

DIRECTORATE OF LABORATORY MEDICINE **LABORATORY HANDBOOK**

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Foreword

Quality is a strategic goal that delivers the best outcome for both clinician and patient. Laboratory Medicine has a primary commitment to quality which clearly requires a close partnership between the providers and users of this service. We are committed to achieving and maintaining the highest possible standards. I am sure that the information contained in this handbook will prove invaluable in helping us to attain this goal.

Dr Neil Todd

Consultant Microbiologist
Clinical Director
Directorate of Laboratory Medicine

Quality Assured

York is a CPA accredited Laboratory. Accreditation awarded by CPA (UK) Ltd is the result of a successful external inspection. This is a formal audit that assesses the ability of the Laboratory to provide services to the highest quality. Laboratories holding CPA accreditation offer their users the reassurance of clearly defined standards. We provide a comprehensive consultative and diagnostic service in collaboration with all users throughout the York Hospitals NHS Trust and beyond.

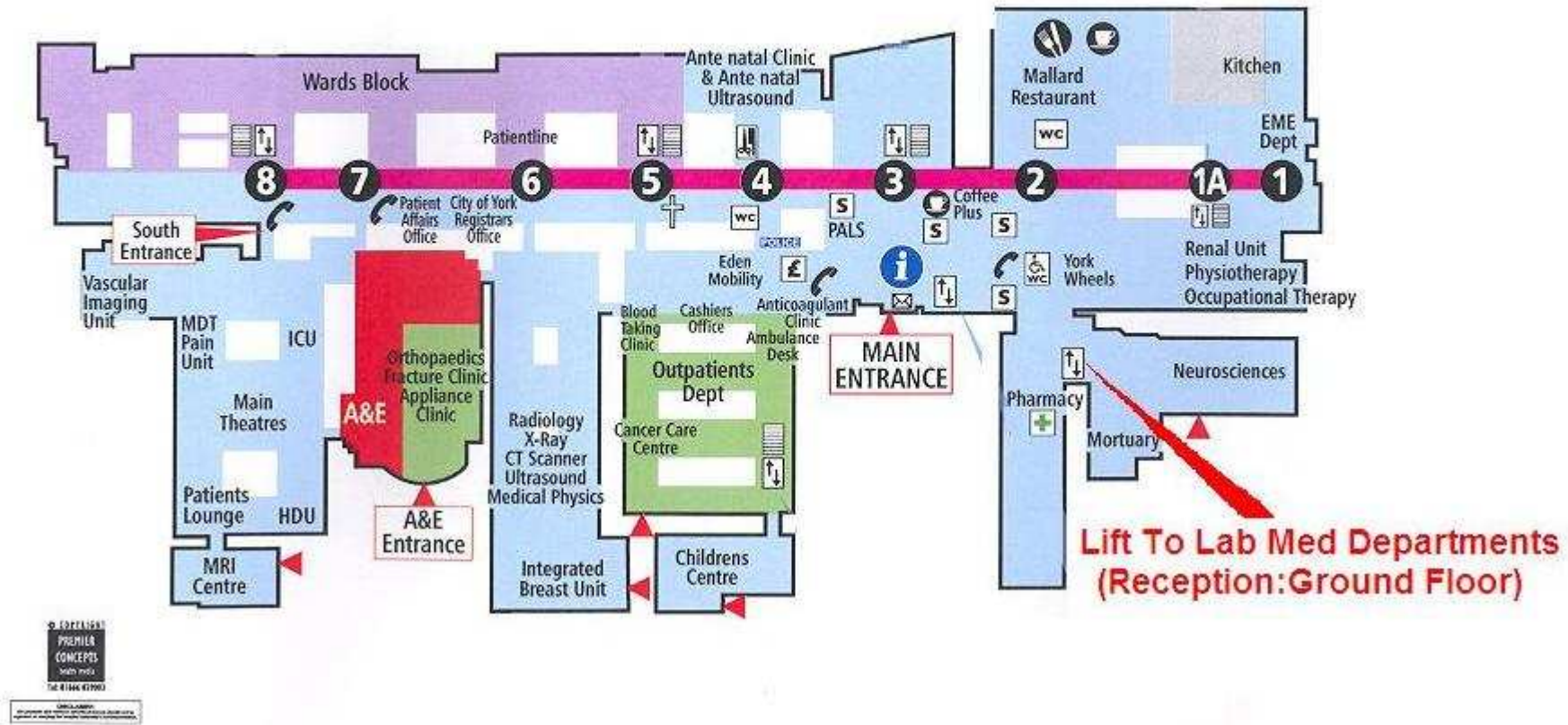
CPA inspection occurs regularly and all departments are fully accredited.

Laboratory Location

The Laboratory Medicine Department reception is located on the ground floor at York Hospital with the departments on the first, second and third floors above. Our address is:

Laboratory Medicine Department,
York Hospital
Wigginton Road
YORK
YO31 8HE

The Laboratory Medicine Department is the block to the right of the main hospital entrance and on the three floors above "Pharmacy" shown on the hospital plan below.



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YORK TEACHING HOSPITAL NHS FOUNDATION TRUST DIRECTORATE OF LABORATORY MEDICINE

Clinical Director

Dr Neil Todd
Consultant Microbiologist
Telephone (01904) 725216

LEAD CLINICIANS

Clinical Biochemistry

Alison Jones
Consultant Clinical Biochemist
Telephone (01904) 725786

Laboratory Haematology

Dr M Howard
Consultant Haematologist
Secretary Telephone (01904) 725854

Clinical Haematology

Dr L Munro
Consultant Haematologist
Secretary Telephone (01904) 725777

Histology

Dr C Bratten
Consultant Histopathologist
Secretary Telephone (01904) 725776

Microbiology

Dr D Hamilton
Consultant Microbiologist
Secretary Telephone (01904) 726170

Directorate Manager

Mr Paul Sudworth
Secretary Telephone (01904) 725859

Directorate Secretary

Mrs Cathy McSkeane
Telephone (01904) 725852

Finance Manager

Mr Paul Roth
(01904) 726190

General Information and normal working hours

Clinical Biochemistry	8.30 am - 5.30 pm Monday - Friday
Haematology & Blood Transfusion	8.30 am - 5.30 pm Monday - Friday
Immunology	8.30 am – 5.00 pm Monday to Friday
Microbiology	8.30 am - 5.00 pm Monday - Saturday
Histopathology	8.30 am - 5.00 pm Monday – Friday (last receipt of semen samples for Cytology 3.00pm)
Laboratory Reception	8.30 am - 5.00 pm Monday – Friday
Point of Care Testing (POCT)	8.45 am – 1715 Monday – Friday

The laboratory provides emergency services on site out of normal working hours for Haematology and Clinical Biochemistry and via an on call service for Microbiology.

CONTACTING THE LABORATORY OUTSIDE NORMAL WORKING HOURS

Department	Bleep Number
Clinical Biochemistry	934
Haematology	842
Microbiology	Dial switchboard '0'
Point of Care Testing	01904 725890 and leave voicemail for action next working day Point of Care Co-ordinator: Anne Penrice

PATHOLOGY REPORTS

These are delivered to the wards by the portering service. The first delivery is at 11.30 am, the second at 3.30 pm and the third between 5 and 5.30 pm. Results from samples tested in York are available to view on the ICE system and in Pathview on CPD.

REQUEST FORMS AND SAMPLES

Where insufficient details are provided on the request form and sample, the assay of the sample may be severely delayed or completely rejected.

Requests being made by the Ordercomms system will automatically have the correct data included if the procedure for using Ordercomms has been followed.

For full details on identifying samples and completing request forms please see:

Completing Request Forms and Labelling Samples Policy.

This document is available on Staff Room - Policies and Procedures › Clinical Documents › Laboratory Medicine - Completing Request Forms and Labelling Samples Policy

SAMPLES

For samples (*other than those for Blood Transfusion*), to be acceptable, they must be labelled with

- 1) The surname
- 2) The forename
- 3) A third identifier; this can be...
 - (i) The NHS number preferably
 - (ii) The date of birth
 - (iii) The hospital number, (or maternity 'D' number or A/E number) if there is no alternative.

Identifiers must be correctly spelt and complete, i.e. Initials are insufficient, as is an age of patient or just a year of birth.

Samples for Blood Transfusion must have **four** parameters for identification and one of these **must** be unique.

The sample must be labelled with

1. The surname
2. The forename
3. The date of birth
4. A unique reference; this can be...
 - a. The NHS number preferably
 - b. A Nuffield ID number
 - c. The hospital number, (or maternity 'D' number or A/E number) if there is no alternative.

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Identifiers must be correctly spelt and complete, i.e. Initials are insufficient, as is an age of patient or just a year of birth. Samples for blood transfusion must be signed by the person taking the blood.

If a patient is unidentified then the A/E number must be used, the surname must be given as UNKNOWN and the gender of the patient entered in the forename box.

Unlabelled samples are unfortunately not suitable for processing and will be discarded with the exception of Histology tissue samples. *Unlabelled tissue samples for Histology will be verified by the clinician attending the laboratory.*

REQUEST FORM

The request form **must** have the **NHS number, surname, and forename**.

In addition to this, other details are required to ensure that a correctly interpreted result is delivered to the correct location.

Patient's current location

Patient's Date of Birth

Patient's gender

Patient's address

Consultant/GP

Time and date of sample

Clinical details

Drug history

Type and site of specimen, (as appropriate)

Dose and Time of last dose for drug assays

Referring clinician and contact details (especially important for ALL Immunology Specimens)

Antibiotic history (vital as part of any microbiology request)

The name of the requestor, who should normally be medical, must be provided to satisfy requirements for consent to test. This is particularly important for sensitive tests such as HIV, syphilis, chlamydia etc.

All requests for **cervical cytology** should be accompanied by the special (HMR 101/5) forms and all details must be completed with the full patient address, NHS number, and sender details along with the smear takers unique LBC smear taker code.

All samples should be dispatched to the laboratory as soon as possible after collection to ensure best turnaround times and most accurate results. It is highly recommended blood samples should arrive in the laboratory within 24 hours of collection – the laboratory may not be able to process samples received after this time. Overnight storage of blood samples before dispatch to the laboratory is not recommended and actively discouraged. Contact the laboratory for further details.

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TRANSPORTATION OF SAMPLES AND POSTAGE

All users are referred to the current laboratory document. This can be found on the Trust Intranet - Staff Room: Policies and Procedures › Clinical Documents › Laboratory Medicine. A hard copy of this policy is available on request.

ORDERING CONSUMABLES

There is a form for ordering consumables from Pathology Reception. This form can be sent into the laboratory or faxed to 01904 726358. Please order weekly and try not to keep large stocks of consumables as some items deteriorate with time.



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PHLEBOTOMY (BLOOD TAKING) SERVICE

Key Contacts

Catherine McCluskey, Phlebotomy Manager
Jo Peirson & Stephanie Holt, Senior Phlebotomists
Blood taking - OPD
Blood Taking – Wards

Telephone

6544
6544
6544

Wireless Telephone

1088, 1089 & 1090

Service Location and Times

Location	Times
York Hospital OPD (Walk In Service)	Mon – Fri 08:00 – 17:15hrs
York Hospital Anti-coag Clinic (Walk In Service)	Mon – Fri 08:00 – 11:00hrs
York Hospital Haematology Clinic (Appointment Only)	Mon – Thurs 13:15 – 16:30hrs Wed & Fri 09:15 – 11:30hrs
ASDA Monks Cross (Walk In Service)	Mon –Thurs 08:30 – 16:40hrs (closed for lunch 13:00 to 13:30) Fri 08:30 – 15:00hrs (closed for lunch 12:00 to 12:30)
Sherburn in Elmet Health Centre (Appointment Only)	Mon, Wed & Fri 08:15 – 11:30
Selby War Memorial Hospital OPD (Appointment Only)	Mon – Thu 08:30 – 16:30hrs Fri 08:30 – 12:30
Tadcaster Medical Centre (Appointment Only)	Mon – Fri 08:15 – 12:15hrs
York Hospital Ward Visits*	Mon – Fri 08:30 – 12:30hrs

*Blood taking on the Wards occurs between 8.30 am and 12.30 pm Monday to Friday and between 8.30 am and 12:30 midday Saturday and Sunday. Wards are assigned time slots during these periods to enable equitable distribution of phlebotomist’s time.

Patients admitted in the afternoon for ‘cold surgery’ or for investigations should be asked to attend outpatient blood taking before changing into their bedclothes. A weekend service exists for all Bank Holidays except Christmas Day.

Requests generated by Ward Ordercomms must be ticked as “Specialist Collection” if phlebotomists are required to take the samples and should be in place by 08:30. Please note that the phlebotomists will not normally return to your ward.

Please note the following

Urgent specimens should be taken by the doctor and sent immediately to the laboratory. The laboratory must be informed by telephone of the imminent arrival of an urgent sample. Samples marked “urgent” for which there has been no warning telephone call will be treated as routine.

Blood cultures will usually need to be taken by ward based staff as the timing will be determined by the condition of the patient.

High Risk/Danger of Infection Samples.

High Risk Samples

Samples must be considered High Risk if the patient has, or is suspected of having...

CJDv HepB HepC HIV TB

Or any other disease classed as category 3 or above.

Samples from patients with jaundice of unknown origin and patients known to engage in high risk activities, such as IV drug abuse, must also be considered high risk.

Packaging and Transport of High Risk Samples

All samples that are included in the above categories **must be double bagged** and **must NOT be transported using the vacuum tube system.**

Labelling Samples as High Risk.

There is an absolute requirement that high risk samples are labelled as such before transport to the laboratory.

The mode of labelling differs with the type of request.

1) *Requests made by Ordercomms electronic requesting.*

The High Risk box must be ticked when making the request on Ordercomms. This ensures a subtle format change to the request form which, along with the use of double bagging, provides all the labelling required.

2) *Requests made to Microbiology.*

For all high risk samples the high risk box on the Microbiology request form must be ticked. Remember to complete the Microbiology request form with all patient details as usual. The sample should be double bagged by placing it inside a second Microbiology request form bag.

3) *Other requests.*

Requests for departments other than Microbiology, (and where no Ordercomms requesting is available), must clearly indicate the infection risk of the patient on the request card. The sample should be double bagged by placing it inside a second request form bag.

Any queries regarding high risk samples can be addressed to

Dr D Hamilton
Consultant Microbiologist
Department of Microbiology
York Hospital

Mr. Paul Sudworth
Directorate Manager
Laboratory Medicine
York Hospital

Blood from these patients should normally be taken by medical staff. If Phlebotomists are asked to take blood they must be informed of the situation. This is the personal responsibility of the doctor making the request.

If Phlebotomists are asked to take blood from patients being barrier nursed they must be informed of the situation.

Storage of Samples before Analysis

All samples will deteriorate from the time they are collected but, with a few simple measures, this deterioration can be minimised.

Samples collected in the hospital should be transported to the laboratory as soon as possible. For some tests special collection procedures should be followed. Please check the tables of sample requirements elsewhere in this handbook to see if special collection procedures apply.

Samples collected outside the hospital should be stored at room temperature until picked up for transport to the hospital. If samples are collected after the transport has left then they should be placed in a refrigerator **except** those samples for genetic tests (EDTA), HLA B27 (EDTA), joint aspirates or other "sterile fluids", urethral swabs and HVS.

It is best to avoid collecting samples for urea and electrolytes, magnesium, phosphate, ESR, coagulation studies, malarial parasites, cold agglutinins and viral PCR if they cannot be transported to the hospital that day. Arrange for the patient to attend at another time when the samples can be sent to the hospital on the transport later that day. Alternatively the patient can attend the walk in phlebotomy service at York Hospital or Asda at Monks Cross. [Opening times](#) for these services are detailed in the Phlebotomy Service section of this handbook.

Some surgeries have centrifuges to spin down brown top blood samples. Once spun down, these samples are relatively stable but may be stored in a refrigerator until collected by transport. Please clearly mark the request card that the sample has been centrifuged and also put a blue cap onto the tube to show that it should not be centrifuged again.

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CLINICAL BIOCHEMISTRY DEPARTMENT

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1. [Test requesting](#)
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5. [Screening for drugs of abuse](#)
6. [Lipid analysis](#)
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8. [Sampling protocol for plasma metadrenalines](#)
9. [Dynamic function tests](#)
10. [Pregnancy tests](#)
11. [Hypoglycaemia in children](#)
12. [CSF sampling for suspected subarachnoid haemorrhage](#)
13. [Pleural fluid](#)
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	Telephone	Bleep
Dr Deepa Narayanan Consultant Chemical Pathologist	(01904 72) 5670	620
Alison Jones Alison.jones@york.nhs.uk Consultant Clinical Biochemist	(01904 72) 5786	500
Dr Daniel Turnock Consultant Clinical Biochemist	(01904 72) 1847	
Michelle Morgan Secretary to Consultant Chemical Pathology team	(01904 72) 5855	
Mrs Joanna Andrew Joanna.andrew@york.nhs.uk Head Biomedical Scientist	(01904 72) 5872	
Mrs Joanna Andrew joanna.andrew@york.nhs.uk Operational Manager - York	(01904 72) 5802	
Results & Specimen Enquiries/Office	(01904 72) 6802	
Duty Biochemist	(01904 72) 6366	

The Department is situated on the second floor of the Laboratory block and is open from 08:30 to 17:30 Monday to Friday. Enquiries about results and specimens may be obtained from the office (01904 726802) 08:30 to 18:30 Monday to Friday. Enquiries at other times should be made via the Biomedical Scientist (BMS) on duty (bleep 934) but these must be kept to a minimum. **Please use the CPD Pathview or the ICE Anglia reporting system whenever possible.** The CPD and ICE Anglia reporting system is available on the hospital network and is updated with completed results every 15 minutes

There is a Duty Biochemist available (01904 726366) from 09:00 to 17:30 Monday to Friday for advice or to discuss results.

Other queries will be answered by the on-call consultant, contact via switchboard.

Frequency of assays

Most assays are performed daily but there are some assays performed less frequently dependant on numbers, clinical need and cost. Some samples are sent away to other laboratories for testing.

Turnaround Times

Turnaround times of samples are calculated from the time of receipt of the sample in the laboratory to when the result has been validated and is available to the user in electronic format. Receipt of hard copy reports may take considerably longer.

General Chemistry Tests

Turnaround times for general chemistries on routine non-urgent samples such as U&E, LFT, Bone profile, and CRP and blood glucose are as follows. From receipt of samples the mean (50%) turnaround times for these tests is 45 minutes; 75% of samples are turned around in 1 hour and 95% of all samples analysed and reported within 2½ to 3 hours.

Urgent samples about which we have been telephoned are turned around within one hour of receipt.

Endocrine Tests

For endocrine tests the turnaround times for 95% samples are as follows: thyroid function (24 hours), free T3 (24 hours), oestradiol, LH & FSH, & tumour markers (all 48 hours), testosterone (3 days), B₁₂ & ferritin (24 hours) from the time of receipt.

Referred Tests

Turnaround times for samples referred to third party laboratories for analysis can also be supplied. It should be noted that referral laboratories own figures do sometimes differ considerably from actual experience.

Exact turnaround times for *any* tests can be supplied on request.

Request forms

These must be correctly filled in, preferably with the details printed in CAPITALS. It is essential that the HOSPITAL NUMBER and DATE OF BIRTH are included whenever possible.

Urgent Requests must be telephoned to the office (6802 or bleep 934 out of hours) to alert the laboratory staff of their arrival. The request form must be clearly marked URGENT. Results will not be telephoned without prior verbal notification.

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Out of Hours

The following tests are available:

U and E, Bicarbonate, serum Glucose, Liver Function Tests, Bone Profile, CK, Amylase, CSF Glucose, CSF protein, Paediatric Bilirubin, CRP, Urate (Maternity), Theophylline, Digoxin, Salicylate and Paracetamol.

Xanthochromia screening for suspected SAH is performed routinely Monday – Friday between 9.00am and 5.30pm, and between 12.00pm and 3.00pm at the weekend. For urgent analysis of xanthochromia outside of these hours, please contact the Duty Biochemist (01904 726366) or the on-call consultant (via the hospital switchboard) to discuss the patient

Requests for other analytes should be discussed with the Duty Biochemist (01904 726366) or on call- consultant via the hospital switchboard.

The department operates a shift system and there is a BMS in the hospital at all times. Outside routine hours only one BMS is on duty and they are often extremely busy. Please be patient and bleep them only when absolutely necessary.

Blood gases and ionised calcium at York Hospital

These are measured on the machines in ICU. There are also machines in CCU, AMU, SCBU, Delivery and the Emergency Department. Samples from ward based patients are analysed by healthcare staff on one of these analysers.

Samples for ionised calcium from out patients and general practice are measured by laboratory staff. A brown top serum sample **with no air bubble** is required for this analysis.

Reports

Most reports are available to view on CPD and completed reports are uploaded electronically every 15 minutes for the hospital. The reports for GP surgeries are sent electronically with regular uploads every 2 hours during the day and evening. Some paper reports are still produced and delivered by internal and external mail.

TEST REQUESTING

We are able to measure over a hundred analytes in the laboratory and we can also arrange for specimens to be sent to other laboratories for measurements of analytes not performed at York.

Routine Tests

We are able to perform measurements of single analytes if required but in practice tests tend to be grouped with other inter-related tests. These are as follows:

Bone	Albumin Alkaline phosphatase Calcium Phosphate
Cardiac Markers	Troponin I (cTnI).
Liver	Alanine aminotransferase (ALT) Albumin Alkaline phosphatase (ALP) Bilirubin Total protein
Renal	Sodium Potassium Urea Creatinine (includes eGFR)

These test groups can be requested by ticking the appropriate boxes on the request form. If you only require a single test or selected tests from a group please indicate which tests are required by writing their names in the space below the request boxes. THIS IS ESPECIALLY IMPORTANT WITH LOW-VOLUME PAEDIATRIC SAMPLES when there may be insufficient sample to perform all the requested tests. The order in which the tests are written will determine priorities during sample analysis. This will ensure that the most needed tests are performed first.

Sample Requirements

There is a comprehensive list of samples required for each test detailed later on in this handbook as well as the frequency of analysis with reference ranges where appropriate. The sample required to analyse all the tests listed in the previous section is 7.5ml of clotted blood. There is also a summary of sample requirements on the back of every pathology request form.

24h urine collections

The following assays require the urine collected into a bottle containing **acid preservative**

calcium

metanephrines (can be collected in a plain bottle if HIAA is **not** also required)

citrate

cystine

Hydroxy-indole acetic acid (HIAA)

magnesium

oxalate

phosphate

The following assays require the urine collected into a **plain** bottle (no preservative)

arsenic

cortisol

creatinine

total protein

urate

urea and electrolytes

copper

mercury

Requesting further tests on samples already received in the laboratory

We keep most of the samples we receive for approximately 3 days before they are discarded. Some samples are kept longer depending on the tests requested. If you want to add further tests to a sample please ring (01904 72)6802 **option 1**. We will check if we still have the sample and then add the tests. Please note that some analytes are labile and deteriorate rapidly. In these cases you we will tell you that the sample we have left is unsuitable and fresh sample will have to be taken.

Reference Ranges

Age and sex related reference ranges are printed on the report forms alongside the results.

eGFR

The National Service Framework (NSF) for Renal Services has recommended that kidney function is measured by serum creatinine concentration together with a formula-based estimation of glomerular filtration rate (eGFR), calculated and reported automatically by all clinical biochemistry laboratories on samples from people who are aged 18 years and over. The formula is not recommended for some specific groups (children, acute renal failure, pregnancy, oedematous states, muscle-wasting disease, amputees and malnourished patients).

Guidance on further investigation and management of patients with chronic kidney disease can be found at <http://www.renal.org/information-resources/the-uk-eckd-guide>.

We use a formula to estimate the GFR based on the Modification of Diet in Renal Disease (MDRD) equation using the serum creatinine concentration, age and sex of the patient. In addition all reports indicate a further multiplication which should be made to the reported value if the patient is of African-Caribbean ethnic origin (*If the patient is of afro-Caribbean origin multiply eGFR by 1.212*). The calculation we make also incorporates correction factors which take into account the particular method and analyser that we use to measure the serum creatinine. These correction factors have been implemented across the UK to improve inter-laboratory agreement and aid correct diagnostic classification.

Therapeutic Drug Monitoring (TDM)

We provide a service for the monitoring of serum concentrations of a number of drugs. If a drug assay is required the following information is helpful:

- Time of last dose
- Duration of therapy
- Co-administered drugs
- Reason for request

The department offers a service for: Lithium, Tacrolimus, Theophylline, Phenytoin, Phenobarbitone, Carbamazepine, Sodium valproate, Primidone, Digoxin, Paracetamol and Salicylate. We send samples to other laboratories for the measurement of Sirolimus and Ciclosporin.

The sampling time should be as follows:

Carbamazepine	Immediately before next dose
Digoxin	>6 hours post dose

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Lithium	12 hours post dose
Phenytoin	At any time
Phenobarbitone	Immediately before next dose
Primidone	Immediately before next dose
Sodium valproate	Immediately before next dose
Theophylline	2 hours post dose
Theophylline (sustained release)	4 hours post dose
Tacrolimus	Immediately before next dose
Sirolimus	Immediately before next dose
Ciclosporin	Immediately before next dose

Phenytoin is bound to albumin in blood and therefore in patients with albumin levels below 40g/L an adjustment can be calculated where appropriate.

$$\text{Adjusted phenytoin (mg/L)} = \frac{\text{measured phenytoin}}{[(0.02 \times \text{serum albumin}) + 0.1]}$$

Drug Analysis in Overdose Cases

The Biochemistry department offers analysis of various drugs in patients where overdose is suspected. This includes:

carboxyhaemoglobin
iron
lithium
paracetamol
salicylate
theophylline
phenytoin
blood alcohol.

Samples for tricyclic antidepressants and barbiturates are sent to another laboratory

Please contact the laboratory to discuss your requirements if necessary.

Screening for Drugs of Abuse

We offer a **clinical** screening service for drugs of abuse. We require a random urine sample collected into a plain container. We always measure the urine creatinine concentration in these samples because if the urine is very dilute any drugs present may be there in concentrations that are below the cut-off value to give a positive result. We screen for the presence of 7 commonly abused drug classes (or their metabolites).

Amfetamines (includes methylated amfetamines such as ecstasy)

Benzodiazepines

Cannabis

Cocaine

Methadone metabolites

Opiates

6 monoacetyl morphine

Some other drugs will give positive results with our amphetamine and opiate screens. For this reason samples that are shown to be positive for the presence of amfetamines or opiates are further investigated using chromatography to check there is amphetamine (or a derivative) or morphine present respectively.

We are often asked how long drugs will remain detectable in urine after consumption. Below is a table with approximate times.

Drug	Approximate retention time
Amfetamines	1-3 days
Benzodiazepines	12 hours to 6 weeks (depends on the type of benzodiazepine)
Cannabis	Up to one month (depends on previous consumption)
Cocaine	1-3 days
Methadone metabolites	1 day
Opiates	1-2 days
6 monoacetyl morphine	12-24h

We will also screen for individual drugs if you do not want to screen for all of the 7 drugs in the above panel. Please indicate the drug(s) that you want to screen for on the request card.

Blood Sampling For Lipids

Serum total cholesterol and HDL cholesterol may be measured in a non-fasting sample. When serum triglycerides are also required the blood should be taken after a fast of 12-14h. In all cases the blood should be taken with minimal venous occlusion after the patient has been sitting for 10 minutes. LDL is calculated from the total cholesterol, HDL cholesterol and triglyceride concentration from a fasting sample provided that the triglyceride level is below 4.5 mmol/L.

Fasting Times

Triglycerides – 12-14h

For most other tests that require the patient to be fasted an overnight fast of 10h (e.g. 11pm to 9 am) is sufficient. These tests would include glucose, iron, and some dynamic function tests.

Specimen Collection for Plasma Metadrenalines

- EDTA blood specimen, at least 5-7 ml of blood.
- Collection of sample should be carefully controlled to avoid stress-related increases in catecholamine levels.
- Collect an EDTA blood samples and transport on ice to Clinical Biochemistry Department within 30 minutes of collection. Sample must be kept cold but is viable for up to 20 minutes without ice and for 30-60 minutes with ice.

Dynamic Endocrine and Metabolic Function Tests

Glucose Tolerance Test

- Patients should be asked to fast from 11:00 pm the night before, but may drink small volumes of water.
- Patient should be advised not to smoke on the morning of the test and until the test is over.
- On arrival, preferably at 09:00, collect 2.5mls blood for fasting blood glucose in fluoride oxalate (yellow top). Label as “fasting sample” and “time 0”
- The patient is then given one of the following solutions: (equivalent to 75g of glucose anhydrous BP).
 - Glucose Tolerance Test solution 75g (300mL, obtained from the Pharmacy Department of York Hospital) or
 - 410mL of Lucozade **energy original** (70 kcal/100mL strength, please check the label on the bottle to confirm the strength).

(NB there are other Lucozade products besides energy original but these should not be used as they contain other ingredients).

- In children the dose is weight related – 1.75g/kg body weight up to a maximum load of 75g.
- The patient must drink the glucose solution over five minutes and must rest after receiving it and not walk around.
- Unless specifically asked for, only one further specimen is collected at 120 min after the glucose drink has been given. This sample should be clearly labelled “120 min”
- If the patient feels sick some more water may be given.
- If the patient vomits test is abandoned and the laboratory is informed.
- All samples should be labelled clearly with times and sent to the laboratory for analysis.
- The patient should be given tea or coffee and biscuits before leaving.

Short Synacthen Test for suspected adrenal failure

- The test should be performed in the morning as the cortisol responses may differ between the morning and late afternoon
- Allow the patient to rest quietly for about half an hour.
- 09:00 collect blood into a brown top monovette tube for cortisol. Clearly label this tube with the time and “baseline”. Also collect blood into a red top EDTA monovette tube for ACTH and send this sample directly to the laboratory on ice as ACTH is labile.
- Inject 250µg of Synacthen i.m. or i.v. (Dose for children is 36 µg/kg body weight up to a maximum of 250 µg)
- 09:30 collect a further sample of blood into a brown top monovette tube for cortisol. Clearly label this tube with the time
- 10:00 collect a further sample of blood into a brown top monovette tube for cortisol. Clearly label this tube with the time

Protocols for other dynamic tests are available from the Duty Biochemist (01904 726366).

Pregnancy Tests (hCG)

Pregnancy test kits are available from the department (available at cost price for GP surgeries) and this point of care test should be used wherever possible. The device has a sensitivity of 20 IU hCG/L and will become positive by the day of the first missed menstrual period in the vast majority of pregnant women. Early morning urine is the preferred sample but random urines can also be used. A protocol for the use of this device is available from the laboratory.

Where the point of care device is not available the laboratory will perform this test. Please send a random urine sample in a plain container. Alternatively the laboratory can also measure hCG in **serum**. Please send a blood sample collected into a brown top tube.

In suspected ectopic pregnancy serum hCG is measured. Please telephone to inform the laboratory if a serum hCG is required urgently.

Hypoglycaemia in children

Instructions and sampling kits for the investigation of hypoglycaemia in children are available on SCBU, Ward 17 and Child Assessment Unit. Please ring Main Laboratory Reception on 6542 (or contact the BMS via bleep 934 out of hours) if you require a further kit.

CSF sampling for suspected subarachnoid haemorrhage

Instructions and sampling kits are available from Main Laboratory Reception (6542) and Biochemistry (6802 or bleep 934 out of hours) for the investigation of CSF in suspected subarachnoid haemorrhage. Please follow the instructions carefully. Samples for spectrophotometric scanning should NOT be sent in the pneumatic tube.

Pleural Fluid

The British Thoracic Society (Hooper C, Lee YCG, Maskell N. Investigation of a unilateral pleural effusion in adults. Thorax 2010; **65**: Supplement 2, ii4-ii17), recommends that **Light's criteria** are used for patients not receiving (or recently receiving) diuretics. Serum and effusion total protein and LDH should be measured. Fluid is an **exudate** if **any** of the following criteria are met

Fluid:serum protein ratio >0.5

Fluid LDH >67% of the upper limit of normal for serum (i.e. >166 U/L in our laboratory)

Fluid:serum LDH ratio >0.6

An alternative is to use the serum-effusion albumin gradient (**SEAG**). Serum albumin and effusion albumin are measured and then the effusion albumin value is subtracted from the serum albumin value.

SEAG \leq 12g/L is an exudate,

SEAG >12g/L is a transudate

This has been found to be useful in classifying patients on diuretics or who have recently been on diuretics.

Ascitic fluid

Measure the fluid total protein

Levels below 25-30 g/L classed as “transudates” (cirrhosis, CCF, nephrotic)

Levels above 25-30 g/L classed as “exudates” (inflammation or infection)

An alternative to the exudate-transudate concept is Serum Ascites Albumin Gradient (SAAG). Serum albumin and ascitic fluid albumin are measured.

SAAG = <11 g/L (low albumin gradient) associated with inflammation and infection

SAAG = \geq 11 g/L (high albumin gradient) associated with portal hypertension

Allergy testing and Specific IgE analysis

We test for most common allergens by measuring specific IgE to the particular allergen and can also send samples to a reference laboratory for some of the less common specific IgE tests.

We offer several panels of allergy tests:-

Inhalant panel: HDM, Cat dander, Dog dander, Timothy grass, Rye Grass, Cladosporium herbarum, Birch and Mugwort.

Tree panel: Alder, Silver Birch, Hazelnut, Oak and Willow.

Mould panel: Penicillium notatum, Cladosporium herbarum, Candida albicans, Aspergillus fumigatus and Alternaria tenuis.

Weed panel: Ox-eye daisy, dandelion, plantain, golden-rod and Lamb's quarters.

Rodent panel: Guinea pig, Hamster, Rabbit, Rat and Mouse

Feather panel: Goose, Chicken, Duck and Turkey.

Food panel: Milk, egg, cod, wheat, peanut and soybean.

Fish panel: Cod, tuna, salmon, blue mussel and shrimp.

Mixed nut panel: Hazel, Brazil, Almond, Peanut and Coconut.

If you only request total IgE we will not do any further allergy tests. If the patient's history suggests possible allergens then we recommend that you request these as individual tests.

Several points should be borne in mind when interpreting results of allergy tests. Firstly the presence of a specific IgE to an allergen indicates sensitisation but does not necessarily indicate clinical allergy. Secondly in atopic individuals the requesting of multiple allergy tests is likely to be of little clinical benefit. There is also little benefit repeating allergy tests, which have already been found to be positive.

Dr Philip Wood, the Consultant Immunologist, is available for clinical advice on 07525055670.

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Samples referred to other laboratories

Some samples are sent away to other laboratories for analysis. A detailed spreadsheet of where we send these tests is accessible here. For information about turnaround times please contact the Duty Biochemist on 01904 726366.



Referred Samples.xls

Paediatric sample tubes

In the table below the sample type is listed in the second column. Each cell is colour coded for the stopper of the Sarstedt tube to be used for the blood sample. Paediatrics do not use the Sarstedt blood collection system so for all **serum** samples (brown top tubes) please use the **white** topped paediatric tubes.

All other blood tube colours are the same (orange, yellow and pink)

NB In the table below there are **white** cells but these are for non-blood samples such as urine or faeces and these samples should be collected in the appropriate containers.

SAMPLE REQUIREMENTS, REFERENCE RANGES & TURNAROUND INFORMATION



Information.doc

Double click icon to open

HAEMATOLOGY AND BLOOD TRANSFUSION DEPARTMENT

1. [Haematology tests](#)
2. [Special Investigations](#)
3. [Normal ranges](#)
4. [Anticoagulant \(Warfarin\) Clinic](#)
5. [Transfusion Tests](#)

	Extension	Bleep
Consultant Haematologists		
Dr M R Howard (Laboratory Lead)	5586	997
Dr L R Bond	5671	616
Dr L Munro (Clinical Lead)	5892	639
Dr A Whittle	1980	Wireless telephone 4518
Secretarial Support		
Mrs C Jepson and Mrs V. Capes (MRH & LRB)	5854	
Mrs E. Calpin (LM & AW)	5777	
Mrs H Atkin (assistant medical secretary – mornings)	5851	
Mrs M Hunt (assistant medical secretary – afternoons)	5851	
Key Laboratory Contacts (Biomedical Scientists)		
Mr C. Smith (Head BMS)	5891	
Mr M. Skelton (Operational Manager - York)	6189	
Mr K. Foster (Blood Transfusion)	6334	
Miss A Buxton (Immunology)	5738	
Transfusion Practitioner		
Mrs C Ivel	5830	
Specimen and Result Enquiries	6802	

HAEMATOLOGY

Location & Opening Times

The Department is situated on the second floor of the Laboratory block and is open from 08:30 to 17:30 Monday to Friday.

Outside these hours the department operates a shift system and there is a minimum of one BMS in the hospital at all times.

Enquiries about results and specimens may be obtained from the office (01904 726802) 08:30 to 18:30 Monday to Friday.

Enquiries at other times should be made via the Biomedical Scientist (BMS) on duty (bleep 842) but these must be kept to a minimum.

Please use the CPD Pathview or the ICE Anglia reporting system whenever possible.

The CPD and ICE Anglia reporting system is available on the hospital network and is updated with completed results every 15 minutes.

Instructions for completion of the request form

Please complete the request form in capitals.

Patient details required include; a full name, date of birth, hospital number/NHS number, patient category, location and clinical details

Request details include; the test, sample type, date and time of the sample, date of the request

Requestor details include; specialty consultant or GP, the name and signature of the requesting doctor, contact details including bleep number

Please use the CPD or the ICE Anglia reporting system whenever possible. The ICE Anglia reporting system is available on the hospital network and is updated with completed results every 15 minutes.

The Haematology consultant on call will answer other queries. Please only contact them via hospital switchboard.

Frequency of assays

Most assays are performed daily but there are some assays performed less frequently dependant on numbers, clinical need and cost. Some samples are sent away to other laboratories for testing.

Test Repertoire

The following table lists the full repertoire of tests available from York Hospital. If you require a test outside this list, please contact the laboratory for further advice. Clinical advice or interpretation can be sought at any time through a consultant haematologist. The Consultants and Laboratory Haematology Staff are happy to be consulted regarding the selection of tests and to aid in the interpretation of abnormal results. Please note:

1. Turnaround times are calculated from the time of receipt in the laboratory to the time when the report is available to the user in an electronic format. Times quoted are calculated on the turnaround times of 95% of requests.
2. "Urgents" are defined as telephoned requests to the department. If "Urgents" are not requested by phoning they may be treated as routine.

3. It is imperative that ALL patient requests have appropriate Clinical Details recorded because secondary laboratory tests may be generated on the basis of laboratory results and this information.

Additional examinations may be requested up to 24h for coagulation samples and up to 3 days for haematology samples, however requests for blood films, malaria parasite screening and ESR testing are best performed on fresh samples that are <24h old.

Test	Specimens Required	Sample Volume	Special Precautions	Turnaround Time ^{1,2}	Reference Range	Key Factors
Anti- Factor Xa assay (LMWH or Danaparoid monitoring) <i>(Apixaban, Rivaroxaban and Fondaparinux sent to Sheffield)</i>	Citrate Tubes must be full to line. Over- or under-filled samples cannot be used	2 x 3mL (adult) 2 x 1mL (paed)	.	4 hours (urgent) 7 days (routine)	Contact Consultant Haematologist for advice.	No need to monitor LMWH's or DOAC's in all patients. Contact Consultant Haematologist for advice.
APTT Ratio	Citrate Tubes must be full to line. Over- or under-filled samples cannot be used	1 x 3mL (adult) 1 x 1mL (paed)	.	45 minutes if urgent. 4 hours routine.	Therapeutic range 1.5 to 2.5.	Used for patients on unfractionated heparin therapy (not LMWHs). Use pharmacy protocol for dosing.
Bone Marrow	Bone marrow aspirate ± trephine	N/A	Contact Consultant Haematologist for advice.	Varies - contact Consultant Haematologist for advice.	N/A	Contact Consultant Haematologist for advice.
CD4 (Leeds) (see also T-cells)	EDTA	Minimum 3mL	Need to be analysed within 24 hours	3 working days	Contact Consultant Haematologist for advice.	Samples referred to St James Hosp (Leeds) Ideally send samples am M-F
Chromosome analysis (karyotype) -St. James	Lithium Heparin (blood samples) Lithium Heparin/Hanks solution (bone	Whole blood (10mL Lithium Heparin) Bone marrow (1mL in Lithium Heparin/Hanks)	Test for 'Fragile X' required 10mL lithium heparin & 5mL EDTA whole blood	7-36 days (peripheral blood) 6-28 days (bone marrow)	N/A	Appropriate tubes available from specimen reception

Test	Specimens Required	Sample Volume	Special Precautions	Turnaround Time ^{1,2}	Reference Range	Key Factors
	marrow samples)					
Clotting factor assays (including von Willebrands)	Citrate	2 x 3mL (adult) 4 x 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used.	4 hours if urgent. 3-6 weeks routine.	Varies – reference range printed on final report. Ranges available from laboratory staff	Contact laboratory for advice on relevance of tests and sample volumes BEFORE taking bloods.
Coagulation Inhibitors	Citrate	2 x 3mL (adult) 2 x 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used.	Same day if urgent (agreed with Consultant Haematologist). 3-6 weeks routine.	Varies – reference range(s) printed on final report. Available from laboratory staff	Contact laboratory for advice on relevance of tests and sample volumes BEFORE taking bloods.
Coagulation Screen (PT, APTT + Fibrinogen)	Citrate	1 x 3mL (adult) 1 x 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used.	45 minutes if urgent. 3 hours routine.	Printed on final report. Subject to change due to reagent changes. Current ranges available from laboratory staff.	Indicate on request form if patient receiving any anticoagulant drugs.
D-Dimer	Citrate	1 x 3mL (adult) 1 x 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used.	45 minutes if urgent. 3 hours routine.	Printed on final report. Subject to change due to reagent changes. Current ranges available from laboratory staff.	Please state clearly why this investigation is required and provide clinical details. Refer to trust protocol
DNA studies-St. James	EDTA	5 – 10mL (adult) Minimum 1mL (paed)	Fragile X test requires 10mL lithium heparin AND 5mL EDTA	1 – 2 weeks	N/A	Store overnight samples at 4°C if necessary.

Test	Specimens Required	Sample Volume	Special Precautions	Turnaround Time ^{1, 2}	Reference Range	Key Factors
			sample			
Erythropoietin	Serum	0.5 – 1.0 mL	Do not freeze. Store overnight samples at 4°C if necessary.	4 weeks	Available on final report	Please state most recent Hb & PCV
EPO receptor gene mutation analysis & VHL gene analysis	EDTA	5mL	Please post Monday – Thursday only	Contact laboratory for expected turnaround time (Tel 02890 329241 ext. 3361)	N/A	
ESR	EDTA	1 x 3mL	Please note this sample can be used for both the FBC and ESR test.	60 minutes if urgent. 5 hours routine.	Male: 0-10 mm/Hr Female: 0-15 mm/Hr	Samples should be as fresh as possible.
Factor V Leiden	Citrate	1 x 3mL (adult) 1 x 0.5mL (paed)	Not suitable if on heparin	Up to 4 weeks	N/A	Discuss with lab before requesting.
Full Blood Count (FBC)	EDTA	1 x 3mL (adult) 1 x 0.5mL (paed)	Do not overfill samples	30 minutes if urgent. 4 hours routine.	See below for FBC ranges.	
Fibrinogen	Citrate	3mL (adult) 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used.	45 minutes if urgent. 3 hours routine.	Printed on final report. Subject to change due to reagent changes. Current ranges available from laboratory staff.	
Film examination⁴	EDTA	1 x 3mL (adult) 1 x 0.5mL (paed)	Prepared from FBC sample. Bone marrow films examined by Consultant Haematologists	2 hours if urgent. 3 days routine.	See below for reference ranges.	Very abnormal blood films referred to Consultant Haematologist
Hb A2 assay	EDTA	1 x 3mL (adult)		Up to 3 days	1.8 – 3.5%	Included as part of

Test	Specimens Required	Sample Volume	Special Precautions	Turnaround Time ^{1,2}	Reference Range	Key Factors
		2 x 0.5mL (paed)				haemoglobinopathyscreen
Hb F assay	EDTA	1 x 3mL (adult) 2 x 0.5mL (paed)		Up to 3 days	0.2 – 1.0 %	Included as part of haemoglobinopathy screen
HBH inclusion bodies	EDTA	1 x 3mL (adult) 2 x 0.5mL (paed)		Up to 3 days	N/A (normal is absent)	Included as part of haemoglobinopathy screen
Haemoglobinopathy Screen – including Sickle Test	EDTA	1 x 3mL (adult) 2 x 0.5mL (paed)		Up to 3 days	Issued with final report & interpretation	Please state ethnic origin if known
Hb electrophoresis	EDTA	1 x 3mL (adult) 2 x 0.5mL (paed)		Up to 1 week	N/A	Included as part of haemoglobinopathy screen
Immunophenotyping (cell markers, HMDS)	EDTA Bone marrow	1 x 3mL EDTA (adult) or 2 x 0.5mL EDTA (paediatric) Approx 1mL bone marrow in EDTA	Fresh sample required (24 hours max)	Up to 10 days	N/A	Available after discussion with Consultant Haematologists
IM Screen (for Glandular fever)	EDTA or Serum	1 x 3mL EDTA (adult) 1 x 0.5mL EDTA (paed) ~1mL serum	Need EDTA sample if FBC required also	75 minutes if urgent. 6 hours routine. 72 hours for full report including blood film comments.	N/A	
INR	Citrate	1 x 3mL (adult) 1 x 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used.	45 minutes if urgent. 3 hours routine.	N/A – target INR depends on reason for anticoagulation	This test is indicated for the control of oral anticoagulant drugs only

Test	Specimens Required	Sample Volume	Special Precautions	Turnaround Time ^{1,2}	Reference Range	Key Factors
Lupus inhibitor screen	Citrate	2 x 3mL (adult) 2 x 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used. Avoid testing during acute post-thrombic period and if on anticoagulants	Same day if urgent. Routine up to 21 days.	Issued with final report and interpretative comments	Anticardiolipin antibody assay indicated if screening for antiphospholipid antibodies
Lymph function tests (St James, Leeds)	EDTA	2 x 3mL (adult)	Samples must arrive before 2.30pm Friday & before 4pm Monday to Thursday.	2 weeks	N/A	Test by prior arrangement only.
Malaria parasites	EDTA	1 x 3mL (adult) 1 x 0.5mL (paed)	All malarias are treated urgently. Please inform laboratory to expect sample. Samples must be as fresh as possible.	1-2 hours	N/A	A single test where no parasites are detected cannot rule out malaria. Always repeat for confirmation, especially if clinical symptoms persist.
Osmotic fragility EMA binding test (send away to Royal)	Please discuss with Laboratory	10mL (adult) 5mL (paed) 1 x 3mL (adult)	Test to be pre-arranged with Laboratory	72 hours	Issued with final report.	Available after discussion with Consultant Haematologist

Test	Specimens Required	Sample Volume	Special Precautions	Turnaround Time ^{1, 2}	Reference Range	Key Factors
Manchester Hospital)						
p50 (oxygen dissociation)	EDTA	5mL EDTA from patient and a normal control	Post samples Monday – Thursday to be tested next working day. Test to be pre-arranged with Laboratory. Advice given on pre-analytical requirements	1 week	Issued with final; report.	3 rd line investigation of absolute erythrocytosis. Contact Consultant Haematologist for advice.
PFA-100 (Platelet function) (St James Hospital)	EDTA <u>and</u> Citrate	1 x 3mL EDTA and 1 x 3mL citrate	Tubes must be full to line. Over- or under-filled samples cannot be used. Test to be pre-arranged with Laboratory. Advice given on pre-analytical requirements	1 week	Issued with final report	Must give prior notice – samples need to be tested within 4 hours of collection

Test	Specimens Required	Sample Volume	Special Precautions	Turnaround Time ^{1,2}	Reference Range	Key Factors
Plasminogen assay (Sheffield)	Citrate	2 x 3mL (adult) 2 x 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used. Test to be pre-arranged with Laboratory. Advice given on pre-analytical requirements	Contact laboratory in Sheffield	Issued with final report	Test rarely indicated - available after discussion with Consultant Haematologist
Platelet aggregation (Send away test to St James)	Citrate	6 – 8 x 3mL (adult) Discuss with lab for paediatric requests.	Tubes must be full to line. Over- or under-filled samples cannot be used. Test to be pre-arranged with Laboratory. Advice given on pre-analytical requirements	Tested on day samples taken. Report issued within 2 – 3 days.	N/A - qualitative report issued	Samples must be in the lab by 10am
Plasma Viscosity (Scarborough)	EDTA	3mL (adult)		7-10 days	Issued with final report	Store overnight samples at 4°C if necessary.
Prothrombin Gene Mutation	Citrate	1 x 3mL (adult) 1 x 0.5mL (paed)	None.	Up to 4 weeks	N/A	Discuss with lab before requesting.
Reticulocytes	EDTA	1 x 3mL (adult) 1 x 0.5mL (paed)	Automated reticulocyte available using FBC sample. Usually performed routinely on	30 minutes if urgent. 4 hours routine.	< 2.0% (adult)	

Test	Specimens Required	Sample Volume	Special Precautions	Turnaround Time ^{1,2}	Reference Range	Key Factors
			paediatric FBC requests.			
Sickle-cell screen	EDTA	1 x 3mL (adult) 1 x 0.5mL (paed)		1 hour if urgent Up to 1 week routine.	N/A	A Sickle screen is always followed up with a Haemoglobinopathy investigation
T-cells(CD4/CD8) – (St James)	EDTA	3mL	Need to be analysed within 24 hours	2 working days	Contact Consultant Haematologist for advice.	Samples referred to St James Hosp (Leeds) Ideally send samples to lab before lunchtime Monday – Friday.
Thrombophilia Screen (Antithrombin, Protein C, Protein S, Thrombin Time, Lupus Inhibitor, Anticardiolipin, Coagulation Screen)	Citrate and Serum	3 x 3mL (adult) 5 x 1mL (paed)	Tubes must be full to line. Over- or under-filled samples cannot be used. Avoid testing during acute post-thrombic period, if on anticoagulants or when pregnant.	3-6 weeks	Printed on final report. Subject to change due to reagent changes. Current ranges available from laboratory staff.	Relevant clinical details required on request form. Requests may be referred to haematologist
Unstable Hb's	EDTA	1 x 3mL (adult) 3 x 0.5mL (paed)		24 hours	N/A	Requires fresh sample – discuss with laboratory staff before taking samples.
Urine Haemosiderin	Urine	20mL in a plain sterile container		24 hours	N/A	

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NOTE: Special Investigations

These include:

- Red Cell Enzyme Tests e.g. G6PD
- Immunophenotyping
- Red Cell Membrane Tests
- PNH
- PFA 100
- Platelet Function Tests
- Bone Marrow Morphology
- Clotting Factor Assays
- FVIII Inhibitor assay
- FIX Inhibitor assay (Send away to Sheffield)

Indications for these specialised tests are always best discussed directly with lab staff. This will clarify the need for the test and the most appropriate sample type and patient information required.

Normal Ranges:

Normal Adult ranges for routine Haematology tests are as follows: (for advice on neonatal ranges, pregnancy etc. please phone the laboratory):

Test	Male	Female	Units
HB	130-180	115-165	g/L
WBC	4-11	4-11	10 ⁹ /L
PLT	150-450	150-450	10 ⁹ /L
RBC	4.5-5.8	4.2-5.4	10 ¹² /L
MCV	77-99	77-99	fl
PCV	0.4-0.5	0.37-0.47	L/L
MCH	27-32	27-32	pg
MCHC	30-37	30-37	g/dL
Neuts	2-7.5	2-7.5	10 ⁹ /L
Lymph	1.0 - 4.5	1.0 - 4.5	10 ⁹ /L
Mono	0.2-1.2	0.2-1.2	10 ⁹ /L
Eos	0.1-0.6	0.1-0.6	10 ⁹ /L
Baso	<0.2	<0.2	10 ⁹ /L
ESR	1-10	1-15	mm/hr
PT (automated)	10 – 12.0	10 – 12.0	seconds
APR (Heparin ratio)	1.5-2.5	1.5-2.5	Ratio
APTT (automated, part of coag screen)	26.0 – 36.0	26.0 – 36.0	seconds
FIB	1.9-4.5	1.9-4.5	g/L
AT3	80 - 130	80 - 130	iu/dL
Protein S Free Antigen	75 - 145	55 - 125	iu/dL
Protein C Activity	70-140	70-140	iu/dL
Factor VIII	50 - 150	50 - 150	iu/dL
Factor IX	65 - 150	65 - 150	iu/dL
D-Dimer for PE exclusion	<230	<230	ng/mL
D-Dimers for ?DIC	21-230	21-230	ng/mL
Lupus anticoagulant	<1.2 = negative	<1.2 = negative	Ratio

Test	Male	Female	Units
screen ratio			
Anticardiolipin IgG	<10	<10	GPL units/mL
Anticardiolipin IgM	<8.9	<8.9	MPL units/mL

*These may change marginally depending on the reagents used for testing. Please contact the laboratory on ext 6326 if an exact normal range is required.

Paediatric Ranges (FBC):

Age	Hb (g/L)	RBC (x10 ¹² /L)	PCV (L/L)	MCV (fL)	WBC (x 10 ⁹ /L)	Neutrophils (x 10 ⁹ /L)	Lymphocytes (x 10 ⁹ /L)	Monocytes (x 10 ⁹ /L)	Eosinophils (x 10 ⁹ /L)	Platelets (x 10 ⁹ /L)
Birth	149 – 237	3.7 – 6.5	0.47 - 0.75	100 – 135	10.0 – 26.0	2.7 – 14.4	2.0 – 7.3	0.0 – 1.9	0.0 – 0.84	150 -450 At All Ages
2 Weeks	134 – 198	3.9 – 5.9	0.41 - 0.61	88 – 120	6.0 – 21.0	1.8 – 5.4	2.8 – 9.1	0.1 – 1.7	0.0 – 0.84	
2 Months	94 – 130	3.1 – 4.3	0.28 – 0.42	84 – 105	6.0 – 18.0	1.2 – 7.5	3.0 – 13.5	0.1 – 1.7	0.1 – 0.80	
6 Months	111 – 141	3.9 – 5.5	0.31 – 0.41	68 – 82	6.0 – 17.5	1.0 – 8.5	4.0 – 13.5	0.2 – 1.2	0.3 – 0.80	
1 Year	113 – 141	4.1 – 5.3	0.33 – 0.41	71 – 85	6.0 – 17.5	1.5 – 8.5	4.0 – 10.5	0.2 – 1.2	0.3 – 0.80	
2 - 6 Years	115 – 135	3.9 – 5.3	0.34 – 0.40	75 – 87	5.0 – 17.0	1.5 – 8.5	1.5 – 9.5	0.2 – 1.2	0.3 – 0.80	
6 – 12 Years	115 – 155	4.0 – 5.2	0.35 – 0.45	77 - 95	4.5 – 14.5	1.5 – 8.0	1.5 – 7.0	0.2 – 1.0	0.1 – 0.50	

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REFERRED WORK

Some tests are referred to other laboratories for investigation. The laboratory confirms all such laboratories are CPA accredited. Our full list of referral sites are detailed below. Specific details of which tests are available in repertoire (above) and further details can be provided on request.

Bradford Royal Infirmary, Department of Haematology, Duckworth Lane, Bradford. BD9 6RJ.

Royal Hallamshire Hospital Department of Coagulation, Floor H, Sheffield Haemophilia and Thrombosis Centre, Glossop Road, Sheffield. S10 2JF.

Belfast Link Laboratories, Belfast City Hospital department of Haematology, Lisburn Road, Belfast, Northern Island, BT9 7AB.

City Hospital NHS Trust, Department of Haematology, Birmingham City Hospital, Dudley Road, Birmingham. B18 7QH.

Cytogenetics, St James University Hospital Yorkshire Regional DNA Laboratory, Beckett Street, Leeds. LS9 7TF.

HMDS, Leeds General Infirmary Blood Bank, Great George Street, A Floor, Jubilee Wing, Leeds. LS1 3EX

Department of Transplant Immunology, St James Hospital, Beckett Street, Leeds. LS9 7TF.

London School of Tropical Medicine, Keppel Street, London. WC1E 7HT.

Scarborough General Hospital, Department of Haematology, Woodlands Drive, Scarborough, YO12 6QL.

National Blood Service Red Cell Immunohaematology, Bridle Path, Leeds, West Yorkshire LS15 7TW

St James University Hospital Department of Blood Transfusion, Beckett Street, Leeds. LS9 7TF.

Department of Clinical Biochemistry & Immunology, LGI, Great George Street, Leeds. LS1 3EX

Central Manchester & Manchester Childrens Uni Hospitals, St Mary's Hospital Department of Andrology, Hathersage Road, Manchester. M13 0JH.

Oxford Radcliffe Hospitals NHS Trust, Churchill Hospital Oxford Medical Genetics Laboratory, Headington, Oxford, OX3 7LJ.

Sheffield, Northern General Hospital Herries Road Sheffield, South Yorkshire, S5 7AU

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ANTICOAGULANT (WARFARIN) CLINIC

This Pharmacy led clinic is open 0800-1700, Mon-Fri and can be contacted on Ext (72)6785/ (72)6787

Outside of these times an emergency service is provided by the On call Pharmacist, who is contacted by switchboard

TRANSFUSION

1. [Surgical Blood Order Schedule — York NHS Staff Room](#)
2. [Other Blood Products](#)
3. [Further Information](#)

The importance of correct identification and sample labelling cannot be overstated. Each and every sample MUST be labelled with the Surname, Forename, DOB and Hospital Number (in emergency cases the A&E number will be accepted) or NHS number for primary care patients. When information to identify the patient uniquely is missing or incomplete then a new sample and request form will be required and will cause delays. **X R numbers are not acceptable.**

Test	Sample Requirements	Sample Volumes*	Special Precautions	Turnaround Urgent	Turnaround Routine	Key Factors
Antenatal Screen	EDTA X 1	4.9 ml 5 ml		N/A	Within 24 hours	
Antibody Panel – (for identification of irregular antibodies)	EDTA X 3	4.9 ml 5 ml		Depends on nature of antibodies – laboratory will discuss	Depends on nature of antibodies – laboratory will discuss	
Antibody Titre	EDTA X 1	4.9 ml 3X 4.9ml for anti-D or c		N/A	Within 24 hours	<i>If anti-D or anti-c is present the specimens will be referred to NBS, Leeds for quantification.</i>
Blood Group & Antibody Screen	EDTA X 1	4.9 ml		45 mins	Within 6 hours	The detection of atypical antibodies and incompatibilities may cause unexpected and inevitable delays.
Cold Agglutinin Titre	EDTA X 1	4.9 ml	Maintain the sample at 37°C post collection and during transit to the laboratory.	N/A	Within 24 hours	Sample MUST BE KEPT WARM prior to separation.

Test	Sample Requirements	Sample Volumes*	Special Precautions	Turnaround Urgent	Turnaround Routine	Key Factors
Crossmatch	EDTA X 1	4.9 ml	Patients' spun samples are stored at 4-8 °C for 7 days and may be suitable for subsequent crossmatch requests.	45 mins	4 hours	<p>Blood – [red cells] is provided in accordance with the agreed "surgical blood order schedule" – see below. Exceptions to the schedule must be discussed directly with the laboratory staff.</p> <p>The detection of atypical antibodies and incompatibilities may cause unexpected and inevitable delays.</p> <p>Un-crossmatched blood may be issued on Clinical demand only.</p> <p>Blood can now be issued electronically provided:</p> <ul style="list-style-type: none"> • Two electronic groups exist on the database (One historical and one for the current situation) • The patient has no atypical antibodies present. Electronic Issue enables blood to be available for the patient within 20 minutes rather than the serological issue of 45 minutes. <p>The transfusion department will undertake the decision to EI.</p>
DCT	EDTA X 1	4.9 ml		45 mins	Within 24 hours	
Genotype	EDTA X 1	4.9 ml		N/A	Usually within 24 hours	

Test	Sample Requirements	Sample Volumes*	Special Precautions	Turnaround Urgent	Turnaround Routine	Key Factors
Heparin Induced Thrombocytopenia (HIT) Assay	EDTA X2 and	10 mL		Screen test completed within 2 hrs to exclude HIT. If not excluded 1-3 days for confirmation	Screen test completed within 2 hrs to exclude HIT. If not excluded 1-3 days for confirmation	Samples referred to Bristol NBS if screening does not exclude HIT, discuss with laboratory staff before taking samples.
	Serum Gel X 1	7.5 mL				
HLA B27	EDTA X 1	4.9 ml	Store at room temperature	N/A	6 weeks – contact laboratory if needed sooner.	Samples referred to Tissue Typing Laboratory, St. James University Hospital, Leeds
Investigation of Transfusion Reaction	EDTA X 1 and	4.9 ml	CONTACT LABORATORY FOR ADVICE	Within 24 hours – contact laboratory	Within 24 hours	USER MUST CONTACT LABORATORY Return all transfused blood packs
	EDTA x 1 and	3 ml				
	Urine	Total of next available				
Kleihauer	EDTA x 1 from mother	4.9 ml		N/A	Within 48 hours – usually 6 hours	A Kleihauer test is a prerequisite for all Anti-D prophylaxis after the 20 th week of pregnancy.
	EDTA x 1 from baby (cord) and	4.9 ml				
	EDTA x 1 from mother	3 ml				
	EDTA x 1 from baby (cord)	3 ml				

* For paediatric patients, smaller volumes (approximately 1 ml) are acceptable – please contact the laboratory for further advice if necessary.

Other Blood Products

- Human Albumin – 4.5% and 20% available only after discussion with laboratory staff
- Fresh Frozen Plasma] Available only
- Platelets] after discussion

- Cryoprecipitate] with laboratory
- Coagulation Factors] staff

Other products such as Prothrombin complex (Beriplex) and Novo 7 are available

Further Information

The Removal of Crossmatched Blood from the Blood Bank

Only staff trained in the procedure for electronically signing out products from the Blood Track Kiosk should remove blood from the issue blood fridge.

The Return of Crossmatched Blood to the Blood Bank

Blood may be returned to the Issue Blood bank within 30 minutes of removal. Outside of this time please contact the laboratory Ext 5739 or out of hours bleep the duty haematologist

Emergency O Rh (D) Negative Blood

This is available for any immediate requirements and is located on the top shelf of the Issue Blood Bank. The units must be scanned out using the electronic Blood Track Kiosk

The laboratory **MUST** be informed via Extension 5739 (or Bleep number 842 out of normal working hours)

1. Patient details must be entered on the Luggage Label.
2. The Luggage Label must be then detached and returned to the laboratory as soon as possible after the blood is used.

Checking Procedure for Blood and Blood Products

Details of this important procedure may be found in York Hospital Transfusion Policy. See Trust intranet Staff Room: Home › Policies and Procedures › Clinical Documents › Blood Transfusion › Blood Transfusion Policies, Procedures, Protocols etc.

Blood transport

Blood in transit boxes are available for all remote sites and for use on site if blood is expected to be outside of temperature control for more than 30 minutes. Please place a cool pack in the transit box. Temperature control will be maintained for up to 4 hours

REFERRED WORK

Some tests are referred to other laboratories for investigation. The laboratory confirms CPA status of all such laboratories. Our full list of referral sites for Blood Transfusion work is detailed below. Specific details of which tests are available in repertoire (above) and further details can be provided on request.

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York Teaching Hospital



NHS Foundation Trust

National Blood Service

Red Cell Immunohaematology, Bridle Path, Leeds, West Yorkshire LS15 7TW

Histocompatibility Laboratory, Langley, Lane Sheffield, S57JN

Histocompatibility and Immunogenetics Dpt., 500 North Bristol Park, Filton, Bristol, BS34 7QH

St James University Hospital Department of Immunology, Floor 9, Gledhow Wing, Leeds. LS9 7TF.

IMMUNOLOGY DEPARTMENT

1. [Samples](#)
2. [Tests performed at York Hospital](#)
3. [Tests referred to other hospitals](#)

Useful Information

	Telephone Numbers
Dr P Wood Consultant Clinical Immunologist (St James's)	0113 206 7256
Secretary	0113 206 7256
Immunology Laboratory (York Hospital)	(01904 72) 5738
Miss A Buxton Senior BMS Immunology	(01904 72) 5738

Samples

All tests for autoantibodies can be performed on a single 7.5mL clotted sample collected into a plain tube. Requests for additional immunology tests can be made for up to 6 weeks.

Frequency of testing

The following assays are performed daily (Mon-Fri) Antinuclear antibody screen, ANCA, anti-GBM and Liver related antibodies, Rheumatoid factor, Coeliac screening, Intrinsic Factor antibody and Immunoglobulins.

All other assays are performed once a week.

Urgent Glomerular Basement Membrane antibody assays will be performed if appropriate, on patients with suspected systemic vasculitis and or acute renal failure.

Turnaround Times

Turnaround times are calculated from the time of receipt in the laboratory to the time when the report is available to the user in an electronic format. Paper copies of reports will take longer than the stated times.

As a guide Immunology tests are processed and reported electronically within the following times:

5-7 days - Antinuclear antibodies, Rheumatoid Factor, ANCA, Coeliac screening, Liver antibodies, Intrinsic Factor antibody, GBM

7-14 days - Tissue specific antibodies, ENA profiles, anti-dsDNA, ENA screens.

Turnaround times for tests, e.g. neurological antibodies, referred to third part laboratories can be supplied on request; as a rule these take about 21 days to be processed. Information on referral laboratories may be obtained by contacting the Immunology Laboratory ext 5738.

Diagnosis and Monitoring of SLE/SCLE/LUPUS/MCTD

Initial screen: ANA, CRP. (ENA and cardiolipin antibodies if pregnant).

Further tests if screen is positive: - anti-dsDNA, antibodies to ENAs, Cardiolipin antibodies, C3, C4, Immunoglobulin levels.

Monitoring: The half-life of antibodies is 3 weeks; therefore serial measurement of antibodies at weekly or fortnightly intervals is unhelpful. At each visit measurement of C3, C4, and CRP is advised with intermittent measurement of ANA and DNA antibodies.

Systemic Vasculitides

Initial screen: ANA, ANCA, C3, C4, CRP, RF, Immunoglobulins and Cryoglobulins.

Diagnosis: In patients with active untreated Wegener's granulomatosis, c-ANCA is present in >90% of cases. Although p-ANCA occurs in microscopic polyarteritis, idiopathic pauci-immune glomerulonephritis and in a few patients with Wegener's, they are also present in a range of other autoimmune diseases e.g. SLE, RA, Ulcerative colitis.

Monitoring: In Wegener's patients CRP and ANCA at each visit. The half-life of the antibody is 3 weeks; frequent ANCA measurement i.e. weekly/fortnightly is unlikely to provide clinically useful information. In patients in remission, rising ANCA titres often precede a relapse.

Investigation of Renal Failure

ANA, C3, C4, CRP, ANCA, anti-GBM, cryoglobulins.

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Serum immunoglobulins and electrophoresis

Urine electrophoresis

Monitoring bacterial infection: CRP

In view of its short half-life (6hrs approx) alternate day measurement is advised to check response to treatment.

Suspected Immunodeficiency

Please discuss with The Clinical Immunologist prior to requesting tests.

Immunology tests performed at York Hospital			
Test Name	Report/Reference range	Further tests if initial test positive &/or relevant clinical details	Clinical significance
Adrenal Antibodies	Negative or positive		Addison's, primary ovarian failure
ANCA	Negative or positive (Plus staining pattern of cytoplasmic c-ANCA or perinuclear p-ANCA).	ANA, C3, C4, CRP, RF Anti-MPO units/ml Anti-PR3 units/ml	c-ANCA: Wegener's, microscopic polyarteritis. p-ANCA: microscopic polyarteritis, 1° glomerulonephritis, RA, SLE, IBD, PSS
Anti-nuclear antibody (ANA)	Negative or positive (titres and staining pattern).	dsDNA, ENA, cardiolipin antibodies	SLE, SCLE, RA, Scleroderma, Sjogren's, Dermatomyositis
Cardiolipin antibodies IgG Cardiolipin antibodies IgM	0 – 10 GPL Units/ml 0 – 8.9 MPL Units/ml	dsDNA, C3, C4	SLE, recurrent thrombosis, anti-phospholipid syndrome, recurrent miscarriage
Centromere antibodies	Negative or positive (titres)		CREST, Scleroderma, Raynaud's, PBC
Anti-Citrullinated Protein antibody (Anti-Citrullinated Vimentin)	0 – 18.9 Units/ml	At the request of Consultant Rheumatologists	Rheumatoid Arthritis
Coeliac screening Anti-Tissue Transglutaminase	0 – 10 Units/ml	IgA endomysial antibody to confirm positive anti-tTG and IgG endomysial antibody if IgA deficiency suspected.	Coeliac disease, Dermatitis Herpetiformis
dsDNA antibodies (only if ANA positive)	0 – 17.3 IU/ml	C3, C4, CRP	SLE, AICAH
ENA's (Extractable Nuclear Antigens) Ro La Sm RNP Jo-1 Scl-70	Negative or positive		SLE, MCTD, Scleroderma, Polymyositis
Epidermal antibodies Intracellular substance ICS Basement membrane BM	Negative or positive	IgG & C3 deposits in skin biopsies (Histology Dept)	Bullous skin diseases

Immunology tests performed at York Hospital			
Test Name	Report/Reference range	Further tests if initial test positive &/or relevant clinical details	Clinical significance
Gastric Parietal Cell antibody	Negative or positive	Intrinsic Factor antibody when PA is suspected	Pernicious anaemia & antral gastritis
Glomerular Basement Membrane antibody	Negative or positive (0 – 20Units/ml)	ANA, C3, C4, ANCA, CRP	RPGN, Goodpasture's syndrome
Intrinsic Factor Antibody	0 – 6 Units/ml		Acquired pernicious anaemia
Liver Kidney Microsomal antibodies	Negative or positive (titres)	Confirmation by immunoblot	AIH Type II, drug induced hepatitis
Mitochondrial antibodies	Negative or positive (titres)	ANA, CRP, Confirmation by immunoblot	PBC
Anti-Myeloperoxidase antibody	Negative or Positive (0 – 5 Units/ml)		Systemic vasculitides, RPGN, Churg-Strauss
Anti-Proteinase 3 antibody	Negative or Positive (0 – 5 Units/ml)		Wegener's, microscopic polyangiitis, Churg-Strauss
Rheumatoid Factor IgM (RF)	0 – 18.5 U/ml	Anti-Citrullinated Protein Antibody	RA (seropositive) maybe present in SLE, Scleroderma, Sjogren's, chronic bacterial infections
Smooth muscle antibodies	Negative or Tubular or Vascular SMA		CAH and AIH Type I
Striated muscle antibodies	Negative or positive	AChR antibody	Myasthenia gravis, Thymoma

Immunology tests referred to other laboratories			
Test Name	Report/Reference range	Further tests if initial test positive &/or relevant clinical details	Clinical significance
Acetylcholine Receptor Antibody (anti-AChR)	0-5 x 10 ¹⁰ M		Myasthenia gravis/Thymoma
Anti-GM1	Negative or positive (titres) <200 Negative, >200 Positive		Chronic peripheral neuropathy syndromes
Glutamic Acid Decarboxylase (Anti-GAD)	Negative or positive (titres) <1.0 U/ml		Stiff-man syndrome, IDDM
Myelin Associated Glycoprotein (anti-MAG)	<1000 BTU		IgM monoclonal neuropathy, Waldenstrom's macroglobulinaemia
Ovarian antibodies	Negative or positive		Primary ovarian failure or associated with other autoimmune endocrinopathies
Purkinje cell antibodies (Anti Hu, Yo, Ri)	Negative or positive (titres) Negative 0-200		Paraneoplastic cerebellar syndrome and neuropathies
Sperm antibodies	Neg (<50%) or Pos (>50% agglutination)		Infertility
Testicular antibodies	Negative or positive		Infertility
Voltage Gated Calcium Channel antibodies (anti-VGCC)	Negative or positive (titres) <45pM		Amyotrophic Lateral Sclerosis (ALS)
Voltage Gated Potassium Channel antibodies (anti-VGKC)	Negative or Positive Titres (<100pm)		Acquired neuromyotonia
Anti MuSK	Negative or Positive		Myasthenia gravis
Anti-GQ1B	Negative or Positive (titres) Negative 0-25		Miller-Fisher syndrome
Anti-Basal Ganglia	Negative or Positive		Chorea, tics, dystonia
Cardiac muscle antibodies	Negative or Positive		Dressler's, post MI
Pancreatic Islet Cell Antibody	Negative or Positive		IDDM
Adrenal Antibody	Negative or Positive		Addison's Disease
Anti GD1b	Negative or Positive		Ophthalmoplegia
Collagen Type II Antibody	Negative or Positive		Relapsing perichondritis

Location and addresses of Referral Laboratories

TEST	REFERRAL LABORATORY
Anti-AChR (Acetyl Choline Receptor Ab) Anti-GAD (Glutamic Acid Decarboxylase Ab) Anti-GM1 (Ganglioside Ab) Anti-GQ1b (Ganglioside Ab) Anti-GD1b (Ganglioside Ab) Anti-MAG (Myelin Associated Glycoprotein) Anti-VGCC (Voltage Gated Calcium Channel Ab) Anti-VGKC (Voltage Gated Potassium Channel Ab) Purkinje Cell Antibodies ('Hu', 'Yo' & 'Ri' & other paraneoplastic syndrome associated antibodies) MuSK	Neurosciences Group Institute of Molecular Medicine John Radcliffe Hospital Headington Oxford OX3 9DS Tel: 01865 222322
Anti-Sperm Antibodies	Sub-Fertility Laboratory 1 st Floor, Old Building St Mary's Hospital Hathersage Road Manchester M13 0JH
Anti-Gliadin Antibodies Cardiac Muscle Antibody Collagen Type II Antibody	Department of Immunology Northern General Hospital P O Box 894 Sheffield S5 7YT
Ovarian Antibodies Anti-Histone Antibody Pancreatic Islet cell Antibody Adrenal Antibody	Clinical Immunology Old Medical School Leeds General Infirmary Thoresby Place Leeds LS2 9JT
Anti-Basal Ganglia Antibody	Neuroimmunology and CSF Laboratory The National Hospital for Neurology and Neurosurgery Queen Square LONDON WC1N 3BG

MICROBIOLOGY DEPARTMENT

1. [Routine investigations](#)
2. [Collection of specimens](#)
3. [Blood cultures](#)
4. [Surgical specimens](#)

	Telephone
Dr D Hamilton (Clinical Lead) Consultant Microbiologist	(01904 72) 5672
Dr K Blackmore Consultant Microbiologist	(01904 72) 6256
Dr N Todd Consultant Microbiologist	(01904 72) 5216
Dr B Neish Consultant Clinical Scientist	(01904 72) 4939
Ms D Cammish Head BMS	(01904 72) 5704
Mrs F Walton Operational Manager	(01904 72) 5065
Mr S Carr Senior BMS, Serology section	(01904 72) 6301
Ms Durga Thapa Senior BMS	(01904 72) 5721
Ms Julie-Anne Child Senior BMS	(01904 72) 5721

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Microbiology Enquiries

Clinical advice

Monday to Friday 9 - 5

Ring **01904 725930** for clinical advice on **GP** patients

Ring **01904 725931** for clinical advice on **hospital** patients

All other times: Contact microbiology doctor on call via hospital switchboard

All other enquiries

5856 or 5857 (internal) or

01904 725856 or 725857 (external)

NORMAL WORKING HOURS

8.30 a.m. until 5.00 p.m. Monday to Saturday.

An on-call service is provided to cover URGENT SAMPLES ONLY at all other times.

However, there is a member of staff available on site 5pm until 8pm, Monday-Friday and 8.30a.m until 4.00pm Sunday.

They can be contacted via Switchboard for urgent work.

REQUESTS FOR URGENT ANALYSIS OUTSIDE NORMAL WORKING HOURS

1. The microbiology Laboratory operates an on call service for CSF samples plus pus from deep seated infection, and body fluids such as pleural or ascitic fluids (but excluding urine). After midnight only CSF samples will be processed. Any other request for urgent work will require approval from the consultant Microbiologist.

The Microbiology BMS on call MUST be contacted by the Switchboard Operator when ANY specimen requires urgent microbiological analysis out of normal working hours.

It is the responsibility of the doctor initiating the request to ensure that all urgent and important samples are expected by the relevant Laboratory.

Example: **For urgent cerebrospinal fluid analysis:**

If a CSF sample requires analysis out of normal working hours, the Doctor initiating the request MUST contact the Microbiology BMS on call via the switchboard (Dial 0). Additionally the Doctor MUST also inform the Chemical Pathology BMS via Bleep 934.

2. Request for blood cultures out of normal working hours.

Blood cultures should be packaged inside the Safeshell carriers provided and dispatched to the laboratory by pneumatic tube.

MICROBIOLOGY REQUEST FORM

The generic test 'culture and sensitivity' has been removed from the Microbiology request form. **For samples such as swabs, faeces and sputa the default test is culture and sensitivity and will be done automatically.** If you require a specialised test such as TB culture on a sputum sample then tick the TB culture option on the request form.

ROUTINE INVESTIGATIONS

Specimens for routine investigations should be collected as early in the day as possible to ensure that they arrive in the laboratory during normal working hours.

TURN-ROUND TIME

Specimens received during working hours will be cultured that day. Negative urine reports are available the same day. Wound swabs, vaginal swabs, sputum specimens and faeces take two working days before a negative result can be issued. Often, a positive result can take 4 working days to complete, but certain fastidious or unusual isolates may take longer to identify. In these cases, interim results are often available, and can be obtained by telephoning the laboratory. Blood culture broths showing no signs of growth are incubated for five days before being reported. Significant blood culture isolates are often telephoned through by the clinical microbiologist on primary isolation.

Chlamydia NAATs tests are performed daily and final reports issued within 4 days of receipt of the sample in the laboratory.

Most in-house serology tests are carried out on a daily basis and reported within 48 hours Monday - Friday. *Helicobacter pylori* antibodies are batched and processed at least weekly and reports issued within 10 days of receipt.

Tests referred to most Reference Laboratories have a turnaround time of 1 – 2 weeks: verbal reports are available in 3 - 4 days, or sooner by arrangement if urgent. Hepatitis C and HIV results are available within 48 hours Monday – Friday.

Contact details and turnaround time information on all the Reference laboratories routinely used by York microbiology can be found by following the link below



Ref Lab Table

Requesting further tests on samples already received in the laboratory

Blood samples for serology are kept for 2 weeks, antenatal samples for 2 years. Needlestick samples are kept indefinitely. We also keep a small number of acute serum samples until a convalescent sample is received. If you want to add further tests to a blood sample we will require an additional request. Please phone 01904 726301 to make arrangements

Most other samples are kept for at least 1 week before they are discarded.

Some samples are kept longer depending on the tests requested. If you want to add further tests to a sample please ring 01904 725721. We will check if we still have the sample and then add the tests. Please note that in some cases the sample may be unsuitable and we will ask you to obtain a fresh sample.

RANGE OF INVESTIGATIONS

In addition to a comprehensive traditional bacteriology service we also carry out:

Investigation	Sample type
Chickenpox antibodies	Clotted blood
Chlamydia NAAT (nucleic acid amplification technology)	Urine or swab in lysis buffer (available from laboratory)
CMV IgM and IgG	Clotted blood
Helicobacter pylori antigen	Stool sample
Hepatitis A IgM	Clotted blood
Hepatitis B markers for infection	Clotted blood
Hepatitis B surface antibody	Clotted blood
Hepatitis C antibody	Clotted blood
HIV antibodies	Clotted blood
Lyme Disease IgM and IgG	Clotted blood
Measles antibodies	Clotted blood
Mycology – microscopy and culture for fungi	Skin and nails
Mycoplasma antibodies	Clotted blood
Rotavirus	Stool sample
RSV antigen	Naso-pharyngeal aspirate

Rubella IgG	Clotted blood
Syphilis serology	Clotted blood
Toxoplasma screen	Clotted blood

Other tests are referred to accredited reference laboratories for specialised serology or NAAT testing.

Collection of specimens

Urine

The method in use estimates the number of pus and other cells, and the number of bacteria in urine to help to distinguish infection from contamination.

A midstream urine or catheter specimen is sent to the laboratory in a sterile 30 mL boric acid container.

Urines should be examined within 1 - 2 hours of collection. If this is not possible then refrigeration at 4°C for up to 24 hours is possible for most specimens without much change in bacterial count, but the white cells may become unrecognisable.

Red blood cells may lyse in dilute urine shortly after the specimen being taken: an on site "stick" test will give a more accurate indication of the presence of blood.

Suggestions for the collection of an MSU

Males

Retract the foreskin if necessary, and then pass the first part of the stream into the w.c. pan and catch the second part in the container.

Females

If there is a menstrual or vaginal discharge, use of a vaginal tampon is helpful. The patient should be instructed to swab the vulva from the front backwards using a cotton-wool swab soaked in sterile water, whilst separating the labia with two fingers of one hand. Antiseptics must be avoided. Keeping the labia separate, the patient passes the first part of the stream into the w.c. and catches the second part in a sterile container.

Babies and young children

A clean-catch specimen is preferred because urine in adhesive bags is frequently contaminated. Special small volume boric acid containers are available for small paediatric specimens.

Urine for TB culture

3 early morning 150 mL specimens are usually required. These may be delivered to the laboratory as collected or refrigerated each day and taken to the laboratory together. The laboratory supplies suitable containers.

Schistosomes

For *S. haematobium* a complete collection of urine voided between 10am and 2pm is required. At least 3 such specimens should be examined. Serological tests to exclude Schistosomiasis may be requested after 3 months from the last exposure.

Clotted blood samples for antibiotic assay

The following information must be written on the Microbiology request form for any samples sent for an antibiotic assay.

- Dose regime (size of dose and frequency)
- Time of last dose
- Nature of sample i.e. pre dose/post dose/post single daily dose/pre dialysis aminoglycoside therapy
- For single daily dose aminoglycoside therapy the time after the dose at which the blood was drawn must be provided

The most common assays are for gentamicin, tobramycin and vancomycin although others are occasionally done. If this information is missing the performance of the test will be delayed until the information can be obtained, from the requester. If the information cannot be obtained then the requester will be asked to repeat the test.

Responsibility for completing these requests lies with the medical staff responsible for the patient and the phlebotomists should not be asked to take these samples

Swabs for bacteriology

Place swab in tube containing transport medium, e.g. "Transwab". Swabs that are not sent to the laboratory immediately can be stored at room temperature for up to 24 hours.

For the diagnosis of Pertussis pernasal swabs are available and are preferred to cough plates. Swabs should arrive (by arrangement with the laboratory) within half an hour of being taken, as the causative organism is particularly fastidious.

Pus

A few mL of pus in a sterile 60mL universal bottle or a few drops in a capped syringe with the needle removed is much better than a swab.

Sputum

Use wide-necked pots with screw-on lids. For most purposes an uncontaminated early morning or post-physiotherapy specimen is preferred. Saliva is not suitable.

Culture of non-purulent material is not helpful as mouth flora inevitably predominates. Inadequate specimens will be discarded. For *M. tuberculosis* and fungal culture, at least three early morning specimens are required.

Lower respiratory tract specimens for Pneumocystis examination

Bronchoalveolar lavage specimens are best for identifying this organism. If this procedure cannot be carried out then sputum induction with nebulised hypertonic saline can be helpful, although false negatives are common. This must only be done in a single-bedded room to prevent cross-infection.

Cerebrospinal Fluid (CSF)

IN ALL CASES - The microbiology department must be informed when a CSF has been taken.

DURING NORMAL WORKING HOURS: The Laboratory must be informed directly via extension 5721

AT ALL OTHER TIMES: The Microbiology BMS on call must be contacted via the switchboard (Dial 0)

It is the responsibility of the Doctor initiating the request to ensure that the CSF samples are expected by the Laboratory.

For **routine** investigation **at least 5mL** of CSF should be obtained. If extra investigations are required more CSF will be needed. The CSF should be divided into three sequentially numbered sterile 28ml universal containers. These should be labelled "First", "Second", etc.

If a glucose level is required another bottle containing fluoride should also be sent together with a sample of blood taken at the same time in another fluoride bottle and sent to the biochemistry department.

Extra tests can be arranged by discussion with medical microbiology staff.

These include:

Serological tests for Syphilis

PCR for Herpes group viruses, Enterovirus and mumps

Cryptococcal antigen

TB culture

Testing Cerebrospinal Fluid (CSF) Samples for Creutzfeldt-Jakob Disease (CJD):



Testing CSF for
CJD.doc

Double click icon to open

Faeces

Use pots with a collecting spoon.

Suggestions for collection of faeces specimens:

When opening your bowels please use one of the following collection methods. It is of paramount importance NOT to scoop the specimen from the W.C. basin as this will be contaminated and may lead to false results.

1. Pass the motion or part of the motion into a suitable container (e.g. clean margarine container or child's potty.)
2. With the spoon attached to the lid scoop some of the motion into the specimen container. Do not fill more than half full.
For certain tests the container needs to be at least a quarter full.
Make sure the lid is securely fastened and the pot placed in the polythene bag provided.
3. On completion, empty the remaining faeces into the W.C and:-
 - a) Wrap the disposable container in a newspaper and place it in the dustbin or
 - b) Using hot soapy water thoroughly wash, rinse and dry the potty using disposable kitchen roll or similar.
4. Please ensure that the person's identity is written clearly on the label of the specimen container.

Specimens for Enterobius (threadworm) investigation.

Normally the condition is diagnosed by microscopic detection of the nematode eggs sampled from the perianal area. However, in extremely heavy infestations some worms may be seen on the buttocks and in the stools. Normally the eggs may be sampled by swabbing the perianal skin with a swab moistened with saline, preferably first thing in the morning. The recommended method is to then dip, rotate and squeeze the swab in 3-5ml of sterile saline in a plain universal, The swab

3. Use a 20 mL syringe and needle, not the "monovette" system.

Do not culture blood from lines, except when diagnosing line infection. In such cases peripheral venous blood should also be cultured.

4. Thoroughly disinfect the skin at the site of venepuncture with alcohol and preferably iodine.

If palpation of the vein is essential then also disinfect the probing finger or glove.

Bottle inoculation

5. Remove the "flip tops" of both bottles

6. Check that the broth is not cloudy, and that the rubber septum is not bulging.

7. Wet the bung with alcohol and allow to dry.

8. Inject 8 to 10 mL of blood into each bottle through the bung.

Do not allow the bottle to suck in more than this.

Inoculate the anaerobic bottle first to prevent any air getting in.

9. Write the patient's name or place an ID sticker on the bottles, **taking care not to obscure the vial identification barcode**, and send them to the laboratory with a request card. **These bottles should be sent in the pneumatic tube system using all the packaging supplied with the bottles.**

The bottles must remain at room temperature prior to transport to the laboratory.

Do not refrigerate the vials, or warm them on radiators etc.

Surgical Specimens

SPECIMENS MUST NOT BE PUT IN FORMOL SALINE for microbiology. Use dry sterile containers, e.g. sputum pots. Make sure specimens are sent directly to the laboratory and not refrigerated. The laboratory should be informed if the specimen is urgent or requires processing out of hours.

Skin scrapings, hairs and nails for mycology

Use a sputum pot or a “dermapack” collection pack.

Chlamydia - Collection of samples

The laboratory issues collection kits for urine and swab samples. This contains a lysis buffer which should not come into contact with the skin, eyes, or mucus membranes.

Female swab collection protocol for endocervical samples

Using one of the two swabs (provided), remove excess mucus from the cervical os and surrounding mucosa. Discard this swab after use.

- To collect the specimen, insert the second swab into the cervical canal & gently rotate the swab 5 times in one direction to ensure adequate sampling.
- Place the swab into the tube until the visible score mark is aligned with the tube rim & break the swab at this point; discard the top portion of the swab.

Handling precautions

- **DO NOT pre-wet collection swabs with the collection media before obtaining the endocervical specimen.**
- **Use care to avoid splashing of contents.**

Urine collection protocol

Patient should provide a first-catch urine (approximately 10 to 50 mL of the initial urine stream) into a sterile urine collection cup (not provided).

- Using the plastic pipette (provided), transfer the urine into the sample tube at a level within the two black lines indicated on the label. If transfer can not be done immediately unstabilized urine may be held for up to 24 hours at 2-30°C.
- Cap & invert the tube 5 times to mix

Handling precautions

- **Female patients should not cleanse the labial area prior to providing specimens.**
- **DO NOT collect specimen from patients who are menstruating.**
- **Female and male patients should not have urinated for at least one hour prior to sampling.**
- **Use care to avoid splashing of contents.**

Storage & transport to laboratory

Once in the transport medium the samples are stable at ambient temperature (2°C to 30°C) for up to 90 days.

Eye swabs. Swabs should be submitted in Chlamydia transport medium for PCR investigation.

VIROLOGY

1. [Transport of specimens](#)
2. [Use of the laboratory](#)
3. [Table of specimen requirements](#)

Viral culture

Swabs: Special non-toxic wooden-shafted swabs should be broken off into the pink liquid provided (“bijoux” bottles with white label) and refrigerated. Fragile viruses such as Herpes simplex will often be lost if delays more than twenty four hours occur before they are cultured - and we have to get them to Leeds.

Faeces: Collect in the standard faeces container. Clearly mark the request form for “viral culture”.

Urine: Add an equal volume of urine to urine transport medium (double strength) and send to the laboratory immediately.

Vesicle fluid: Due to safety considerations the laboratory will not accept vesicle fluids in syringes. If PCR or culture is required, the fluid may be collected in a fine gauge needle and expressed into viral transport medium.

NOTE: ALWAYS SEND A SPECIMEN FOR VIRUS ISOLATION TO THE LABORATORY AS SOON AS POSSIBLE.

Clotted blood or serum for antibody studies

Paired sera are usually required, one in the acute and the second in the convalescent phase (10-14 days after onset). We need to know enough clinical detail to decide which viruses to screen for, and a date of onset to decide whether waiting for a second serum is appropriate.

Only a limited range of viruses is tested for, and often serology is unhelpful, e.g. for coxsackie and echo viruses where culture or PCR of throat swab and faeces is suitable. Viral serology is helpful when a specific virus is suspected (e.g. rubella, CMV, mumps), or with particular problems such as rash, flu-like, and other respiratory tract infections. Patients with vague or long-standing problems (“lassitude” etc.) almost never produce diagnostic results. As a high proportion of people have antibody to Herpes simplex virus antibody tests are usually unhelpful: PCR is the diagnostic method of choice.

TRANSPORT OF SPECIMENS

All fluids, e.g. CSF, pleural fluid, joint fluids and pus require culturing without delay. Specimens should preferably be taken during laboratory opening hours and sent immediately to the Department. The Microbiology Department (NOT general pathology reception) should be warned of the arrival of urgent and important, unrepeatabe specimens. If taken outside laboratory hours the Microbiology "BMS on-call" should be contacted via Switchboard.

In general all specimens should reach the laboratory as soon as possible after being taken. Micro-organisms may be susceptible to drying, heat or cold (particularly freezing). In specimens such as sputum and urine they can multiply to inappropriate levels.

Genital pathogens and anaerobic organisms are particularly sensitive to delays before culturing

All bacterial swabs should be placed in transport medium (the clear jelly seen in many swab tubes) which prevents drying, maintains pH and excludes oxygen; Swabs should be kept at room temperature until delivery to the laboratory.

Urine for culture should always be taken in the borate containing red-topped 30ml bottles to prevent bacterial overgrowth. Refrigerate until delivery.

Specimens of clotted blood (brown top "serum" tubes) are suitable for all serological tests. Refrigerate until delivery: do NOT freeze.

Blood cultures - Keep at room temperature and send the broths to the laboratory. Do not place on radiators etc as they get too hot (many pathogens cannot tolerate temperatures over 37°C).

USE OF THE LABORATORY

In these days of clinical budgeting everyone is encouraged to use the laboratory in a cost-effective manner.

The microbiology laboratory can help to:

- provide or confirm a diagnosis
- suggest appropriate antibiotics
- monitor response to treatment

Inevitably judgements will have to be made about whether to treat blind or request an investigation which may cost more than a course of antibiotics.

Failure to investigate may lead to:

- An increased use of antibiotics causing possible harm to patients
- An increasing reliance on expensive new broad spectrum agents
- Increasing antibiotic resistance in the community (and concomitant lack of knowledge of this)
- Difficulty in establishing a diagnosis when a patient has failed to respond to treatment

LABORATORY METHODS

Microbiology assesses the clinical relevance of investigations performed and the reliability of interpretative comments in consultation with its users through user surveys and general feedback.

New tests/services may be commissioned through discussions with the Clinical Microbiologists.

Methodology and testing is benchmarked against the Health Protection Agency (HPA) national standard operating procedures, whose web-site offers valuable information on microbiological disease processes and associated microbiological investigations. http://www.hpa-standardmethods.org.uk/pdf_sops.asp

<u>SPECIMEN</u>	<u>INVESTIGATION</u>	<u>SPECIMEN</u>
Blood	Serological investigations	Brown topped Sarstedt tube – 7.5mL clotted blood is sufficient for several tests
Blood	Hep C & HIV by PCR	Phone laboratory for advice
Blood	Blood Culture	Blood culture sets available from laboratory
CSF	Culture & Sensitivity	Universal container (white top)
Ear Swabs	Culture & Sensitivity	Transwab (orange top)
Faeces	Culture & Sensitivity	Universal with spoon
Faeces	Ova, cysts and parasites	Universal with spoon
Fluids	Culture & Sensitivity	60mL container
Genital swabs	Culture & Sensitivity	Transwab (blue cap)
Genital swabs	Chlamydia	Kit available from laboratory
IUCD	Culture & Sensitivity	60mL container
Pernasal swabs	Bordatella pertussis	Pernasal swab available from laboratory
Respiratory swabs	Culture & Sensitivity	Transwab (blue cap)
Skin swabs	Culture & Sensitivity	Transwab (blue cap)
Skin, nails, hair	Mycology	Folded in dermapak, or submitted in 60mL container
Sputum	Culture & Sensitivity	60mL container
Sputum	TB culture	60mL container
Swabs	Virology	Viral Transport medium – available on request
Tissue	Culture & Sensitivity	60mL container – must NOT contain formalin
Urine	Culture & Sensitivity	30mL universal with boric acid (red top)
Urine	TB culture	160mL container
Urine	Schistosome ova	160mL container
Urine	Virology	60mL container
Wound swabs	Culture & Sensitivity	Transwab (blue top)

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Date Next Review Due: 01/03/2016 Do not use after this date.

INFECTION CONTROL TEAM

		Extension	Bleep/Pager
Dr K Blackmore	Trust Infection Control Office Consultant Microbiologist	6256	Contact via switchboard
Linda Horton-Fawkes	Senior Infection Prevention Nurse Specialist	1346	809
Mrs V Parkin	Deputy DIPC	5304	
Mrs Jane Balderson	Audit/Surveillance Nurse	5775	
Community Infection Prevention		01423 557340/347	

The Infection Control Team has primary responsibility for and reports to the Chief Executive (via the Infection Control Committee) on all aspects of surveillance, prevention and control of infection within the Trust.

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HISTOPATHOLOGY DEPARTMENT

1. [Histology](#)
2. [Cytology](#)
3. [Fixatives and specimen containers](#)
4. [Autopsy examination](#)
5. [Coroner's autopsy examination](#)
6. [Death certificates](#)
7. [Cremation certificates](#)

	Telephone
Dr A C Andrew Consultant Pathologist	(01904 72) 5801
Dr C Bratten Consultant Pathologist and Lead Clinician in Histopathology	(01904 72) 5675
Dr AMT Clarke Consultant Pathologist and Lead Clinician in Cytopathology	(01904 72) 5669
Dr I M Hanson Consultant Pathologist	(01904 72) 6284
Dr PR Maheswaran Consultant Pathologist	(01904 72) 5784
Dr N Maughan Consultant Pathologist	(01904 72) 5474
Dr K Miller Consultant Pathologist	(01904 72) 5477
Dr M Toy Consultant Pathologist	(01904 72) 4050
Mr Trevor Hair Head BMS	(01904 72) 5853/5783

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Helen Armitage Operational manager	(01904) 725783
Office/Enquiries	(01904 72) 5774/5787
Histology Secretaries	(01904 72) 5772/5773/5776
Laboratory Enquiries (Histology)	(01904 72) 5728
Laboratory Enquiries (Cytology)	(01904 72) 6332
Mortuary	(01904 72) 6803
Mr K Breheney Mortuary Manager	(01904 72) 6803

HISTOLOGY

The Histopathology Department is open from 8:30-5pm Mon-Fri. For information regarding verbal requests of reports, progress of cases, clinical advice, or interpretation of results, please ring the Histology Office on 01904 72(5772/3/6). For any other information please ring the Histology Laboratory on 01904 72(5728).

For information regarding names and addresses of referral laboratories please contact the Histology Laboratory on the above number.

Request Forms

All specimens must be accompanied by a request form. All details on the request forms should be completed together with results of relevant investigations in order to provide an adequate clinical history. Any therapy which may alter histological appearances should also be detailed on the request form.

Specimen Labels

Specimen labels must indicate the name of the patient, the ward, the nature of specimen and other relevant information. The laboratory cannot take responsibility for unlabelled specimens.

Specimen Transport

Specimens should be sent to the department as soon as practicable after removal. Medium and small sized specimens should be put in containers of appropriate size containing a suitable volume of fixative (ideally some ten times more than the volume of specimen) which are obtainable from the Pathology Department. All small biopsies (e.g. endoscopic, needle biopsies) should be placed in the biopsy capsules provided. The number of endoscopic biopsies should ideally be stated on the request form. Biopsy capsules for this purpose are available in the endoscopy suite and at various sites around the hospital where small biopsies are commonly taken. Please contact the department for advice where any doubt exists. Fresh specimens from theatres must be double bagged, with a patient identification label attached to the inner bag. Place the Histology request form in another clear bag and place both the specimen and the request form in to another bag and knot it. These specimens are kept in the theatres' fridges prior to collection by the porters.

All fresh specimens should be delivered to the Microbiology department in the theatre tins provided. Care must be taken in the transportation of all such specimens and they must be handled as potentially infectious.

Disposal of Specimens

Unless the department is advised otherwise, all specimens are disposed of five weeks post-receipt.

Frozen Sections

These should be requested by telephoning the Histology Laboratory at least 24 hours in advance. The specimen should be received fresh and delivered directly to the laboratory. The procedure takes about 15 minutes from receipt of the specimen to the telephoned report. If several frozen sections are required (e.g. for the exclusion of malignancy in lymph nodes), each separate specimen will take a further 10 to 15 minutes. The extension number to which the report should be telephoned **MUST** be clearly stated on the request form to prevent any delay.

Lymph Nodes

Lymph nodes removed for suspected lymphoma should be sent to the laboratory immediately in a fresh unfixed state. The laboratory must be informed that a specimen is to be taken to ensure staff are available to deal with the specimen immediately. Out of hours these specimens should be refrigerated.

Skin biopsies for Immunofluorescence

Notice is required for immunofluorescence. The specimen should arrive in a Petri dish, moistened with saline. If it is sent from another hospital it should be placed in Zeus tissue fixative.

Skin Biopsies for Marker Studies

Notice is required for marker studies. The specimen should arrive in a petri dish, moistened with saline.

Renal biopsies

Notice is required to allow the laboratory time to make up the Mirsky's Fixative. When booking the specimen the following details are required: Patient name, DOB, Hospital number, Consultant, Date and time of biopsy, degree of urgency, and details as to whether it is a native or transplant biopsy. The renal biopsies should be placed in the appropriate fixatives according to the clinical details: (i) 10% Formal Saline (ii) Mirsky's fixative is required for the EM specimen (iii) Zeus tissue fixative for immunofluorescent studies. The specimens should be sent immediately. Specimens that are received into the Histopathology Department at St James's Hospital, Leeds after 12:30pm will not receive a same day diagnosis. Urgent specimens need to arrive in the Histology department no later than 11:15am to be dealt with the same day. The requesting doctor must ring St James's Hospital, Leeds to inform them of any urgent renal biopsies on 0113 20677498 or 0113 2067530.

Testicular biopsies

Notice is required. Bouin's fixative will be provided. The specimen should be sent immediately.

Muscle biopsies

These specimens require advance notification on 0113 3927880 or 0113 3927830. They should be sent by taxi directly to Britannia House, Britannia Road, Morley, Leeds, LS27 0DQ. The muscle biopsy should be wrapped in saline moistened gauze and placed in a sterile specimen pot and labelled appropriately.

Placenta Specimens

These specimens should be placed in the clear plastic bags provided by main theatres (swab bags). Please do not use the bags labelled 'pathology specimens' as they are prone to leak. The placenta must be placed in one bag and the top of the bag knotted. A patient identification label must be placed on this bag. Place the Histology request form in another clear bag and place both the placenta and the request form in to another bag and knot it. During working hours the bagged placenta is then placed in a white bucket and sent to the laboratory via a porter (buckets are obtained from the Histology department). Out of hours the specimen is refrigerated and sent as above the following day. If the placenta is too large to fit in to a bag it is placed directly in to the bucket with the lid securely placed on top. The patient identification label is placed on the outside of the bucket and the bagged request form is securely attached to the bucket lid.

Cytogenetics

Specimens should be sent directly to the Histopathology Department in the appropriate transport medium, accompanied by a Cytogenetics request form. The transport medium is provided by the Cytogenetics Department at St. James's Hospital where the test is performed.

Urgent specimens

Please indicate the urgency of the specimen on the request form and the date by which a report is required. Please confirm these arrangements by telephone.

Out of hours requests

Frozen sections are only carried out in extreme emergencies. A Consultant Histopathologist can be contacted via the switchboard.

CYTOLOGY

Cervical Cytology

Specimens are transported to the laboratory in the dedicated NYCCSS transport bags sealed with a plastic security tag.

All requests for cervical cytology should be accompanied by the special (HMR 101/5) forms and all details must be completed with the full patient address, NHS number, and sender details along with the smear takers unique LBC smear taker code. Information for smear takers and smear taker codes are available through the **Cervical Sample Taker Database** <http://www.cstd.neyhgarc.nhs.uk/admin/>. Correct patient details enables correct matching via links with the FHSA computerised recall system.

Liquid based cytology 'clinic kits' are available from the laboratory. Forms to order LBC clinic kits are available from Pathology Reception, as part of the Laboratory Medicine Pathology order form



LM-TEM-GENORDFR
M.doc

or the NYCCSS order form for these kits only.



"NYCCSS order
form.doc"

These kits contain all of the necessary consumables to take 25 LBC cervical samples. LBC endocervical samplers are not provided by the laboratory but may be purchased from Medical Solutions if deemed necessary by the Gynaecologist.

GP practices must purchase their own stock of Rover cervex brooms should they require additional stock.

Reporting of cervical cytology is in accordance with national guidelines. The 14 day turnaround is measured from the date the sample is taken to the date the lady receives her result letter. Therefore it is imperative that all cervical samples are dispatched to the laboratory on the next available transport. If you require further information please contact the laboratory for details.

The laboratory has implemented HPV testing for high risk types as triage and test of cure in accordance with national guidelines.

Limitations of HPV testing: *A negative result does not preclude the presence of HPV infection because results depend on adequate specimen collection, absence of inhibitors (e.g. vaginal lubricants, heavily blood stained samples), and sufficient DNA to be detected.*

Non-gynaecological Cytology

Fine needle aspiration cytology

Cell samples taken by aspiration from solid lumps should be spread thinly onto glass slides and air-dried by waving the slides vigorously in the air, particularly if there is a lot of blood contamination. Afterwards the needle and syringe should be rinsed in the needle washing fluid which should also be sent together with the glass slides for examination. The laboratory provides an immediate reporting service for FNA samples if required. The doctor requiring the service should phone extension 6332 to request immediate reporting and this should be agreed with the reporting Cytopathologist. They should send the sample to the laboratory immediately. **The request form must clearly state where the report should be sent and the telephone extension number highlighted.**

Serous and Cyst Fluids

A fresh representative specimen should be sent to the laboratory in a 25mL white-topped Universal container. These should reach the laboratory as soon as possible, but if they are taken at the weekend or out of hours they can be refrigerated.

Seminal fluids/Sperm samples for infertility and post vasectomy analysis

Infertility investigation:

Patients please note: You will need to be provided with a pre-weighed and toxicity tested pot by your GP for your sperm sample, along with a request form **signed** by your clinician **before** we can accept your sample for analysis.

Any samples received which are **not** in a pre-weighed and toxicity tested pot with a signed request form will unfortunately be **unsuitable for analysis and will be rejected**. The sample pot must have your name and date of birth on it.

Samples for fertility investigation i.e. for sperm morphological assessment, count and motility, should be brought directly to York Teaching Hospital, Laboratory Medicine, Specimen Reception between 8.45am and 3pm Mon-Fri, ideally within 1 hour of production in the toxicity tested sample pot provided by your GP/Clinician. It is important that the time of collection should be clearly indicated on both the form and specimen pot as samples which are examined more than two hours from production are unsuitable for assessing sperm motility.

Directions: On arrival at the York Teaching Hospital Main Entrance, turn immediately right past the Patient Discharge Lounge, then right at the T junction, Sample Reception is 10m down on the left.

Please do NOT bring infertility samples to Scarborough Hospital laboratories as these samples are time sensitive and cannot be analysed at the Scarborough laboratory.

In exceptional circumstances a patient facility can be made available for the production of a sperm sample on-site **by prior arrangement only with the laboratory only**, please telephone 01904 726332 to make an appointment.

Normal Ranges: Taken from WHO Laboratory Manual for the examination of Human Semen and Sperm-Cervical Mucus Interaction 5th Edition 2010

Sub fertile range:

Count <15 million sperm/ml.

Motility <40%

Morphology <4 % normal forms

Lower reference limit for semen volume is 1.5 ml.

Post Vasectomy samples:

These samples are not time sensitive and do not require a pre weighed pot, a normal sterile sample pot supplied by your GP will be adequate. These can be taken either back to your GP or to either York or Scarborough Laboratory Medicine reception.

Post vasectomy samples for analysis should be brought to the laboratory on the same day as production, 3 months after surgery.

Sputum

Sputum samples should only be sent for cytology if there is a reasonable suspicion of malignancy in patients who are unsuitable for bronchoscopy. In most cases the respiratory pathology is due to infection which resolves on treatment. Sputum should only be sent if the clinical symptoms and radiological findings do not resolve after a course of treatment. The pick-up rate for malignant cells is very low because of inappropriate patient selection. Examination of sputum samples is an expensive and time-consuming process.

Early morning specimens of sputum on three consecutive days are desirable, and these should be obtained before eating and oral hygiene have been commenced. The specimen should be a deep cough specimen and sent straight to the laboratory.

Urine

A fresh sample of urine (not the first early morning specimen) is required, some 30mL being sufficient. The specimen should reach the laboratory as soon as possible.

Samples referred to other laboratories

Any non-gynaecological samples with appropriate clinical information may require haematological investigations which are not available at York Hospital.

These specimens will be received fresh into the York cytology laboratory and are transported to HMDS Leeds Teaching Hospitals NHS Trust. without undue delay (i.e. the same day). **If a sample only requires investigations to be undertaken at HMDS they should be sent to the Haematology laboratory who will forward the specimen.**

The final report will be sent to the requesting clinician and a copy sent to our requesting pathologist. The turnaround times from HMDS are routinely 1.6 days for CSF samples and 3.2 days for tissue aspirates and effusions.

Turn Round Times for Reports

The following times given are the **minimum** time taken to process and produce a typed report. Inquiries regarding reports should not be made in advance of the minimum time. If an urgent report is required, this should be clearly indicated on the request form. A telephone or bleep number should be given.

Surgical Histology Specimens:	3 days from receipt
Non-gynaecological Cytology:	70% are reported within 3 days from receipt

(FNA rapid verbal reporting 30 mins from receipt after agreement with the reporting pathologist)

Gynaecological Cytology: 7 days from receipt (urgent), 14 days routine.

FIXATIVES AND SPECIMEN CONTAINERS

When used accordance with the safety data sheets provided, and in conjunction with the appropriate use of Personal Protective Equipment, the fixatives outlined below present a low risk to staff. In the unlikely event of any formalin spillages within normal working hours please contact the histology laboratory on 5728. Outside normal working hours spillages should be absorbed with inert, damp non-combustible material, then flush the area with water. Absorb small quantities with paper towels and evaporate in a safe place. Allow sufficient time for vapours to completely clear, and then place the paper towels in a clinical waste bag away from combustible material.

Storage

Formalin pots and buckets should be stored at room temperature in a dry well ventilated area. Keep containers securely closed.

Disposal

Out of date formalin pots should be returned to the laboratory for disposal.

Health and Safety

Formalin is harmful by inhalation, in contact with skin and if swallowed. May cause sensitisation by skin contact. Use protective gloves, and wear eye protection when handling formalin.

First Aid Measures

EYES Wash eyes immediately with plenty of water whilst lifting eyelids. Seek medical attention immediately. Continue to rinse.

SKIN Remove affected person from source of contamination and immediately flush contaminated skin with plenty of water. If clothing soaked through, remove it immediately and flush skin with water. Should irritation persist seek medical attention immediately

INGESTION Never make an unconscious person vomit or drink fluid. Let affected person drink lots of water immediately in order to dilute the swallowed liquid. After the liquid has swallowed try to induce vomiting.

INHALATION Move the exposed person to fresh air immediately. If breathing has stopped, perform artificial respiration immediately. **Keep the affected person warm and at rest whilst seeking medical attention.**

1) Routine Histology specimens: Containers of 10% buffered formalin should be used.

Containers of various sizes are available from the laboratory.

2) Immunofluorescence: Petri dishes and containers of Zeus tissue fixative should be used.

3) Electron microscopy: Containers of Mirsky's Fixative containers should be used.

4) Testicular biopsies: Containers of Bouin's Fixative should be used.

Biopsy capsules should be used for the secure transport of small biopsies.

Cork boards are available for pinning out specimens prior to fixation.

Cytology consumables available from the Laboratory:

1. Containers

Type of container	Used for
60mL sterile container	seminal fluid/sputum
25mL white-topped Universal container	ascitic fluid pleural fluid cyst fluid urine

1. Other consumables

Plastic specimen bags
Single frosted-end slides
LBC smear taking kits
Containers of needles

Slide carriers

washing fluid for FNAs

AUTOPSY EXAMINATION

Both hospital and Coroners autopsy examinations are performed during weekdays only. An Autopsy may only be arranged out of hours in exceptional circumstances (e.g. where there is requirement to remove tissue immediately). This will only occur with the specific agreement of a Consultant Histopathologist.

Mortuary Opening Hours

08.30 – 16:30 hours Monday to Friday

Telephone Extension 6803.

The Mortuary technicians also initiate the cremation certificate procedure.

On weekends, Bank Holidays and at all other times, the Mortuary Technician may be contacted via the Hospital Switchboard.

Mortuary Staff arrange viewing, initiate the Cremation Certificate procedure and liaise with the Consultant on call for urgent autopsies.

Hospital Autopsy Examinations, i.e. Non-Coroner's Cases

It is imperative that an **Autopsy Consent Form** is completed and signed in all hospital request cases, even if verbal permission has been obtained. An **Autopsy Request Form** stating the points of clinical interest, and the likely cause of death should also be completed. It is normal to issue a death certificate with the appropriate box ticked "Information from post mortem may be available later". If the cause of the death is obscure, the death should be reported to the Coroner. Please inform the Mortuary Technician as soon as permission for autopsy has been obtained - do not rely on the autopsy request reaching the Mortuary, for there may well be a delay. Send the consent and autopsy request forms plus the case notes and X-rays to the Mortuary promptly.

Perinatal and Foetal Examinations

All fetuses of any age should be sent to the mortuary with an appropriate request form completed. It is also helpful to contact the Mortuary directly if an examination has been requested, especially if the birth has been out of normal working hours.

A completed consent form is required in all cases regardless of gestation.

Coroner's Autopsy Examinations

Coroner's Officers Location

Time	Location	Contact Number
09:00-12:30	Police Station	01904 669332
12:30-16:00	Mortuary, York Hospital	01904 726804
16:00-09:00 (Weekdays) and during weekends	Via Control Room York Police	01904 631321

Pamphlets on which cases to refer to the Coroner are available on the wards, but if in any doubt you are advised to contact your Consultant or one of the Coroner's Officers. The Consultant Pathologist will also give advice.

The following is a guide to which deaths should be reported. Remember failure to report, or delay, may cause the bereaved relative unnecessary distress.

A death should be reported to H. M. coroner if:-

1. it cannot be certified as being due to natural causes.
2. the deceased was not seen by a doctor within the last 14 days.
3. there is any element of suspicious circumstances.
4. there is any history of violence.
5. the death may be linked to an accident (whenever it occurred).
6. there is any question of self neglect or neglect by others.
7. the death has occurred or the illness arisen during or shortly after detention in police or prison custody (including voluntary attendance at a police station).
8. the deceased was detained under the Mental Health Act.
9. the death is linked with an abortion.

10. the death may have been contributed to by the actions of the deceased himself (e.g. self injury, history of drug addition or solvent abuse).
11. the deceased was receiving any form of war pension or industrial disability pension unless the death can shown to be wholly unconnected.
12. the death could be due in any way to the deceased's employment.
13. the death occurred within 24 hours of admission to hospital.
14. the death occurred during an operation or before full recovery from the effects of the anaesthetic or was in any way related to the anaesthetic (in any event a death within 14 days of surgery should normally be referred).
15. the death may be related to a medical procedure for treatment whether invasive or not.
16. the death may be due to lack of medical care.
17. there are any other disturbing features to the case.
18. it may be wise to report any death where there is an allegation of medical mismanagement.

DEATH CERTIFICATES

Remember you should not defer completing a death certificate until after the result of a hospital autopsy examination. You should put down your opinion as to the cause of death and initial the section, 'Further information available later'. Avoid using vague terminology on the death certificate such as 'heart failure' without qualification and also such terms as 'cerebrovascular accident or incident'. The word 'accident' or 'incident' should be avoided by the use of the term 'spontaneous intra-cerebral haemorrhage', 'cerebral infarction/cerebral thrombosis', 'subarachnoid haemorrhage' etc where appropriate. A death certificate should not be issued in the case of Coroner's post mortem examinations - the Coroner will issue a disposal certificate. In all cases consideration should be given to the bereaved relatives and documentation be completed as soon after death as possible to facilitate burial or cremation. If you are going off for a day or a weekend please ensure that you inform the colleague who is covering for you.

Viewing of Bodies by Relatives of the Deceased

Relatives wishing to view deceased persons need every assistance, and arrangements should be made with the Mortuary Staff.

CREMATION CERTIFICATES

The Mortuary staff initiates these and when Form '4' has been completed it should be sent, with the case notes, to the Mortuary, where arrangements will be made for form '5' to be completed.

Extreme care must be exercised in completing medical certificates for cremation. These certificates are statutory and if they are not completed properly, fully and accurately cremation may have to be postponed with resultant distress to relatives. All questions must be answered and abbreviations should not be used.

Form '5', the confirmatory medical certificate, may only be signed by a registered medical practitioner who has been fully registered with the General Medical Council for not less than five years. A doctor who is on the same clinical team as the doctor who signed Form '4' should not issue this certificate. Both certificates are examined by the Medical Referee who must be satisfied in all respects before the cremation is authorised. Owing to the risk of explosion or radiation, bodies with cardiac pacemakers and/or radioactive implants in situ are not suitable for cremation. Pacemakers and implants must, therefore, be removed and this fact stated on cremation forms. Arrangements for the removal of a pacemaker or implant should be made with a Consultant Histopathologist.

Where the deceased died as an in-patient in a hospital, and a post mortem examination has been made by a suitably qualified doctor, and the deceased's medical attendant knows the result of the examination before giving his certificate, the cremation may take place without subsequent completion of Form '5'. Question 10 on Form '4' covers this eventuality.

Signing of Cremation Form '5'

The Home Office takes the view that the term 'registered medical practitioner of not less than five years standing' means one who has been registered with the General Medical Council for not less than five years; and in these circumstances registration outside the country would not count towards the requisite period. It is also the view of the Home Office that any periods of limited or provisional registration cannot count as part of the five years. This means that the date from which the five years is calculated is the date of registration with the General Medical Council, not the date of qualification.

The Medical Referee at York Crematorium has no option but to abide by the advice of the Home Office, and you should bear the above points in mind when the question of signing cremation Form '5' arises.

Enquiries about the medical aspect of cremation should be addressed to the Medical Referee (District Medical Officer), City of York Crematorium, at Bootham Park (York 642171 Ext. 77) or to the Superintendent, York City Crematorium (York 706096).

Doctors should note that crematorium fees are taxable and should be disclosed.