists – Rare Disease	Duncan Baker duncan.baker@nhs.net Nick Beauchamp nick.beauchamp@nhs.net Joanna Brock joanna.brock1@nhs.net Renata Crookes renarta.crookes@nhs.net Florentina Sava florentina.sava@nhs.net Emma Shearing emma.shearing@nhs.net
General enquiries	0114 271 7014
Email address	sheffield.diagnosticgenetics@nhs.net
Website link	http://wwwsheffieldchildrens.nhs.uk/SDGS.htm

Samples coming via the STH/SCFT pneumatic tube system (PTS) – address 51

ENQUIRIES AND RESULTS

Contact can be made by telephone, email, or letter during normal working hours. For further information, clinical advice and interpretation contact the relevant Head of Section or the Head of Laboratory as detailed above.

LABORATORY OPENING TIMES

Normal laboratory opening times:

Monday to Friday	9am – 5.30pm
Saturday	10am – 11.30am (skeleton lab staffing)

The laboratory does not offer an out of hours service. However, it may be possible to organise analysis of urgent samples outside of these times by prior agreement.

SERVICES PROVIDED

We aim to outline the service offered by each group for the guidance of medical, nursing and laboratory staff. The laboratory should be contacted for advice should there be any doubt concerning any of the procedures; some of the tests require discussion with the laboratory **before** the sample is sent. The most up to date information on the Sheffield Diagnostic Genetics Service (including tests and accreditation status) is available on the website
https://www.sheffieldchildrens.nhs.uk/sdgs/

The National Genomic Test Directory is available
https://www.england.nhs.uk/publication/national-genomic-test-directories/.

Whole Genome Sequencing (WGS) is available for certain clinical indications, as outlined in the National Genomic Test Directory. Further information about accessing this testing can be found here
https://ney-genomics.org.uk/genomic-laboratory-hub-services/whole-genome-sequencing/

The genetic services are currently organised into two main groups: Oncology and Rare Disease.

Important Procedural Changes During the Covid-19 Pandemic
Please see SDGS website for most up to date information regarding COVID-19. https://www.sheffieldchildrens.nhs.uk/sdgs/

Oncology
Cytogenetic, FISH and molecular tests are offered as part of the diagnosis and management of acute leukaemia, chronic myeloproliferative disorders and myelodysplastic syndromes and for a number of specific solid tumours (including sarcomas) and lymphomas. We offer molecular testing by Sanger sequencing or next generation sequencing panel testing for specific somatic mutations used to define treatment sensitivity.

Cytogenetic analysis can be performed on bone marrow, blood or fresh tumour biopsy. We require between 0.25 and 1.0ml of bone marrow aspirate (preferably not the final exudate) in 5ml of transport medium containing heparin and antibiotics. This medium is supplied on request from the department and should be stored at +4ºC and kept in sterile containers e.g. universals. In addition, one drop of marrow should be placed in transport medium with colcemid as the marrow is taken. The medium is provided ready for use on request from SDGS, and these instant cultures should arrive at the laboratory within one hour for immediate processing.

If blood samples are sent for cytogenetics we require 5-10ml of blood in a lithium heparin tube. Please do not put blood into transport medium. Provided a suitable marrow sample has been sent there is no need for an accompanying blood. Cytogenetic analysis on blood is only possible if there are sufficient immature cells present, as in CML and some acute leukaemias.

FISH testing will be performed alone or as an adjunct to cytogenetic analysis for detection or clarification of abnormalities or to exclude/confirm cryptic gene fusions where appropriate. FISH can be carried out on bone marrow, blood, solid tissue biopsy and on certain archive material including paraffin embedded tissue sections (PETS). We carry a large number of FISH probes including those required for the accurate diagnosis of the diseases described above and probes for some lymphomas and sarcomas.

Samples for Multiple Myeloma FISH testing require 2-5ml of Bone Marrow in EDTA or culture medium, to be received before 4pm on a Thursday to allow plasma cell enrichment by CD138 separation. Outside of these hours FISH testing will be attempted on the whole marrow sample.

For molecular analysis 2-5ml of blood or bone marrow in K-EDTA (pink or purple tops) is required. Smaller samples can be processed but may not be sufficient for the test required and are more likely to fail. If in doubt please contact the laboratory.

Samples should arrive no later than the day after they are taken. Solid tumour samples should preferably arrive on the day they are taken and no later than the following day. Please do not rely on first class post at weekends or bank holidays.

Molecular testing and FISH are also available for a number of disorders from paraffin embedded tumour tissue samples.

For the accumulation of accurate information on the relationship between genetic findings and clinical conditions, it is important to have accurate referral information.

Rare Disease
Please refer to the National Genomic Test Directory for a full list of tests available.

Karyotype analysis is carried out from *in vitro* culture of blood samples and FISH is offered as an adjunct to classical chromosome analysis when appropriate.

For fetal testing of amniotic fluid, chorionic villus or fetal blood samples. Rapid aneuploidy screening by QF-PCR or FISH is offered and abnormalities detectable include trisomy 21, 18 and 13, sex chromosome aneuploidies and triploidy (this rapid service is also offered for newborn babies to detect these abnormalities). This may be is backed up with conventional karyotype analysis or microarray (SNP array).

FISH for specific syndromes is not carried out on prenatal cytogenetics samples unless indicated by a family history or to clarify a result from the chromosomal analysis. An exception is the use of the TBX1 probe for the 22q11.2 region. All referrals with heart defects are screened by FISH using this probe as some cases may be associated with deletion in this region.

Microarray (SNP array) testing is available for patients with developmental delay and/or multiple congenital abnormalities, autistic spectrum disorder, or seizures. This is carried out as a higher resolution alternative to karyotyping. Please note that Fragile X syndrome testing will not be initiated prior to SNP array testing but is available after a normal SNP array result has been issued for patients with a specific clinical query or appropriate maternal family history.

2-3ml venous blood in lithium heparin is required for a blood karyotype. 4ml venous blood in lithium heparin is required for chromosome breakage / fragility testing. 2-3ml venous blood in lithium heparin and 2-3ml of blood in K-EDTA is required for microarray (SNP array) testing. Skin biopsy samples from patients should be around 1-2mm in diameter, and 1mm in depth, taken from an alcohol swabbed area. The depth is important as dermal tissue needs to be sampled. The sample should be transported in bottles of sterile tissue culture medium (available

by request from the laboratory). Sterile saline can be used if no medium is available. If delay in transport is unavoidable, samples should be stored at +4◦C. **Samples must not be placed in Formalin.**

In cases of fetal loss, IUD, stillbirth or therapeutic termination due to fetal abnormality, we require a small biopsy of fetal placenta (approx $1cm^3$ membrane, cord and placenta taken from, at or near the cord origin). We are unable to accept a fetus. Specimens should be placed into sterile tissue culture medium as above. In addition to placental biopsy, when possible, 1-3 ml sample of fetal cord blood in lithium heparin can be successful. (NB Cardiac blood is rarely successful).

Blood samples in K-EDTA (pink or purple tops) are received routinely for molecular genetic analysis. Volume should be 2-5ml: smaller samples can be processed but may not be sufficient for the test required and are more likely to fail. DNA can be extracted from a variety of other tissues but if in doubt about the sample size or suitability please contact the laboratory before taking the sample.

Other conditions are tested for by other laboratories, to whom samples are forwarded. Tests referred to other laboratories can be delayed in reporting due to transfer time and factors beyond the control of this laboratory. Please contact us if the sample is urgent.

Molecular prenatal diagnosis should be arranged well in advance if possible to allow time to acquire any relevant test results or samples. Clinical genetics service involvement is essential for all prenatal diagnosis referrals. Reliable prenatal diagnoses require that the initial diagnosis has been clearly established and it is important to appreciate the need for rigorous investigation even when the index case presents in a terminal phase with little hope of useful intervention.

URGENT REQUESTS

Current turnaround times are detailed on the SDGS website. Urgent samples should be clearly identified and telephone contact numbers listed in order to report results. In the case of clinical need do not hesitate to contact the laboratory to request an urgent result so that appropriate arrangements can be made.

REQUESTING ADDITIONAL INVESTIGATIONS

If further tests are required on samples already sent, this may be possible as cytogenetics samples are stored for a period of between one month and one year before disposal. DNA / RNA samples are stored, as appropriate, on the majority of samples received in the laboratory for the purposes of validation, controls and family studies. If further testing is required contacting the laboratory directly is the most straight forward way to do this.

LIMITATION OF RESULTS

(Also see section on Uncertainty of Measurement in the General Information)

Cytogenetic results

Cytogenetic results from blood samples will be based on the analysis of a minimum of 3 banded cells. The presence of mosaicism for any chromosome abnormality is not routinely investigated by the level of analysis performed unless dictated by the clinical referral reason or suggested by an observation during routine analysis. The standard count for detection of a clone present at greater than 10% level is 30 cells. This is reported in the karyotype comments if carried out.

The nature of fluorescent in-situ hybridisation (FISH) means that interpretation of FISH signals can be challenging. There is the possibility of split signals (one signal appears as 2), false signals due to background fluorescence and weak signals resulting in them not being detected. For this reason sufficient numbers of metaphases or nuclei are examined to maximise the statistical validity of testing. The number of cells that should be examined depends on the type of FISH being performed.

Microarray (SNP array) testing will detect aneu and polyploidy but not balanced rearrangements and is limited in detecting mosaicism. The resolution of SNP array analysis will be stated on the report.

Prenatal reports are based on the analysis of a minimum of three banded cells, and therefore are unlikely to detect mosaicism. It should be noted that the majority of samples sent for prenatal chromosome analysis are taken with a view to screening for common numerical chromosomal abnormalities, particularly Down syndrome. For technical reasons, the quality of structural analysis on such samples is often conducted at a lower level than that which is required to reliably detect small and unexpected chromosomal deletions and other rearrangements. Although many structural chromosomal abnormalities will be detected, those that fall below the limits of resolution of the analysis will be missed.

For oncology samples a normal cytogenetic result is based on the complete analysis of a minimum of 10 G-banded cells usually with the examination of at

least a further 10 cells. The number of cells analysed in abnormal cases or previously abnormal cases may be increased or decreased according to the reason for referral. A normal in situ hybridisation result is based on the exclusion of a given abnormality in a minimum of 100 interphase cells. An indication will be given if minimum standards are not reached.

For all cytogenetics analyses the ability to detect subtle, unexpected chromosome rearrangements is governed by the resolution of banding achieved This is intrinsically highly variable. If the quality of the preparation or extent of the analysis performed is not considered adequate for the reason for referral this will be indicated on the report.

DNA Sequencing

Sensitivity of DNA sequencing is over 95%. Rare cases of single nucleotide polymorphisms under the primer binding sites may lead to non-amplification of one allele when using Sanger DNA sequencing (mainly used for familial tests. The specificity is near to 100% where the variant has been previously reported.

Next generation sequencing technical sensitivity may be reduced for genes with pseudogenes or paralogs, mosaics and for copy-number variation >20 nucleotides. Dosage analysis screening for large deletions and duplications is performed using comparative depth of coverage of NGS data (DeCON software: sensitivity >0.999 and specificity 0.989). Where the variant is novel or there is limited or conflicting data available, it may be necessary to carry out further studies e.g. family testing, and it still may not be possible to reach a conclusion regarding pathogenicity. Only variants of uncertain significance with a high probability of pathogenicity are included in clinical reports.

All sequence and MLPA variants are classified using practice guidelines for variant interpretation: ACMG/AMP Richards et al 2015 Genet Med. 17(5):405-24 and ACGS Best Practice Guidelines for variant classification (https://www.acgs.uk.com/quality/best-practice-guidelines). Variants may be subject to reclassification with new evidence or changes in variant classification guidelines. Only clinically relevant results are reported.

Low Level Mutations

In some circumstances it may prove difficult to detect mutations present at a low level, e.g. in cases of mosaicism (particularly if less than 20%) or mitochondrial heteroplasmy or where there is a mixed cell population due to malignancy. Sensitivity of detection may be tissue-specific and in some cases alternative sample types may be required.

Non-paternity

An error in the diagnosis of disease status may occur if the true biological relationships of the family members being tested are not as stated. For example, non-paternity means that the stated father of an individual is not the true biological father. Any erroneous diagnosis in a family member can lead to an incorrect diagnosis for other related individuals who are being tested.

CONSENT

Samples received in the Genetics laboratory are accepted under the assumption that the patient has consented to genetic testing and to laboratory disposal of any remaining primary sample. This is clearly identified by the information for the referring clinician on the laboratory referral form. When the patient has not consented for disposal by the laboratory, all remaining samples will be returned to the referring hospital for appropriate disposal. To keep return of sample to a minimum, large amounts of tissue should not be sent.

DNA (either pure or a crude preparation) is retained from the majority of samples received in the laboratory for the purposes of validation, controls and family studies. It is important that the patients are aware of this. If there are any problems with the storage of samples, please contact the laboratory. The guidelines for consent are produced by the Royal College of Pathologists, British Society for Genetic Medicine & Royal College of Physicians (July 2019).

Predictive testing in late onset disorders such as Huntington disease or Hereditary Cancer is only available through the Clinical Genetics Service, as is diagnostic testing for dominant disorders where the family implications can be complex, and the issues of consent require detailed discussion and documentation. Predictive testing for adult onset disorders in children lies outside our professional guidelines; in the event of a sample being referred, the referring clinician will be contacted.

Carrier testing in children is generally to be avoided until the child is considered Gillick competent. Where it is necessary to exclude the child being affected, the report will not report the genotype but simply "unaffected" if the child is a carrier or normal. The results will be recorded in the lab and be available to the child once they are able to consent.
All prenatal testing involving assessment of maternal cell contamination using polymorphic markers assumes that the appropriate consent has been obtained for the analysis of all chromosomes. If this is not the case the laboratory must be contacted, prior to the prenatal sample being taken, to discuss the matter further.

ARRANGEMENTS FOR MICROBIOLOGY, VIROLOGY & IMMUNOLOGY

There are no Microbiology, Virology or Immunology laboratories on site and these services are provided by Sheffield Teaching Hospitals Trust. Their handbook can be accessed at SCH and is available at:
https://sheffieldlaboratorymedicine.nhs.uk/ All Microbiology/Virology services are now provided from the NGH site only.

MICROBIOLOGY

Clinical Microbiology Advice
There are four Consultant Microbiologists (2WTE) who work at Sheffield Children's who can provide clinical and infection prevention and control advice. The consultants are: Sarah Thompson (Mon-Fri), Emma Boldock (Mon-Tues), Chris Lynch (Wed-Thur) and Gayti Morris (Fri only). They can be contacted for microbiology or IPC advice on office extension 17579 or bleep 255.

Outside normal working hours, there is a city-wide on call Microbiology service for urgent queries. The on call microbiologist can be contacted via STH switchboard.

Laboratory Queries
For laboratory queries please contact the laboratory at the NGH ext 14777 between 08:30 – 20:00 weekdays. At all other the laboratory can be contacted by phoning STH switchboard and asking to speak to the microbiology laboratory or virology laboratory.

On Call Service
Weekdays 20:00 - 08:00 hrs
Weekends 16:00 - 08:00 hrs
Bank Holidays 16:00 – 08:00 hrs

A single Biomedical Scientist (BMS) is available to process emergency and urgent samples. When sending a sample the BMS must be contacted first to ensure they are aware of the sample otherwise it will not be processed in a timely manner.

There is no guarantee that any non-urgent work will be processed outside normal working hours.
Sample Transport to Microbiology (NGH Laboratory Medicine Building)

Weekdays 09.00 – 17.00 hrs

		Where from	Time
Weekdays (09.00-17.00)	Routine	SCH Clinical Chemistry	09.40, 11.10, 13.10, 14.40, 16.10, 16:45
	Urgent		Taxi arranged via SCH Clinical Chemistry if outside routine pickup times

Notes for urgent samples

- Prior to sending, SCH Clinical Chemistry should be alerted that an urgent sample is being sent so that the urgency of the request can be discussed and it can be established whether the sample may be sent by a scheduled taxi or whether an urgent taxi needs to be booked. The sample should then be sent by pneumatic tube system (PTS) (clearly labelled as urgent) or by hand to SCH Clinical Chemistry reception (see Sample Transportation section).
- The Microbiology department at NGH must be informed by requestors that the sample is being sent so they can ensure it is dealt with promptly on arrival.

Out of hours service (including weekday evenings, Saturday, Sunday and Bank Holiday)

Clinical Chemistry are NOT responsible for out of hours transportation arrangements

		Where from	Time	
Out of hours	Routine	A&E Reception	Sat./Sun./Bank holidays	08.30, 11.30, 14.30, 17.30, 19.30, 21.30, 23.00
			Week nights	18.30, 19.30, 21.30, 23.00
	Urgent	A&E Reception	Urgent transport booked via switchboard (if no routine transport within 30 minutes)	

Notes for urgent samples

- Urgent samples should be clearly identified as urgent on the request form.
- Contact the on-call Microbiology Biomedical Scientist (via the NGH switchboard) at the same time as sending urgent samples.

Results
Authorised Microbiology results are electronically accessible via ward/office computers through the hospital network or directly from the PC desktop 'ICE' icon. Passwords can be obtained by contacting the IT helpdesk. Please refer to the Reports section of this handbook for instructions on how to access results.

Microbiology specimens over 'long' weekends
Please ensure that on long bank holiday weekends that sample fridges/boxes on wards/units are regularly inspected, and samples transported as above, to avoid sample deterioration leading to potentially misleading results.

ANTIBIOTIC ASSAYS

The following assays are performed by Clinical Chemistry at SCH

Gentamicin and Tobramycin **-.**
Gentamicin and tobramycin should be prescribed according to SCH clinical guidelines which includes guidance for the timing and interpretation of antibiotic assays. Speciality specific guidance exists for haematology/oncology patients and cystic fibrosis patients and should be used for these groups only.

Optimum sample size: Venous blood. 1ml-clotted blood in a plain tube
Capillary blood. 1ml-clotted blood in microtubes

Note: Venous blood is required for CF patient levels.

Samples should be sent to SCH Clinical Chemistry for processing. Where possible out of hours testing should be avoided. The department runs an on-call service and as such notification must be made to the person working on-call if a sample requires analysis. The person on-call may ask questions about the urgency of the bloods in order to plan their workload

Vancomycin
Vancomycin prescribing charts give guidance for the calculation of vancomycin doses and the timing of vancomycin assays. Separate dosing guidance exists for haematology/oncology patients.
Pre-dose level should be 10-15 mg/L, unless otherwise specified by Consultant Microbiologist or Pharmacist.

During normal lab hours send samples to Clinical Chemistry at SCH for dispatch to NGH Microbiology. "On-call" contact the on-call STH Clinical Chemistry biomedical scientist via NGH switchboard and send sample direct to NGH (see 'sample transport to microbiology)

Other antibiotic levels
Please contact Microbiologist.
See following protocols for further information.

Guidelines for the use of antibiotics that require assays are available:

- Guidelines for once daily gentamicin in infants and children (CG893)
  Available from the clinical guidelines section of the SCH intranet pages. A search for 'gentamicin' will identify the document.

- Intravenous guideline for cystic fibrosis
  Available within the Medical Handbook (Section 16.2B)

- Antibiotic doses
  Available within the Medical Handbook (Section 15.2)

VIROLOGY SERVICES

The Virology Department is based within Microbiology at the Northern General Hospital.

Department Staff and General Information

There are 5 Virology Consultants based at NGH (Dr Mohammed Raza, Dr Alison Cope, Dr Cariad Evans, Dr Michael Ankcorn, Dr Anupama Mutagi), supported by Virology Specialty Registrars and a Clinical Scientist. They are available for clinical virology advice regarding Sheffield Children's patients and can be contacted on extension 66477.

Leeanne Tovey (Virology Department Manager) Ext 169494, NGH

Laboratory Hours

Weekdays 8am - 8pm
Saturdays 9am - 8pm
Sundays 9am – 12.30pm

Emergency Requests via Ext 66477, NGH or NGH Bleep 537

General Enquiries/ Results Enquiries Ext 14777

On-Call Service

Consultant Virologist (via NGH switchboard) provides an advice-only on call service.

Please consult annually updated bronchiolitis flow chart for details of RSV testing service. Rapid tests for RSV are carried out by the SCH Haematology Department with results published to ICE. Tests are carried out in batches throughout the day, the times of which are published at the start of each RSV season.

Urgent out of hours virology requests other than rapid RSV must be phoned to the on call Consultant Virologist (See above)

IMMUNOLOGY SERVICES

The Immunology Department is based at the Northern General Hospital. Transport to the NGH Immunology department is by STH-arranged van collections organised by the NGH Transport Manager (Ext 14701) and Campuslink. The van visits various laboratories and GP surgeries and calls for samples to the NGH at approximately 10:30 am and 2:30 pm, Monday to Friday. Outside of these times Monday to Friday, samples can also be transported by the CampusLink taxi sample shuttle at 09:40, 11:10, 13:10, 14:40, 15:40 and 16:00.

For the full repertoire of tests see: Sheffield PRU test repertoire
Also see Investigations In Immunology/Infectious Diseases for immunology investigations'

http://nww.sch.nhs.uk/documents/24-medicine-handbook/1190-immunology-infectious-diseases-investigations-in

Department Staff and General Information

Dr Evon Boules (Clinical Lead for Immunology & Consultant) Ext 15701 (Lab) / 69020 (Secretary), NGH

Clare Del-Duca (Immunology Laboratory Manager) Ext 15719, NGH

Admin Lead / PA to Laboratory Managers Ext 15706

Immunology enquiries Ext 15552 (results) / 69196 (general enquiries)

Laboratory Hours

Weekdays 9.00am - 5.00 pm

Results, from April 2012 no printed reports will be sent out. Authorised Immunology results are electronically accessible via ward/office computers through the hospital network or directly from the PC desktop 'ICE' icon. Passwords can be obtained by telephoning ext 53064. Please refer to the Reports section in the General Information section for instructions on how to access results.

CSF SAMPLES

Volume of CSF required for specific tests (paediatric samples)

1 **BEFORE** you take the CSF -

- Decide which test you require
- Calculate the volume of CSF this will need.
- Work out the number of drops that this will be.

Regardless of the size of needle used, 1ml of CSF is equivalent to 20 drops. Remember that all volumes given are the **minimum** required, so extra drops are always useful.

2 For **MICROBIOLOGY** investigations

If the CSF is **bloodstained**, take the volume you require into three screw-topped universal containers (these have a conical bottom). Number them 1,2,3.

If the CSF is **clear**, take the volume into a single universal container.

DO NOT use the flat bottomed sputum pots for collecting CSF as they cannot be centrifuged and fluid will be lost transferring to a universal container.

3 For **CLINICAL CHEMISTRY** INVESTIGATIONS -

Glucose and/or Lactate: take 4-5 drops into a paediatric fluoride-heparin tube.

Protein: take 4-5 drops into a paediatric 1ml plain tube/universal 25mL. Blood stained samples will elevate results!

Serine and glycine 8-10 drops into paed 1mL plain tube.

Please label these tubes by hand

4 Put the tests that you require in **ORDER OF PRIORITY** on the request form, so that we can allocate CSF accordingly. This is **VERY** important for very small volumes.

5 Transport specimens to the laboratory without delay:

Protein, glucose and lactate should be sent to the Clinical Chemistry at SCH.

Bottles for microbiology/virology investigations should be sent urgently to Microbiology at NGH. Please see the Microbiology pages for further information about transport routes in/out of hours. The on call Biomedical Scientist for Microbiology (via STH switchboard) should be informed that the sample has been sent to ensure it is processed in a timely manner.

6 If the specimen is to be examined out of normal working hours, **ALWAYS** inform the relevant biomedical scientists on duty.

All volumes given are the minimum required

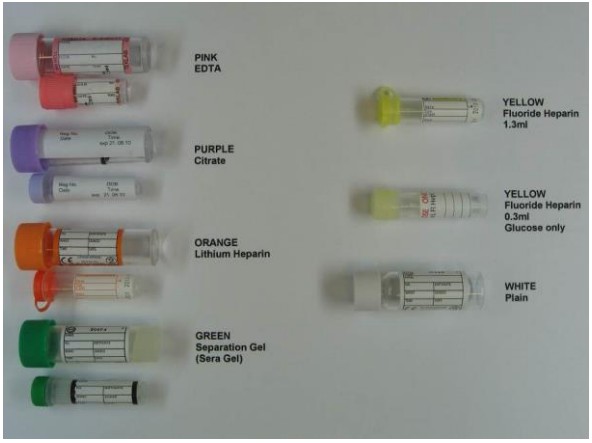
INVESTIGATION	Volume of CSF	Number of Drops	Additional blood sample required
Microbiology			
Culture (bacterial/fungal) Cell count Gram film	0.5ml minimum	10	NO
Z-N film Mycobacterial culture	0.5ml minimum	10	NO
Cryptococcal antigen	0.1 ml	2	YES
Bacterial PCR	0.5 ml minimum	10	NO
Viral PCR	0.2 ml*	4	NO
Syphilis Leptosspira Toxoplasma	0.25ml for each test	5 for each test	YES
Borrelia	0.5 ml	10	YES
Clinical Chemistry			
Glucose	0.25 ml	4-5	YES
Protein	0.25 ml	4-5	NO
Lactate	0.25 ml	4-5	NO
Serine Glycine	0.25 ml	4-5	YES

* Smaller volumes can be tested but reduce the sensitivity of the test. 0.5ml is ideal to allow confirmatory or additional testing where required.

NB The plain 1 ml bottles issued by the laboratory for sending CSF samples for protein estimation must only be used for this purpose. These bottles are non-sterile and are not suitable for M, C & S requests. They should also not be used for blood samples as this results in insufficient sample being collected - please use the **1ml or 5ml labelled bottles** supplied to the ward.

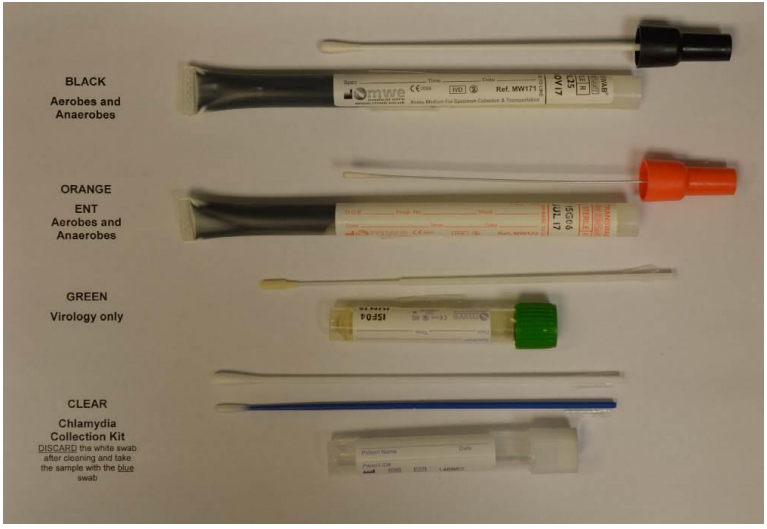
SPECIMEN CONTAINERS

Please refer to the test directories available on the intranet for details of the type of specimen required for each test.



PINK

Paediatric


BLACK
Aerobes and Anaerobes
ORANGE
ENT
Aerobes and Anaerobes
GREEN
Virology only
CLEAR
Chlamydia Collection Kit
DISCARD the white swab after cleaning and take the sample with the blue swab

APPENDICES

Appendix 1 - Pathology Requests - Quick Reference Guide

Sheffield Children's NHS
NHS Foundation Trust

sunquest ICEdesktop

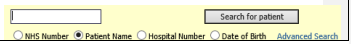
Quick reference guide:

PATHOLOGY REQUESTS

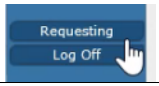
Pathology ICE requests (key stages):

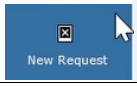
1. Login
- Double click on the ICE desktop icon
- Enter your log-in details

2. Patient Search
- Enter patient details and click 'Search for patient' then select patient.

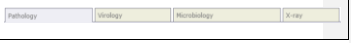


3. Start Requesting
- Click 'Requesting' (bottom left of screen)
- Click 'New Request' (upper left of screen)





4. Select Pathology panel
- Go to the home page on the pathology panel using the tabs at the top of the screen

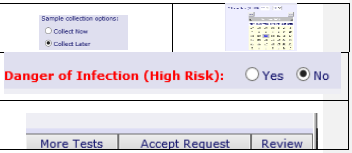


5. Refine test
- Select type of test required, e.g. urea and electrolytes plus full blood count.

6. Requester's details
- Click 'Continue with request' button (bottom left)
- Complete details of requesting consultant

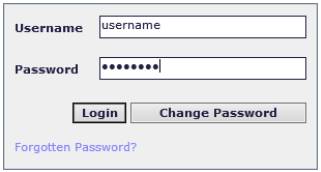
7. Clinical details
- Enter any clinical details relevant to all laboratories in the global clinical details box
- Select 'print this order' if printing a label straight away.
- Enter any clinical details relevant to a specific laboratory in the order clinical details box

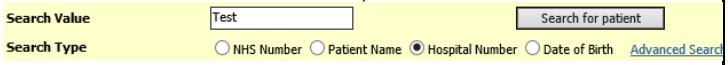
8. Finalise request
- Select 'Collect Now' or 'Collect Later' then choose a date and time
- Select 'Yes' or 'No' to 'Danger of Infection' (only select 'Yes' if the sample would be a category 3 risk)
- Select Accept Request to finish the order and print labels if printing now

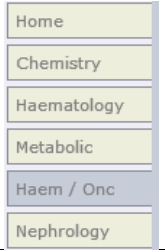
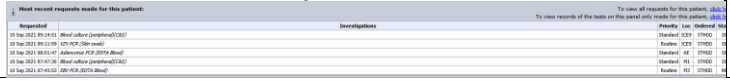


Appendix 2 - ICE Ordercomms - Pathology Training Document

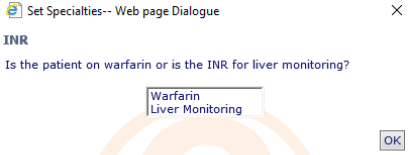
Contents

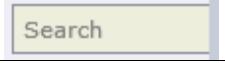
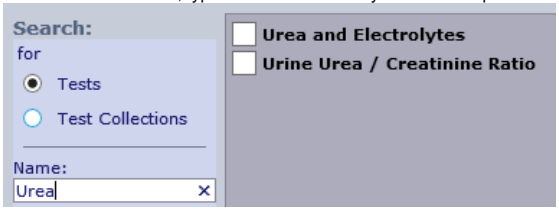
1.1 – Logging into ICE		
Step	**Activity**	**Additional Information**
1	Open ICE using the desktop shortcut labelled 'ICE Desktop' 	-
2	Click on the 'sunquest ICE desktop' image to enter the login screen 	-
3	Enter your username and password in their respective boxes, then select 'login' to login to ICE 	-

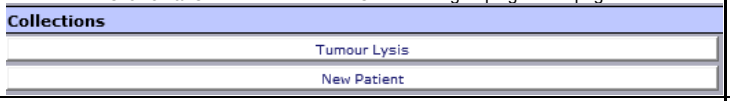
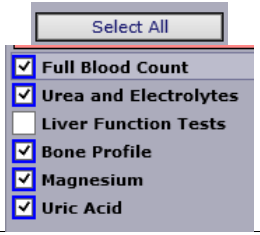
1.2 – Making a pathology request in ICE		
Step	**Activity**	**Additional Information**
1	Select the new 'Requesting' toolbar menu button on the left hand side of the screen 	-
2	Click on the 'New Request' button in the newly opened menu 	-
3	In the patient selection screen, search for your patient via any of the below fields, then click the 'Search for patient' button 	This screen allows for the searching of patients by multiple criteria (The 'Advanced Search' option can be clicked for additional criteria)
4	Click on your patient – If a screen asking you to please select an application is presented, please click on the 'New Request' button (Step 2) again to proceed 	-
5	Observe the patient information at the top of the screen, ensure you have selected the correct patient 	Patient information should always be checked prior to making a request to avoid mismatches
6	Observe the 'Panels' at the top of the screen (just below the patient information) – If not already selected, click the 'Pathology' panel 	The panels at the top of the screen contain multiple pages

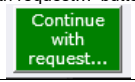
7	Observe the 'Pages' on the left hand side of the screen – Select the page you wish to view 	The pages contain the tests which are requestable via ICE
8	Select the 'Set as Default Panel' button below the page list to automatically open up the 'Pathology' panel and the selected page the next time you go to make a request 	The default panel/page can be altered at any time to a panel/page of your choice
9	Observe the most recent previous requests made on the patient at the bottom of the page – Links to view the patient's full request history are located just above the table in the bottom right of the screen 	Examining this box prior to making a request may assist in avoiding making accidental duplicate requests

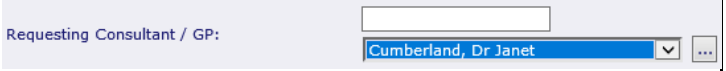
10	Hover your mouse cursor over a test in the main screen to examine the 'Help Text' that appears above the selectable tests **Sample can be venous 1.3 ml or capillary 0.5 ml - 0.5ml obtained from Haematology Lab - Please fill to the line**	Help text is information provided by the laboratory that may assist you with the requesting of tests – An orange background denotes important information or a useful warning, while a dark blue background denotes helpful information/guidance
11	Click on the test in an attempt to request it	-

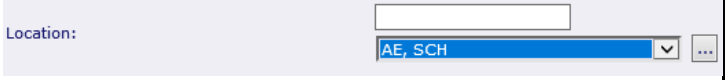
12	If a question is asked, attempt to answer it – Note that for multiple choice questions, you may be able to select multiple actions by holding the 'Ctrl' button while clicking  	When attempting to request specific tests, certain questions may be asked to assist the laboratories with the performance of said tests and the interpretation of any results – Please read such questions and answer appropriately in order to permit the laboratories to provide the best service possible ☺ Questions may be presented to you in various forms, e.g. a free text question, meaning you can provide as much or as little information as you deem necessary for the laboratory – A different example would be a pop-up box that explains how a test has already been requested in a specific time/date interval, confirming whether you wish to request the test once more

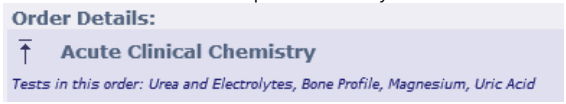
13	Deselect your selected test by clicking on its name	If you accidently select a test in error, you can simply click on it again to deselect it
14	Select the 'Search' page at the bottom of the page list 	The search page allows you to search for tests you may not be able to find on any given screen or those which you might know by another name
15	In the 'Name:' box, type in the name of test you wish to request 	You can search for a single keyword or even part of a word as opposed to the full name of the test in order to improve the odds that you can find the test you need – Tests selected on this page will be remembered by ICE if you then move to a different page (so you don't need to worry about losing anything you've selected)
16	Select a 'Speciality' page relevant to your profession	-

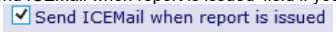
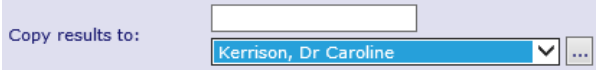
17	Click on a 'Collection' under the 'Collections' grouping on the page 	Collections are combinations of multiple tests created by clinical leads which allows the simple selection of many tests at the same time
18	Click the 'Deselect All' button to deselect all tests 	The collection screen automatically selects all tests within the collection to begin with, but you can either deselect all of the tests, or alternatively deselect individual tests to customise the selection to your liking
19	Click the 'Select All' button to select all tests again, then click on the name of a single test to remove it from the selection 	Once happy with your selection, you can either click 'Ok' to proceed with the selected tests or click 'Cancel and Return' to go back to the page you were originally on

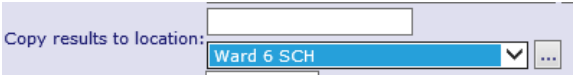
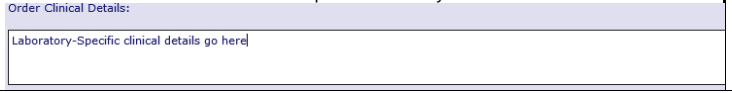
20	Click the 'Cancel and Return' button 	-
21	Using the above information, find and select the appropriate tests that you wish to request, then click the green 'Continue with request…' button in the bottom left of the screen 	Once you are happy with the selected tests, you can then proceed to the next/final stage of the request
22	Observe the 'User' field under the 'General Details' heading 	The logged-in user who is making the request is presented – The laboratories are fed this information for the purpose of auditing and in the event that the requestor needs to be contacted (e.g. communication of urgent results) so where possible please ensure that you are logged in to your ICE account when making a request ☺

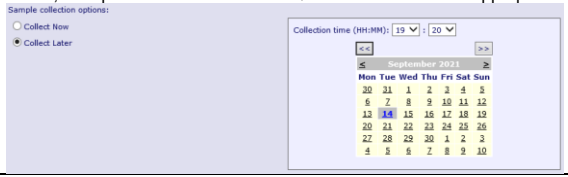
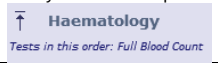
23	In the 'Bleep / Contact No:' box, enter either your bleep or phone number if you have one 	The number entered here is also fed to the laboratories, meaning they can contact you directly with any necessary information as opposed to going through the ward or department
24	In the 'Requesting Consultant / GP' box, select the patient's consultant 	You are able to select the consultant in question by either the dropdown box, by searching for their surname in the box above, or alternatively via an advanced search by clicking on the '…' box – Entering the correct consultant means the results/reports are sent to and filed under the correct consultant

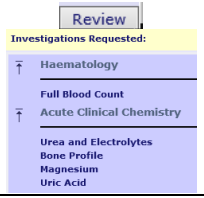
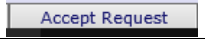
25	In the 'Location' box, select the patient's location 	You are able to select the location in question by either the dropdown box, by searching for its name in the box above, or alternatively via an advanced search by clicking on the '…' box – Entering the correct location means the results/reports are sent to and filed under the correct ward/clinic
26	In the 'Global Clinical Details' box, enter the patient's clinical details relevant to all laboratories 	Clinical details entered in this field are sent to <u>every</u> lab – When making an actual request, accurate and detailed clinical details or underlying conditions should be entered into this box to assist <u>all</u> laboratories in interpreting any results produced ☺

27	Observe and set the patient's category to the correct type 	The 'Category' field is used to allocate the patient's category – It automatically defaults to NHS as that is the category of patients that the majority of requests will be made for, however if you are making a request for a research or private health care patient, then please alter the category appropriately by clicking the drop down box
28	Observe the right hand of the screen detailing the 'Order Details', specifically the ordered tests under the top-most laboratory header 	Here you are able to view which tests you have requested under each laboratory / service provider to ensure you haven't missed anything or have accidently ordered something

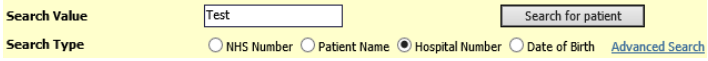
29	Ensure the 'Print this order' box is ticked 	The field is automatically selected and ensures that upon completion of the request, the correct labels are printed out ready for use – If for some reason you do not want to print any labels out, you can untick the box
30	Tick the 'Send ICEMail when report is issued' field if you wish to do 	By selecting this field, you will receive an ICEMail when results are reported by the laboratories – ICEMail is a notification system that pops up in the top right of the screen when available – Using the system is entirely optional and down to preference
31	In the 'Copy results to' box, select a second consultant if you wish to copy the report to another consultant 	The Copy-To feature allows you to make ICE automatically copy a report/set of results to a consultant of your choice – If you do not want to copy a report, simply leave this field blank

32	In the 'Copy results to location' box, select a second location if you wish to copy the report to another location 	Like for the consultant copy-to feature, you can also copy a report automatically to a different location if you wish
33	Ensure the 'Priority' field is set to 'Standard' 	The 'Standard' priority should be the only selectable priority for SCH pathology requests – If you require urgent analysis of any samples, the laboratory in question must be phoned to inform/agree urgent analysis (identical system to pre-Ordercomms)
34	In the 'Order Clinical Details' box, type any clinical details that you think are only valuable to this specific laboratory 	Clinical details entered in this field are sent to the specific laboratory named in the header

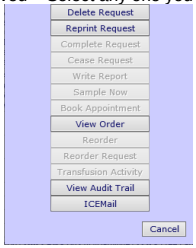
35	Ensure that the 'Sample collection options' field is set to 'Collect Now' if you wish to take the sample now, or 'Collect Later' if you wish to take the sample later – If you select 'Collect Later', then please fill out the calendar/time selection box as appropriate 	The field automatically defaults to 'Collect Now' as the majority of requests will be made at or shortly before collection, however if you wish to collect the sample at a later time or even date, then you may simply select the 'Collect Later' radio dial when appropriate to inform ICE
36	Ensure that the 'Danger of Infection (High Risk)' field is set to match the patient's category 3 risk status 	This field refers to patients whose samples are designated as a category 3 risk by infection control – For such patients, you should select the 'Yes' option, but please note that the samples and transport bags must still be labelled with the yellow Category 3 Risk stickers from infection control
37	Fill out the details as above but for any other service providers in the request as appropriate 	-

38	In the bottom right of the screen, select the 'Review' button to review the tests you have ordered 	The review screen allows you to examine one last time the tests which you have requested – If you have missed any, you can click 'More Tests' at the top of the screen to go back to the requesting screen and select any further tests that are necessary
39	Select the 'Proceed With Request' button to return to the final requesting screen 	-
40	Select the 'Accept Request' button in the bottom right of the screen to complete the request 	-
41	Select the appropriate printer that you wish to print from	Whichever printer you select will attempt to print the sample and bag label off, ready for use

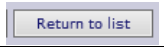
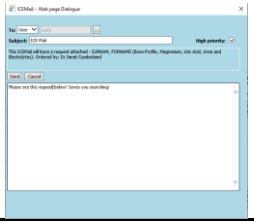
1.3 – Viewing requests by patient in ICE		
Step	**Activity**	**Additional Information**
1	Select the new 'Requesting' toolbar menu button on the left hand side of the screen 	-

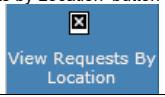
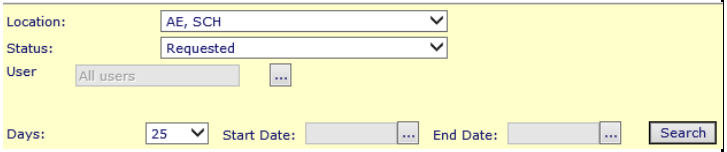
2	Click on the 'View Requests by Patient' button in the newly opened menu 	-
3	In the patient selection screen, search for your patient via any of the below fields, then click the 'Search for patient' button 	This screen allows for the searching of patients by multiple criteria (The 'Advanced Search' option can be clicked for additional criteria)
4	Click on your patient – If a screen asking you to please select an application is presented, please click on the 'New Request' button (Step 2) again to proceed 	-
5	Observe the patient information at the top of the screen, ensure you have selected the correct patient 	Patient information should always be checked prior to viewing previous requests to avoid confusion and incidents

6	Observe the table 	The screen allows you to view: when requests were made; what was requested, who made the request; what location the patient was under; the status of the request – For SCH Pathology, a status of: 'REQ' means requested; 'SR' means sample received by the laboratory; 'RR' means reports received – If you see a status of 'RR', you can click the icon to view the results or go to the full report!

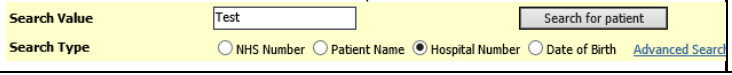
7	Click on the request you made in section 1.2 of this testing script to open up a menu – Note that the request you made is broken down into multiple orders based on the laboratories involved – Select any one you wish 	This menu permits you to: delete or reprint a request (up to the point the laboratory receives the sample); view the order in full; send results via ICEMail
8	Observe the 'Delete Request' button 	This option should only be used if you have made a request in error and wish to cancel it – Please note that if a sample has already been sent to the laboratory in question, you should telephone and inform them that you wish to cancel analysis of said sample

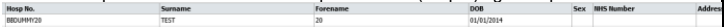
9	Observe the 'Reprint Request' button Reprint Request	This option should only be used if you require a fresh label for a sample as the original one has been damaged or lost – This feature must not be used to avoid making a second request at a later date, as doing so would disrupt laboratory operations
10	Click the 'View Order' button View Order  Patient Details NHS number: Hospital Number: T.20.126568 Name: FIRMANE SURNAH Date of Birth: 13 May 1989 Address: House no. and street name,District,Town,XX0 0XX General Details Username: chehb Bleep / Contact No: Requesting Consultant / GP: Dr Janet Cumberland (C3122590) Location: AE, SCH Clinical Details: Clinical details go here Laboratory-Specific clinical details go here Priority: Standard Telephone Results: No ICUMed Results: Yes Category: NHS Requested Date/Time: 14 September 2021 19:24 Order Number: 3213957 Additional Information Examination(s) Requested Bone Profile Magnesium Uric Acid Urea and Electrolytes Sample Details Sample Number A200007 Container Name 1.2 ml Lithium Heparin Status Pending Sample Collected Date 14 Sep 2021 19:20 Collecting User chehb Reason	Clicking this button will present you with a screen containing all information relating to the order, including the sample types and number of samples required!

11	Click the 'Return to list' button in the top right of the screen to return to the requests review screen 	-
12	Click on the same order as previously, then select the ICEMail button if you wish to use the feature 	The ICEMail option allows you to send a request/results to a user of your choice, alerting them to the fact that you or someone has made a request or that results are now available – This feature is completely optional and can be used if you wish to utilise it
13	In the 'User' field, click the '…' button to find and select a user you wish to send the ICEMail to, enter a subject for the ICEMail then leave any notes in the large text box before clicking 'Send' 	-

1.4 – Viewing requests by location in ICE		
Step	**Activity**	**Additional Information**
1	Select the new 'Requesting' toolbar menu button on the left hand side of the screen 	-
2	Click on the 'View Requests by Location' button in the newly opened menu 	-
3	In the top left of the screen, change the 'Location' to a location of your choice via the dropdown box, followed by altering the 'Days' field to any number of days before hitting the search button 	The list can be further filtered down based on the status of the request, as well as the type of sample etc.

4	Observe the previous requests table 	The 'Requests by Location' screen allows you to view all previous requests made for any patient under a specific location, this could be used for keeping track of requests in a clinic etc.

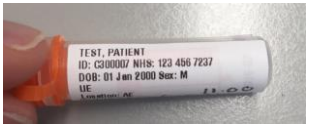
1.5 – Viewing requests and results in ICE's EPR (Electronic Patient Record)		
Step	**Activity**	**Additional Information**
1	Select the new 'Tools' toolbar menu button on the left hand side of the screen 	-
2	Click on the 'EPR' button in the newly opened menu 	-
3	In the patient selection screen, search for your patient via any of the below fields, then click the 'Search for patient' button 	This screen allows for the searching of patients by multiple criteria (The 'Advanced Search' option can be clicked for additional criteria)

4	Click on your patient – If a screen asking you to please select an application is presented, please click on the 'New Request' button (Step 2) again to proceed  Hosp No. | Surname | Forename | DOB | Sex | NHS Number | Addres BBDUMMY20 | TEST | 20 | 01/01/2014	-
5	Observe the patient information at the top of the screen, ensure you have selected the correct patient  Patient Name: 20 TEST | Hospital Number: BBDUMMY20 | Sex: Unknow Date of Birth: 01 January 2014 | NHS Number: No NHS Number Address: | Telephone No:	Patient information should always be checked prior to viewing previous requests to avoid confusion and incidents
6	Observe the EPR table  Event | Description | Clinician | Location | Status | Date Order placed | BONE Bone Profile, PAG Magnesium, UA Uric Acid, UE Urea and Electrolytes | JEC | AE | REQ | 16/09/2021 15:2 Order placed | F Full Blood Count | JEC | AE | REQ | 16/09/2021 15:2 Order placed | Blood paragh. (CBS) Blood culture (peripheral) (CBS) | PIS | ICU9 | DEF | 16/09/2021 09:1 Order placed | VZV PCR (CSF) VZV PCR (CSF) (NHS Invest) | D. A. H. | ICU9 | DEF | 16/09/2021 09:1 Order placed | Adeno PCR (EDTA) Adenovirus PCR (EDTA Blood) | HEGH | AE | DEF | 16/09/2021 09:1	The EPR screen allows you to view both requests made and reports received simultaneously, acting as a requesting/reporting record which you may find useful

Appendix 3 - ICE Requesting Sample and Bag Labelling Guide

ICE requesting labels are perforated labels that can be separated to be applied to the sample tube and sample bag.

- The larger label is to applied to the bag
- The smaller label is applied to the sample tube (as below)



Both labels have a Collection Details box to allow a signature and date (as below)

The sample tube should be placed into the bag once the Collection Details are completed.

Samples should be bagged according to the laboratory they are being sent to. The laboratory is shown on the label (as below). Where multiple samples are being sent to the same laboratory, ensure all a bag label for each sample tube is attached to the bag.