Brentwood Hub User Handbook (Brentwood, Cambridge & Ipswich)

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Contents

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1. Executive Summary /Purpose

1.1. The user manual serves to inform all service users of the services provided by pathology as well as details of sample types, turnaround times and reference ranges.

2. Scope/Roles & Responsibilities

2.1. Scope

The scope of this document covers from pre-analysis, analysis and post analysis stages in processing patient samples. This scope of the user manual does not cover clinical advise for users, this can be sourced separately from discipline respective consultants.

2.2. Roles and Responsibilities

The Group Pathology Manager is responsible for the overall Governance of the division and is responsible for ensuring the quality management systems are appropriate for service needs and that they comply with Group, Divisional and Hospital policies and procedures. Well defined Service Agreements form part of an effective quality system.

The Group Pathology Governance Manager is responsible for ensuring the implementation and review of this procedure.

Pathology Managers are responsible for ensuring that the procedure is carried out by the personnel for whom they are responsible and for ensuring where appropriate that these requirements are followed by clinical staff.

All staff who receives this document must read and understand the content, acknowledge as such in Q Pulse where appropriate. Recipients shall also remove any previous versions of the document and destroy replacing with the latest version.

3. General information

The Brentwood Hub pathology consists of 3 hospitals. These are Brentwood, Cambridge and Ipswich hospitals; with Brentwood laboratory being the Hub and Ipswich and Cambridge as spoke sites.
The Pathology Laboratory provides a wide range of services to the consultants and patients of the Nuffield Hospital Brentwood, Cambridge and Ipswich and also provides services to Nuffield Health Wellbeing, GPs, NHS hospitals and other clinics. All 3 hospitals provide medical and surgical services on an inpatient, day case and outpatient basis.

BARS (Blood Audit Release System) is used on all three sites to issue blood safely. All specimens are dealt with promptly and efficiently, and results are validated and authorised by HCPC registered Biomedical Scientists.
Results are despatched immediately to the requesting Clinician who can also view authorised results on Cyberlab.

The spoke laboratory at the Nuffield Health Cambridge Hospital processes most biochemistry samples on the Roche C111 and the Haematology samples on the Sysmex XS1000i. Other samples are referred to Nuffield Health Brentwood Hospital.

The spoke laboratory at the Nuffield Health Ipswich Hospital, processes urgent samples on the Pochi and Piccolo and prepare the rest of samples for analysis at the Nuffield Health Brentwood Hospital. The spoke sites also dispatch histology samples for referral to their local NHS trusts Addenbrookes and Ipswich respectively. Some POCT services are available on all sites.

Brentwood pathology
The pathology laboratory at the Nuffield Health Brentwood is situated at the first floor of the hospital adjacent to Physiotherapy and above the Outpatients Departments. Included in the pathology department is the phlebotomy service as well.

Address: Nuffield Health Brentwood Hospital Pathology, Shenfield Road, CM15 8EH

Cambridge
The pathology laboratory is temporarily located in the X-ray room in Radiology department. The new pathology lab is undergoing construction at present with target date being June 2016. Phlebotomy services are provided by the outpatients department.

Address: Nuffield Health Cambridge Hospital Pathology, Trumpington Road, CB2 8AH

Ipswich
The pathology department is located in the basement; Randlesham wing. Phlebotomy services are provided by the OPD department on the ground floor near the reception.

Address: Nuffield Health Ipswich Pathology, Foxhall Road, Ipswich IP4 5SW.

3.1. Aims and objectives

To maintain professional standards
- The laboratory works to standards appropriate to CPA (UK) Ltd/UKAS ISO15189 accreditation.
- The laboratory will ensure minimum turnaround times for accurate results.
- The laboratory uses the appropriate quality control procedures and belongs to the relevant External Quality Assurance schemes for all tests carried out in house.
- The Biomedical Scientists take part in Continued Professional Development activities.

To maintain high standards of care
- The laboratory utilises up to date equipment of a high standard and quality. Equipment is regularly serviced and fully maintained.

- The laboratory uses orthodox methodology that has been nationally evaluated. The methodology is regularly reviewed in the light of recent advances and current knowledge.
- The department evaluates the feedback of turnaround times and regularly monitors these times.
- The laboratory is subject to regular internal and external audits.
- The department business plan is prepared annually and this forms part of the overall Nuffield Diagnostics business plan. The pathology team as a whole is encouraged to participate in this process.

To maintain effective communication with users

- The needs of the users are constantly being reviewed, via questionnaires and various meetings within the Hospital.
- User satisfaction is ascertained via surveys, these are performed at least annually.
- The users of the laboratory service have access to Pathology Consultants and Clinical Scientists in all the in-house disciplines.
- There is a system in place for conveying unexpected or abnormal results by telephone or personal contact to the appropriate clinical staff.
- A 24-hour service is provided, with an emergency out of hours on call cover.
- The department ensures that investigations are carried out and reports returned in a timely fashion.
- The laboratory advises the clinical and medical staff of new procedures and advances, which is likely to promote improved patient care.
- Laboratory staffs attend many inter-departmental meetings.

Assessment of the needs of patients

- Patients will be handled courteously and sympathetically.
- The laboratory staff will respond to all reasonable questions from patients.
- The laboratory will provide appropriate instructions for the tests to be carried out e.g. fasting details or 24-hour urine instructions.

4. Accreditation

The laboratory works to the standards of the Clinical Pathology Accreditation (UK) Ltd. (CPA)/United Kingdom Accredited services (UKAS) and Medicines and Healthcare products Regulatory Agency (MHRA). It participates in all appropriate External Quality Assessment programmes and Internal Quality Control programmes are undertaken to ensure high standards of performance in all disciplines. All specimens are dealt with promptly and efficiently and results are validated and checked by suitably qualified and competent staff before they are released.
The overall supervision of the pathology service is provided by the Consultant Pathologists, who are responsible for clinical interpretation of all results generated by this laboratory or a referral laboratory. They must be available for enquires and consultation as and when required.

4.1. Scope of service and capacity

The Pathology Laboratory provides a wide range of services to the consultants and patients of the Nuffield Hospital Brentwood, Cambridge and Ipswich and also provides services to Nuffield Proactive Health, GPs, NHS hospitals and other clinics. All 3 hospitals provide medical and surgical services on an inpatient, day case and outpatient basis. BARS (Blood Audit Release System) is used on all three sites to issue blood safely. All specimens are dealt with promptly and efficiently, and results are validated and authorised by the Biomedical Scientists. Results are despatched immediately to the requesting Clinician who can also view authorised results on Cyberlab.

The spoke laboratory at the Nuffield Health Cambridge Hospital processes most biochemistry samples. Other samples are referred to Nuffield Health Brentwood Hospital.

The spoke laboratory at the Nuffield Health Ipswich Hospital, processes samples in preparation for analysis at the Nuffield Health Brentwood Hospital. The spoke sites also dispatch histology samples for referral to the Adenbrookes and Ipswich NHS Trusts respectively. Some POCT services are available at both sites. Both spoke sites provide out of hours service led by an RMO who process samples.

For a full list of the examinations offered please see Appendix

4.1.1 Haematology

Majority of the haematology work is done in-house.

- Any Haematology not performed in house is sent to the Central Laboratory Nuffield Health Warwickshire Hospital or The Doctors Laboratory (TDL).
- The Haematology analysers are the Sysmex XT1800i, Sysmex X1000 and Pochi 100.The analysers are bi-directional electronically linked to the IT data system.
- Coagulation is performed using a Sysmex CA560 Coagulometer for INRs, PT and APTTs.
- There are also point of care HemoCue hand held analysers for haemoglobins in theatres and high dependency units.

4.1.2 Clinical Chemistry

All routine chemistry is done in-house.

- Any biochemistry tests not performed in-house is sent to the central laboratory at Nuffield Health Warwick or TDL Laboratories.

- The Chemistry analysers are the Roche C111, C311 and E411. The analysers are bi-directional electronically linked to the IT data system.
- There are ISTATs and glucometers.

4.1.3 Microbiology

- Nuffield Health Guildford Laboratory
- Some urgent services going to the local respective NHS Trusts.

4.1.4 Transfusion

The Transfusion section is fully automated with a Diamed Gel Station. The analyser is electronically linked to the IT data system. The BARS audit and release system is used for electronic issue of blood where applicable.

- The system is networked to BARS issue boxes at Cambridge and Ipswich.
- There are back-up manual procedures in place.
- ABO and Rhesus (D) grouping, antibody screening, antibody identification and cross matching are performed. Electronic Issue is used where possible.
- Blood products are issued.

4.1.5 Histology

All histology at Brentwood Hub is processed and reported externally. All samples are collected and prepared for processing from theatres; they are then dispatched to different histology laboratories as requested by the surgeons. The major service providers for histology include

Basildon NHS Trust

Barking and Hovering NHS Trust

CPS laboratories

Queens Hospital

Ipswich NHS Trust

Adenbrookes NHS Trust (TPP)

Independent histopathology laboratories (IHS)

Mid-Essex Service and NHS Trust

4.2 Consultant cover

All 3 sites have consultants who cover through the day and out of hours

The consultants provide with the following services:

- The provision of diagnostic advice to clinicians and general practitioners.
- The advice on validation of analyses and maintenance of standards by the use of selected internal and external quality assurance procedures.
- Alerting clinicians and GPs to matters concerning the prevention and containment of diseases for microbiology.
- To advise Clinicians and GPs on the appropriate pathological management of patients, including treatment and/or direct patient care as required.
- Acting as intermediary between clinician, GP and laboratory as required.

Consultant contact details

The consultants at Brentwood cover for both Brentwood and Cambridge for haematology and clinical chemistry. However Microbiology is covered by separate consultants. Ipswich has a completely different set of consultants. See list below:

Consultant	Site	Discipline	Contact Details
Dr Cervi	Brentwood and Cambridge	Haematology and Transfusion	0845 1553111 07959134725 Paul.cervi@southend.nhs.uk
Mr Whiting	Brentwood and Cambridge	Clinical Chemistry	012680524900 Ext 3025 Stphen.whiting@btuh.nhs.uk
Dr Edwards	Brentwood	Microbiology and infection prevention.	0845 1553111 07957283527 Justin.edwards@btuh.nhs.uk
Dr Klostas	Cambridge	Microbiology and infection prevention.	effrossyni.gkrania-klotsas@addenbrookes.nhs.uk
Dr Ademokun Dr Chalmers Dr Whalley	Ipswich	Haematology and Transfusion	Please contact Ipswich NHS Trust directly and ask for consultant on call on: 014730712233 Debo.Ademokun@ipswichhospital.nhs.uk; isobel.chalmers@btinternet.com; ioana.whalley@ipswichhospital.nhs.uk;
Dr Kent	Ipswich	Microbiology and infection prevention.	Please contact Ipswich NHS Trust directly and ask for consultant on call on: 014730712233 richard.kent@ipswichhospital.nhs.uk;
Dr Twomey	Ipswich	Clinical Chemistry	ptwomey@nhs.net

4.3 Staffing

All the Biomedical Scientists have multidisciplinary training and rotate between all sections; they also have responsibilities in specified areas. All are registered with the Health Professions Council. Continued Professional Development is undertaken.

Personnel records are kept within the department and within Human Resources. The hub is staffed with a total of 7 biomedical scientists (BMS), 9 Medical laboratory assistants (MLA), a Quality Manager (QM), a Deputy Manager (DM) and the Pathology Hub Manager (PM).

The Pathology Manager assumes the responsibility for the operations of the pathology department and is accountable to the Nuffield Health Regional Pathology Manager who reports directly to Nuffield Health Diagnostic Directorate.

NUFFIELD HEALTH BRENTWOOD HUB PATHOLOGY DEPARTMENT			
Name	**Hours Per Week**	**Title**	**Additional Roles**
Fadzai Marange	37.5	Pathology Hub Manager	
Maria Luck	30	Deputy Pathology Manager	Deputy Manager Training Officer
Claire Smith	25	Quality Manager	Quality Manager
Yemi Faseyi	37.5	Senior Biomedical Scientist	POCT Co-ordinator/ Chemistry Lead Brentwood
Georgina Long	30	Senior Biomedical Scientist	Haematology / BT Lead
Ragini Khurana	37.5	Senior Biomedical Scientist	Haematology lead
Nana Mohammed	37.5	Biomedical Scientist	
Khairya Ishag	37.5	Biomedical Scientist	
Sarah Harris	37.5	Specimen Reception Supervisor	Phlebotomist
Carole Nash	30	Senior Phlebotomist	Medical Laboratory Assistant/ Administration
Maggie Franklin	37.5	Phlebotomist	MLA
Alex Aiken	35	Phlebotomist	MLA
Lisa Penalver	22.5	MLA	Administration
Elisha Edwin	30	Phlebotomist	MLA

NUFFIELD HEALTH IPSWICH HOSPITAL – PATHOLOGY SPOKE SITE			
Name	**Hours Per Week**	**Title**	**Additional Roles**
Sophie Herritty	37.5	MLA	Lead MLA
Andrew Hewitt	37.5	MLA	H&S co-ordinator

NUFFIELD HEALTH CAMBRIDGE HOSPITAL – PATHOLOGY SPOKE SITE			
Name	**Hours Per Week**	**Title**	**Additional Roles**
Kim Hartley	37.5	Senior Biomedical Scientist	Chemistry Lead and H&S coordinator
Clare Parkinson	30	Biomedical Scientist	POCT coordinator
Valerie Burdon	37.5	MLA	

4.4 Out of hour's service

The on call service for Brentwood Hub is operated from Brentwood Hospital. Any urgent work from the spoke sites i.e. Cambridge and Ipswich are either done onsite via POCT or sent to the Local NHS Trust. Urgent samples for Nuffield Health Ipswich are processed at Ipswich NHS Trust while those at Cambridge are processed at Adenbrookes NHS Trust

The Brentwood laboratory provides an on call service outside of normal working hours, including weekends and bank holidays. See table of contact details and opening hours above.

- This includes all urgent tests and post and pre-operative investigations. Advice is available from the Biomedical Scientist on call; the Pathology Consultants are available by telephone.
- On call cover is on a rota basis. The Biomedical Scientist on call is available by mobile telephone, see below.

Typically the following tests will be available out of hours:

Haematology	**Clinical Chemistry**	**Blood Transfusion**
Full blood count	Renal profile	G&S
Film examination	Liver function tests	Cross matching
Coagulation screens	Bone profile	FFP issue
Malarial Parasites	Cardiac enzymes	Platelet issue
ESR	Uric Acid	
Sickle Cell Screen	CRP Amylase.	
	Blood gases	

Troponin T, Therapeutic drugs, D-dimers sent to respective local NHS Trusts.

4.5 Pathology contact details

Brentwood Hub Contact details Useful Contact Numbers:	All Sites	Hours of Business- All Sites
Hub Manager	07920822644	
Pathology - Brentwood	01277 695591	Mon – Fri 08:30 to 18:00 Sat 09:00 to 13:00
Pathology – Cambridge	01223 303336 Ext 1268	Mon – Fri 08:00 to 17:30
Pathology – Ipswich	01473 279100 Ext 344	Mon – Fri 09:00 to 17:00
Blood Transfusion – Direct Line	01277 695573	
Pathology Fax Number	01277 263899	
Brentwood Numbers		
Deputy Manager	01277 695665	
Specimen Reception	01277 695663	
Blood Tests	01277 695720	
Results	01277 695690	

Contact numbers for individuals on call are provided on the on call list and are kept in the Ward, theatre and reception on each site.

5.0 Quality Policy

Nuffield Health Pathology are committed to ensuring that all of their pathology laboratories provide a service of the highest quality and are aware of and take into consideration the needs, requirements and views of their users. In order to ensure that the needs and requirements of users are met, the laboratories will:

- Operate a quality management system to integrate the organisation, procedures, processes and resources and work to improve the service by a continuous and planned process of evaluation and review.

- Set quality objectives and plans in order to implement this quality policy with the aid of a named Quality Manager and the use of a defined document control system.

- Ensure that all personnel are familiar with this quality policy and procedures relevant to their work and the contents of the Quality Manual to ensure user satisfaction.

- Undertake an annual review of the laboratory Quality Management System and agree appropriate action plans which are formalised into an executive summary which is sent to CPA (UK) Ltd / UKAS and the Nuffield Health Pathology Integrated Governance Committee.

- Commit to the health, safety and welfare of their staff, and to comply with relevant environmental legislation.

- Ensure that visitors to the departments are treated with respect and that due consideration will be given to their safety and welfare while on site.

- Uphold professional values and commit to good professional practice and conduct, ensuring all disciplines are professionally directed by a suitably qualified Consultant Pathologist or Clinical Scientist.

The Pathology Laboratories will commit to continuing compliance with standards set by CPA (UK) LTD / UKAS, and ISO 15189 and the Blood Safety and Quality Regulations 2005 where applicable.

All laboratories are all committed to:

- The recruitment, induction, training, development and retention of staff at all levels to provide a full and effective service to their users.

- The proper procurement, validation, maintenance and cleaning of such equipment and other resources as are needed for the provision of the service.

- The maintenance of appropriate premises and environment to ensure a clean and safe working environment.

- The strict adherence to IT policies to ensure all data meets the data protection requirements of the Nuffield Hospitals Group.

- The collection, transport and handling of all specimens in such a way as to ensure the correct performance of laboratory examinations.

- The provision of a User Handbook that provides information on the scope and limitations of the service as well as the availability of clinical advice.

- The use of examination procedures that will ensure the highest achievable quality of all examinations performed.

- The timely, accurate and confidential reporting of results of examinations in a manner that maximises their clinical usefulness.
- The assessment of user satisfaction, in addition to internal audit and external quality assessment, as part of a process of continual quality improvement and will feed back all quality issues quarterly to the Pathology Integrated Governance Committee.

5.1 Data protection

Everyone has rights with regard to the way in which their personal data is handled. It is the duty of Nuffield Health to comply with Data Protection Act 1998 (DPA) regarding the data we collect, store, and process about our customers, suppliers and other third parties.
Lawful treatment of this data will maintain confidence in the organisation and will provide for successful business. The data protection policy is to be used as guidance to Nuffield Health employees with access to, and responsibilities for, processing data. It explains the principles that govern personal and sensitive data, while providing guidance on how the data can be used and how to comply with the legal requirement of storage and sharing data. Patient data will be collected for billing purposes as well as clinical relevant details.
All employees (and those engaged on business within Nuffield Health) are responsible for complying with this policy when processing personal data on behalf of
Nuffield Health. Any actual or suspected breach of the Data Protection Act must be reported via the Datix Risk Management System as an information security/breach of confidentiality incident. Breaches may result in disciplinary action.

All Managers are responsible for ensuring that staffs are made aware of this policy and that processing within their service/site/department is in line with this policy.

The Group Quality Assurance Director is responsible for coordinating data protection compliance across the organisation on behalf of the General Counsel and Company Secretary. Compliance is monitored through the Group Information Risk Expert Advisory
Group and reported through the Group Quality and Safety Committee, who are responsible for ensuring compliance on behalf of the Board Quality and Safety Committee.

The Group IT Chief Information Officer is responsible for ensuring that safe and secure systems and processes are in place within Group IT for the processing and storage of person identifiable data to ensure compliance to the Data Protection Act.

Hospitals and Wellbeing Boards – The Chief Nurse (Hospitals Board) and the
Wellbeing Medical Director (Wellbeing Board) hold specific responsibilities with regard to the processing of patient information and are consulted where key decisions are required to ensure fair and lawful processing.

5.2 Complaints policy

Complaints regarding the Pathology Service either by a clinician or patient are to be managed according to the Nuffield Hospital Concerns and Complaints Resolution procedure (CL 11). The procedure details the complaints process, stages of resolution and timescales for actions. All complaints should be handled in an open manner consistent with GOV 02 – Being Open Policy.

Complaints are held on the Datix system and these complaints are monitored by the Clinical Performance Managers within Nuffield Health. The Clinical Performance Manager for pathology feeds back summaries for complaints to the Pathology Integrated Governance Committee.

Records of complaints received by the laboratory are to be reported in the annual management review. In addition the monthly KPI requires disclosure of the number of complaints received by the laboratory.

6.0 Repertoire of tests for the Hub and special sample instructions

Blood samples received by 4pm will be processed within the times below, after this time they will be processed the following day.
All full blood counts will be processed on the same day up to 5pm.
Health screening tests and HDU requests for FBC and Chemistry are reported within 90 min.
BUPA Home Health Care to be reported within 2 hrs.
Hormone levels to be reported within 24H.
All urgent results to be authorised immediately after completion
Cambridge oncology samples to be completed within 1 hour

6.1 Important sample volumes to note

- The list below shows most commonly requested tests. More test information available in appendix
- A minimum of 3ml filled blood tube is required for haematology and coagulation tests. However for chemistry the routine and default tube to use is 5ml, where patient is difficult to bleed the smaller 3ml tubes may be used.
- For paediatrics ensure paediatrics vials are used to avoid collecting excessive volumes.

Test	Site Performed					
	Brentwood	Cambridge	Ipswich	Referred	Sample typ	TAT
Haematology						
FBC	✓	✓	✓		EDTA	24H
Film examination	✓	X	X		EDTA	24H
ESR	✓	✓	X		EDTA	24H
Reticulocyte count	✓	X	X		EDTA	24H
Glandular fever screen	✓	X	X		EDTA	24H
Sickle Cell Screen	✓	X	X		EDTA	24H
Malaria screening	✓	X	X		EDTA	24H
INR	✓	✓	✓		CITRATE	24H
APTT	✓	X	X		CITRATE	24H
PT	✓	X	X		CITRATE	24H
Blood Transfusion						
ABO and rhesus grouping	✓	X	X		EDTA	24H
Antibody screening	✓	X	X		EDTA	24H
Crossmatching	✓	X	X		EDTA	24H
FFP and Platelet concentrate issue	✓	X	X		EDTA	24H
Basic Antibody Identification	✓	X	X	✓	EDTA	24H/48H
Electronic issueing	✓	X	X	✓	EDTA	24H

Test	Site Performed					
	Brentwood	Cambridge	Ipswich	Referred	Sample type	TAT
Clinical Chemistry						
Renal profile	✓	✓	✓		SST	24H
Liver function tests	✓	✓	✓		SST	24H
Bone profile	✓	✓	✓		SST	24H
Lipid profile	✓	X	X		SST	24H
CK	✓	✓	✓		SST	24H
Troponin-T	X	X	X	✓	SST	24H
Glucose	✓	✓	✓		SST	24H
Uric acid	✓	✓	✓		SST	24H
Amylase	✓	✓	✓		SST	24H
Magnesium	✓	✓	✓		SST	24H
CRP	✓	✓	X		SST	24H
LDH	✓	✓	X		SST	24H
HBA1C	✓	X	X		SST	24H
TSH	✓	X	X		SST	24H
FT4	✓	X	X		SST	24H
FT3	✓	X	X		SST	24H
LH	✓	X	X		SST	24H
E2	✓	X	X		SST	24H
Progesterone	✓	X	X		SST	24H
Testesterone	✓	X	X		SST	24H
FSH	✓	X	X		SST	24H
HCG	✓	X	X		SST	24H
CA125	✓	X	X		SST	24H
CA153	✓	X	X		SST	24H
CA199	✓	X	X		SST	24H
PSA	✓	X	X		SST	24H
fPSA	✓	X	X		SST	24H
B12	X	X	X		SST	24H
Folate	X	X	X		SST	24H
Ferritin	X	X	X		SST	24H
Point of care (POCT)						
Haemocue HB	✓	✓	✓		WB	24H
Urinalysis	✓	✓	✓		Urine	24H
Cholesterol	✓	✓	✓		SST	24H
HDL	✓	✓	✓		WB	24H
Glucose	✓	✓	✓		WB	24H
HIV	✓	✓	✓		SST	24H
Blood Gases	✓	✓	✓		WB	24H
INR	✓	✓	✓		WB	24H
Renal profile	✓	✓	✓		SST	24H
Lipid profile	✓	✓	✓		SST	24H
Bone profile	✓	✓	✓		SST	24H
LFT	✓	✓	✓		SST	24H

WB - whole blood
SST - gold top
EDTA - purple top
Citrate- light blue top

6.2 Referred tests

- Specimens for tests not performed on-site are referred to external providers whose standards have been assessed and have achieved an appropriate level of quality. Normally CPA (UK) Ltd. accreditation is accepted as appropriate.
- Every effort is made to refer specimens to other Nuffield Hospital Laboratories.
- Service level agreements are raised and External Quality Assessment reports are forwarded along with CPA status.
- Turnaround times are regularly audited and documented.
- The data management of all referred samples is automatically updated on the computer system. Referred results are checked on return and reference ranges compared to our records
- A full catalogue of test repertoire is in the appendix.

7.0 Pre-analytical procedures

7.1 Pre-admission special instructions

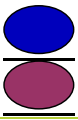
- All blood samples for group and save to be within the laboratory at least 48h before procedure. This is to allow room for antibody identification at a referral laboratory in the event the antibodies could not be identified locally.
- All patients must have an active group and save result. This means a group and save should be done within 28 days of the procedure if the patient does not have known antibodies and within 72h if the patient has known antibodies.
- All MRSA samples for group and save to be within the laboratory at least 48h before procedure. This will allow delays due to distance the samples must travel to Guildford in case they failed to go on the transport for the day.
- All group and save samples to be labelled using Bars print outs.
- If manual labelling is used, please send two separate samples on separate forms bled by 2 individuals at least 20 min apart to ensure we can confirm patient ID.
- Cambridge and Brentwood currently using one group and save sample, patient confirmation done using reverse grouping. Patient ID is secure. The positive identification of patient using Bars procedures ensures the correct patient sample is collected.

  Important
- Ipswich Hospital has opted out of the one sample and follows the two sample rule. In the event a second sample cannot be provided, the clinical team must phone pathology so blood can be released on one sample.

7.2 Specimen collection and handling - sample requirements

It is very important that when samples are collected contamination is avoided. Contamination results in interference with several tests causing unnecessary delays with the patient results. Listed below are the colours of the specimen requirements and order of collection if more

than one tube is required in order to minimise contamination.

Order	Test(s)	Colour	Type	Special Instructions
FIRST	Blood Culture		Aerobic Anaerobic	Aerobic followed by anaerobic
	INR, APTT, D-Dimer		Sodium Citrate 3.2%	Ensure correct fill volume (to line) Mix gently by inversion 3-4 times
	ESR		Seditainer Sodium Citrate	
	Chemistry Tests		SST (Gel)	Invert 5-6 times
	Trace Metals		Trace Element Serum	Invert 5-6 times
	POCT Chemistry Tests (URGENT – U&E, Ca^{++} only)		Lithium Heparin	Mix gently by inversion 8-10 times
	Full Blood Count, ESR, Blood Film, Reticulocytes		EDTA	Mix gently by inversion 8-10 times
	Group & Save, Crossmatch, Direct Coombs Test.		7ml EDTA	Mix gently by inversion 8-10 times
LAST	Glucose (if delay in testing), Alcohol		Fluoride Oxalate	Mix gently by inversion 8-10 times

Blood collection tips

- All tubes must be filled to the line and must be mixed gently but thoroughly soon after collection.
- For the citrate tube it is more critical that this tube be filled to the line to ensure the correct ratio of blood and anticoagulant (9:1) respectively.
- The gold top must always be collected first to avoid contamination, in the event of an error: DO NOT TIP sample back into the yellow top. This causes contamination leading to spurious results on a number of chemistry tests.
- Where multiple tests are required please provide at least 2 yellow top tubes.

Trained Phlebotomists take specimens in the outpatient department, following approved methods. The Resident Medical Officer (RMO) performs the phlebotomy on the wards and Anaesthetists in the theatres. All specimens are placed in individual sealable plastic bags. The specimens are transported in designated closed boxes (UN3373 compliant). Stocks of blood tubes, needles, blood culture bottles, microbiology swabs and containers for histology and microbiology specimens are held in stores, the pathology laboratory and individual departments.

7.3 Interferences

Please note that there are a number of factors that interfere with some sample analysis therefore precaution must be taken to ensure sample integrity to avoid unnecessary delays. Below is a list of inferences and this list are not limited to:

- Haemolysis (caused by a tight tourniquet)
- Tourniquet also falsely elevates calcium (always remove tourniquet when bleeding.
- Under filled citrate (9:1 ratio of blood to anticoagulant), under filled samples cannot be used for analysis as they give erroneous results.
- EDTA contamination causing problems with potassium, calcium, magnesium and ALP (caused by tipping samples from an EDTA to a plain tube). Avoid tipping samples from one tube to another.
- Sodium oxalate affects sodium concentration. Do not use the grey top tube for normal chemistry tests.
- Collection of sample from a drip arm (cannulated arm) dilutes samples giving falsely low results or falsely elevated glucose levels. Collect samples from an un-cannulated arm.

- Always use the designated commercial urine containers, using any other container may introduce contaminants that result in interference.

7.4 Request form

Any sample sent to pathology must be accompanied by a sufficiently completed request form with a legible writing.
The following are requirements to complete on a request form:-

- Patient surname and forename(s)
- Patient address
- Gender
- Date of birth
- Hospital number
- Date and time of collection
- Name of requesting doctor and person collecting sample
- Source of sample (ward)
- Sample collection time
- Clinical details
- For Blood Transfusion, the Signature of Medical Officer/Clinician

Additional specific information is required for **Blood Transfusion** requests:

- Has the patient been transfused in the previous 3 months?
- Is the patient pregnant?
- Full details of blood component requirements, reason for request and date/time required.
- If the patient has known antibody to add an extra blood bottle and indicate on the form.

Requests not complying with these requirements will be returned to the request source or may be rejected

Printed labels **may only** be used on Nuffield Health request forms either when printed from the BARS (Blood Audit & Release System) identification system. Patient addressograph labels derived from Hospital systems containing full patient details are also acceptable.

Any additional tests required must be done on a laboratory request form and sent to pathology. A list of tests that can be added and time limits are listed in the appendix.

7.5 Patient Preparation for sample collection

All patients must consent to have their blood taken as they undergo the pre-admission processes. Blood will only be collected on patients with a blood request form. Therefore a correctly completed request form shows that a patient has understood the explanation of clinical procedures to be performed and consented to them (includes consent to disclose clinical information and family history if required). Patients in a hospital bed must agree to have their blood taken, in an emergency samples may be collected from the patients in the interest of their safety.

The Bars system is used to collect patient samples. This system is secure to ensure the correct blood samples are collected from the patient. A patient is positively identified by asking them to confirm their name and date of birth. The information given by the patient is crossed checked against their 3D Bars label on the form. Then the patient is bled according the SOP BR- PATH E3 SR1.02.
All clinical waste used in sample collection must be disposed of correctly in the provided clinical waste bins or sharps bins depending on the waste.

7.5.1 Collection of mid-stream urine (MSU)

Mid-stream samples must always be collected in a STERILE container.

- Provide the patient with a suitable sterile container e.g. 30 mL Universal Container.
- The first part of the urine passed should be discarded to the toilet; the middle part of the sample should be put directly into the sterile container. The last part of the voiding again goes into the toilet.
- The patient details should be written directly onto the label on the universal container.

7.5.2 Collection of other urine specimens

- For Bence Jones protein (BJP), an early morning urine sample should be provided, into a non-additive container.

- For Urine Cytology, the second sample of the day should be collected into a suitable container. Three samples should be collected over three consecutive days. Ideally each sample should be brought to the laboratory on the day of collection. If not, the sample should be stored at 4 °C.

- For TB, the first sample of the day should be collected for three consecutive days.

7.5.3 Collection of 24 hour urine samples

- At a suitable time in the morning, empty bladder into the toilet as normal. Note the time.

- All urine passed for the next 24 hours should be collected, taking care not to spill any. A jug is a convenient receptacle for initial collection, it must be clean, but need not be sterile, and all urine should be transferred into the container.

- Pass a final specimen at the same time the following morning. This specimen should also be collected and transferred into the container provided. Note the time.

- If this is a 24-hour test also requiring a blood sample (e.g. Creatinine Clearance), then arrange for the patient to attend the Pathology Laboratory or Outpatient Department for the blood test during the urine collection period.

- The patient must be warned of the health risks of any preservative present in the container.

Preservatives required for 24-hour urine samples

Test	Preservative
Aldosterone	24 hr in 50ml of 1N HCL
Calcium	24 hr in 50ml of 1N HCL
Catecholamines, total	24 hr in 50ml of 1N HCL
Copper	24 hr, no preservative
Cortisol, free	24 hr, no preservative
Creatinine clearance	24 hr, no preservative
Culture for acid fast bacilli	3 x 30 ml early morning urine no preservative
Haemoglobin, free	10 mL random urine
Hemosiderin	25 mL random urine
Hippuric acid	24 hr, no preservative
5-HIAA	24 hr in 50ml of 1N HCL (48 hours prior to and during collection the patient should avoid intake of: aubergine, avocados, banana, chocolate, kiwi fruit, pineapple, plums, nuts & tomatoes)
Oxalate	24 hr, no preservative
Porphyrin	Random urine, keep in the dark
Potassium	24 hr, no preservative
Pregnancy test	10 mL early morning urine
Protein, total	24 hr, no preservative
Metanephrines	24 hr with 25Ml 1N HCL
Sodium	24 hr, no preservative
Urea	24 hr, no preservative
Vanillylmandelic acid (VMA)	24 hr with 25 mL 1N HC1

(48 hours prior to and during collection the patient should avoid intake of custard powder, ice cream, vanilla essence *e.g.* cakes, chocolate, packet puddings, bananas and excessive amounts of tea & coffee)

7.5.4 Collection of faecal samples

- The patient should have been provided with a blue sterile container that has a spoon attachment to the lid. Using this, a portion of the faeces sample collected should be placed into the sterile container.
- Label the container with the patient name, hospital number, date of birth and date of sample.

7.5.5 Collection of blood cultures

- Thoroughly clean the area of the arm from which blood is to be taken with a medi-swab to reduce surface contamination.
- Using approved phlebotomy techniques collect 15 - 20 mL of venous blood. Blood should be taken directly from a vein if possible, avoid sampling via venflons etc. as they can become colonised by skin flora.
- Carefully lift the transparent caps from the blood culture bottles and swab the rubber stopper of each with a separate medi-swab.
- Change the needle on the syringe (dispose of in a sharps bin) and inject 7-10mL blood into the first bottle.
- Change the needle again and inject the remaining 7-10mLs of blood into the second bottle and replace the transparent caps.
- Label the bottles with the patient's name, date of birth and hospital number.
- Take the bottles immediately to the Pathology department and place in the 37°C incubator in the microbiology laboratory. The key for the door lock has been given to the Nurse base and reception.

7.5.6 Oral glucose tolerance test (GTT)

The GTT is a provocation test to examine the efficiency of the body to metabolise glucose. The GTT distinguishes metabolically healthy individuals from people with impaired glucose tolerance and those with diabetes. The GTT is more sensitive than fasting plasma glucose (FPG) for the diagnosis of diabetes. Nevertheless the final diagnosis of diabetes should not be based on a single 2 h post-load glucose ≥11.1 mmol/L but should be confirmed in subsequent days (FPG and/or casual glucose estimation).
The GTT is not used for the monitoring of day to day blood glucose control, which is done by HbA1c-, and repeated glucose measurement. The GTT is used mainly for diagnosis of IFG

(impaired fasting glucose), IGT (impaired glucose tolerance), GDM (gestational diabetes mellitus) and in certain studies with patients, but is not recommended or necessary for routine diagnostic use.

Preparation of the patient

- Three days unrestricted,
- Carbohydrate rich diet and activity.
- No medication on the day of the test following an 8 to 14 h fast. No smoking.

Glucose load

- Adult's 75 g anhydrous glucose in 300 – 400 mL of water.
- Children: 1.75 g/Kg up to 75 g glucose

Solutions containing glucose and oligosaccharides are commercially available, see Pharmacy.

Plasma glucose sampling

- Collect a fasting grey top blood sample 10 min before glucose load and wait for a result from pathology before continuing with the test.
- Give Glucose load
- 120 min after glucose load collect a grey top blood sample

Urine glucose can be additionally measured in case of hyperglycaemia.

Evaluation

	Fasting plasma glucose	**120 min glucose**
IFG	6.1-6.9 mmol/L	
IGT	≤7.0 mmol/L	7.8-11.0 mmol/L
Diabetes	≥7.0 mmol/L	≥11.1 mmol/L

These values only apply to venous plasma glucose.

7.5.7 Synacthen stimulation test (short Synacthen test)

This is performed for the investigation of adrenal insufficiency

- This test should be carried out by the RMO or Consultant in the morning due to diurnal variation of Cortisol
- Patient should be rested but fasting is not necessary
- Collect a blood sample into a Red topped bottle for Cortisol
- Dissolve 250 µg of Synacthen in 1 ml of sterile water or isotonic saline
- Administer intramuscularly into the deltoid
- After 30 minutes collect a second Red topped blood sample for Cortisol

7.5.8 Long Synacthen test

- As above
- After 60 minutes collect a third Red topped blood sample for Cortisol

7.6 Histology and cytology sample collection and handling

- Various sized containers with neutral buffered formaldehyde 10% v/v (formalin) for histology samples can be collected from the laboratory at Brentwood, Ipswich and Cambridge.

COSHH

All prefilled specimen pots supplied by the department are filled with 10% formalin fixative. Formaldehyde is classified as an IRRITANT and should not come into contact with Skin or eyes. If there is accidental spillage, wash the affected area with soap and water.
There are formalin spillage kits that should be used to absorb formalin spillage on the working surfaces or the floor.

- Cervical smears for cytology should be spray fixed using cytology fixative or the correct liquid based collection system used and labelled with the patient's full identification. The slide or pot must then be placed in a slide box or suitable container ready for transport to the laboratory.

- Body fluids for cytology must be fresh samples.

- Samples for Immunofluorescence staining should not be put into formalin, and must be brought directly to the laboratory, as they must be frozen immediately upon receipt.

7.61 Routine specimens

Specimens should be sent in a formalin fixative container of sufficient size. There should be at least three times the amount of formalin to sample size. If both Histology and Microbiology are required the sample should be sent in a dry sterile container accompanied by the appropriate request form duly completed.

7.6.2 Cervical smear specimens

Specimens should be sent to the Laboratory accompanied by a fully completed request form. Cervical cytology should have a Nuffield Hospital cervical cytology request form.

Request forms must contain the following essential information:
- Surname and forename
- Hospital Number
- Date of Birth
- Clinical details
- Nature of specimen
- Name of requesting clinician

Each specimen container and microscope slide must be labelled with:

- The name of the patient
- Date of birth
- Hospital number

If the information on the request form, microscope slide and/or specimen is incomplete or inconsistent, the specimen WILL NOT be examined but returned to the sender.

7.6.3 Non gynaecology cytology

- Ascitic fluid
- Pleural fluid
- Peritoneal fluid.
- Peritoneal washings
- Thyroid fluid.
- Cysts fluids
- Urine Cytology.
- Fine needle aspirates.

7.7 Therapeutic drug monitoring samples

The most common requests for therapeutic drug monitoring are for monitoring levels of Vancomycin and Gentamicin. Other drugs can be monitored on request, after discussion with the laboratory.

Samples for drug assays should be taken into a Red bottle/Gold bottle.

7.7.1 Vancomycin

Levels should be taken immediately prior to a dose (pre-dose) and 1 hour after the dose has been given (post-dose).

7.7.2 Gentamicin

Levels should be taken immediately prior to a dose (pre-dose) and 1 hour after the dose has been given (post-dose).

7.7.3 Gentamicin once a day (extended interval)

Levels should be taken 18 hours after the dose is given.

Always seek advice from the respective microbiology consultant:
Brentwood - Dr Edwards
Ipswich - Dr Kent
Cambridge - Dr Eklostoas

All requests for therapeutic drug assays should state on the request form if the sample is the trough (pre-dose), peak (post-dose) or extended interval Gentamicin sample and time of sample collection and last dose. All tests are to be sent to the local NHS Trust.

7.8 Transfusion processes and specimen handling

Patients undergoing elective surgery require a 'Group & Save' to establish their ABO/RhD blood group and check for plasma antibodies.
Accurate testing ensures any blood components transfused are compatible. ABO incompatibilities can cause fatal acute haemolytic reactions. Rhesus incompatibilities or atypical antibodies can cause mild to severe/life threatening reactions.

Each stage of the blood transfusion process, from correct sample labelling through to component transfusion must therefore be carefully controlled to minimise risk.
The Blood Audit and Release system tracks the movement and storage of blood components from delivery to final fate ensuring full traceability. Access to the electronically locked fridges, for loading or removal of packs, is controlled via barcode technology preventing unauthorised access and incorrect product removal. When the correct product is obtained from the fridge the information is automatically loaded into a portable BARS (pBARS) hand-held scanner. This is used at the bedside to verify patient identity via a 2D wristband barcode before transfusion can commence.

Electronic Issue

Electronic issue (EI) is the provision of blood components based on a computerised compatibility check instead of being serologically 'crossmatched'. A patient will be authorised for EI only if the following criteria are met:

- **2 identical blood groups on record (current and historical)**
- **Negative antibody screen**
- **No history of antibodies or special requirements**

Any patient unsuitable for EI must have blood crossmatched as required to cover surgery.

The '2 Sample Rule'

To permit EI a patient must have both a current and historical blood group and negative antibody screen on record (as defined by National guidelines).
If no previous history of blood transfusion testing within the Nuffield group exists it is necessary to either obtain 2 G&S samples taken on different dates or by different staff, or following risk assessment the same sample is tested twice. This is to minimise the risk of mislabelled samples and wrong blood in tube errors. If in doubt contact the laboratory for advice.

Sample Timings

Provided a patient is not pregnant and has not been transfused within the past 3 months then the current sample may be tested up to 28 days prior to admission, otherwise the timings for sample collection prior to transfusion are:

Previously transfused within	Current sample
< 3 months	< 72 hours
14-28 days	< 72 hours
3-14 days	< 72 hours
< 3 days	not required
If pregnant the current sample must be < 72 hours	

Atypical Antibodies

A positive antibody screen requires further investigation to identify the specific antibody(s) present. Further samples may be necessary for referral to the National Blood Service to allow provision of compatible blood components.
Testing and serological cross-matching takes time so it is vital that repeat samples are taken sufficiently in advance, ideally 3-7 working days prior to admission, to avoid delaying surgery.

Sample Requirements

- All samples must be identified using the surname, forenames, sex, date of birth, and Hospital number of the patient.
- The blood samples must be accompanied by a transfusion request form, and the information on this form MUST be identical to that on the sample tube. There are a series of questions on this form that MUST be filled in. Please also ask the patient if they carry an antibody alert card.
- The request form should also state the time and date when the blood is required, and give details of previous pregnancies and history of blood transfusions. It must also state the reason for the request.
- In an emergency the time usually taken for crossmatching may need to be reduced and in cases of extreme urgency where there is no time for crossmatching, blood will be issued as group confirmed only and will be labelled as such.
- Fresh Frozen Plasma (FFP) and cryoprecipitate, and platelet concentrates have to be obtained

from The National Blood Service, not kept on site.
- For the Nuffield Hospital at Cambridge and Ipswich FFP may need to be provided by the NHS Trust Hospital.
- The laboratory is not involved with the issue of Human Albumin Solution.

Procedure at time of Phlebotomy

- Where possible ask the patients to identify themselves verbally. For inpatients check this information against the wristband.
- Check that the blood transfusion request form has been filled in correctly.
- Ensure that the form contains the following:
    - Patients full surname and forenames
    - Date of birth
    - Hospital number
    - Address
    - Requesting Clinicians name
    - Source
    - Specific details of request; group and save, crossmatch, number of units required, date and time required, blood product required.
    - Signature of the Clinician and or the Phlebotomist.
    - ALL relevant history in the boxes provided, including blood group and atypical antibodies if known.
- Immediately, fully label the tube whilst still with the patient.
- Pre-printed labels will not be accepted on transfusion specimens

7.9 Handling high risk samples

All patient samples must be treated as if they were high risk at all times. If a patient is known to be of high risk i.e. positive for BBVs it is the responsibility of the person who requests laboratory investigations to label the form and sample with “High Risk” stickers, to indicate a high risk specimen. Protective personal equipment (PPE) shall be worn at all times when handling samples.

7.9.1 Procedure for handling known high risk samples

- Wear disposable gloves at all times.
- Label all samples and accompanying request forms with “High Risk” stickers and full patient and specimen details. The request form should also include information to enable identification of the risk.

- These include specimens from “at risk groups” for blood borne viruses (e.g. HIV, Hepatitis B & C), suspected TB, Brucellosis, Typhoid or CJD
- Place samples in a bag labelled “High Risk” and seal.
- Transport directly to the laboratory in the specimen transport boxes provided.

- Below is a list of most common high risk samples

Contaminant Name	Category
Brucella spp.	3
Salmonella typhi and paratyphi	3*
Mycobacterium tuberculosis	3
Hepatitis A	2
Hepatitis B, C and D	3*
Herpes virus Varicella-Zoster	2
Cytomegalovirus	2
Measles	2
Mumps	2
Rubella	2
Human parvovirus (B19)	2
Coxsackieviruses	2
Rhinoviruses	2
Human Immunodeficiency Virus (HIV)	3*
Human T-cell Lymphotrophic viruses (HTLV)	3*
Rabies	3
Bovine Spongiform Encephalopathy (BSE)	3
(Variant) Creutzfeld-Jakob Disease (CJD)	3
Leishmania spp.	2
except, Leishmania braziliensis and donovani	3*
Plasmodium spp.	2
except, Plasmodium falciparum	3*
Trypanosoma brucei brucei	2
Trypanosoma brucei gambiensie	2
Trypanosoma brucei cruzi	3
Trypanosoma brucei rhodesiense	3*
Wuchereria bancrofti	2
Aspergillus fumigatus	2
Candida spp.	2
Hendra (formally equine mobillivirus)	4
Herpesvirus simiae (B virus)	4
Russian Spring Summer Encephalitis	4
Ebola spp.	4
Crimean/Congo Haemorrhagic Fever	4
Lassa fever	4

7.10 Specimen transportation to the laboratory

The safe transport of pathology samples within a hospital is important, and we must ensure:
- That hospital personnel, patients and visitors are not put at risk of infection.
- That the integrity of the specimen is maintained.

7.10.1 Equipment

- Sealable and durable transport box for the transportation of the specimens.
- Sealable, leak proof plastic specimen bag with outer pocket for request form.

7.10.2 Procedure

During normal hours

- Once a specimen has been taken and labelled with the patient name, hospital number, date of birth, date and time of sample and signature of the phlebotomist, place it inside a plastic specimen bag and seal it. Place the completed and signed request form in the outer pocket of the bag.

- Place the specimen bag in the box for transporting specimens and close it. Take the container to the laboratory with minimal delay.

- Hand the sealed container into the laboratory specimen reception and the laboratory staff will unpack and remove the specimen.

- If a specimen leaks or if a specimen is dropped and broken do not try to clear it up. Contact the laboratory for help and ask for it to be made safe.

- Always wash your hands after transporting specimens to the laboratory.

All blood and bodily samples must be considered to be potentially infectious.

7.10.3 Urgent specimens

Urgent specimens requiring results for immediate management of the patient should be hand delivered to the Laboratory and the degree of urgency communicated to Laboratory Staff.

Out of Hours

- When the laboratory is closed, place any non-urgent samples in the designated refrigerator in outpatients. **All red topped/ gold top bottles must be centrifuged prior to storage as per local protocol.**

- The on-call Biomedical Scientist must be contacted to deal with urgent samples or any sample that requires immediate separation.

7.10.4 Information for porters

When on duty to transport laboratory samples, ensure the following is done:-

- Cover any cuts or grazes on your hands with a waterproof dressing.

- Handle all specimens gently to avoid breakage.
- Carry all specimens in the boxes provided, not in hands or in pockets.
- If you do touch a specimen in error wash your hands immediately.
- If a specimen leaks into the box tell the laboratory reception staff and ask them to make it safe.
- If you drop and break a specimen do not touch it or clear up the spillage. Send someone to the laboratory for help.
- Never take specimens or the specimen transport box into the restroom or canteen.
- Never eat, drink, or smoke when you are carrying specimens, or when you are in any laboratory.
- If you cut yourself or have an accident, however small, tell the Laboratory Manager and enter it in the Accident Register.
- If you become ill inform your doctor of your place of work, so that your doctor can take this into account.
- Always wash your hands after handling specimens, before meal breaks and at the end of your shift.

7.11 Spillage procedures

7.11.1 Blood and Body Fluid spillages

- A risk assessment should be taken prior to using chlorine on carpets.
- Any person can clean a blood spill, provided they have been trained in the following procedure.

1. Disposable gloves and a plastic apron should be worn.
2. Dissolve an Acticlor 1.7g tablet in 100mL water to give a 1% hypochlorite solution (10, 000 ppm). It is recommended that the Acticlor bottle is used for Health and Safety reasons. Alternatively, sprinkle hypochlorite granules* liberally over the spillage, ensuring complete coverage. Leave for at least two minutes. **Do not leave unattended.**
3. Using paper towels or a scoop, place debris into yellow clinical waste bags.
4. Remove remaining powder with a damp paper towel and place into yellow clinical waste bag.
5. Wipe area with detergent and hot water.
6. Place all disposable equipment (e.g. gloves and apron) into a yellow clinical waste bag.
7. Wash hands.

*NOTES Chlorine gas may be generated when hypochlorite's are used (particularly with granules), they should only be used in well ventilated areas, and not by patients.

Avoid use on acids, e.g. Urine spills
Chlorine containing products may bleach colour from carpets and upholstery.

7.12 Needle stick injury

In the event of a needle stick injury, eye splash, or any sharp injury or inoculation please follow the instructions on the flow chart in your clinical area.
Flowcharts detailing the action to be taken in the event of a needlestick, eye-splash, sharps or other inoculation injury are displayed in all clinical areas, and should be the first point of reference in an accident of this kind.
The most important actions to be taken are:

Make the puncture bleed by squeezing the finger or area pricked –

Wash injury copiously with water and surgical scrub Solution or soap
(Wash eye splashes well with eye wash from the first aid station)

Contact the Resident Medical Officer for advice.

The sharps injury risk assessment form should then be completed, which will help you assess the risk of infection and guide you through the procedure following the injury, including if it is necessary to take blood samples from either yourself or the source patient. The injury should be reported on DATIX.

All patients are assessed for their risk of carrying blood-borne viruses at pre-assessment clinic. This should aid the initial risk assessment if an injury occurs, and saves time if the donor patient is under general anaesthetic.

If the risk assessment suggests that there may be a risk of infection from a blood borne virus, you may be referred to the Accident and Emergency Department at the local NHS. This should be done as quickly as possible, preferably within one hour of the injury occurring.

7.12.1 Pathology testing

The Pathology Laboratory can arrange relevant testing of both the donor blood (for HIV 1 and 2, Hepatitis B and Hepatitis C), and recipient blood (for Hepatitis B immunity levels) at the Nuffield Hospital Warwick. This is not normally undertaken out of hours unless previously agreed with the Consultant Microbiologist. A point of care test can be used for a provisional result for HIV on the patient.

Patients MUST be counselled as to the consequences of having HIV and Hepatitis testing, and a note recording that the patient has been counselled should be written on the microbiology request form that is sent to the laboratory. Specimens cannot be processed without this information.

Blood samples should be taken in a Red tube, and properly labelled. The microbiology form should be completed with the details of the person bled, and it must be made clear on the request forms

that this is a needle stick injury, which person is the donor, and which is the recipient of the injury.

7.12.2 Counselling for inoculation injuries and blood borne virus testing

Please refer to the Nuffield Hospitals Policy and Standard Operating Procedures for testing patients for Blood Borne Virus following an inoculation injury.

All patients must be properly counselled to ensure that they understand the implications of a positive blood-borne virus test. They must give informed consent to have blood taken for testing.

The member of staff who has received the injury should not be involved in the process of counselling the donor.

7.12.3 Availability of results

Results of blood testing, when available will be communicated to the involved parties ONLY in the following ways:-

Patient (donor) results will be communicated to the patient by the Consultant in charge of their care, or the RMO.
Staff (recipient) will be informed of the results of their blood testing and the donor blood testing only by the Occupational Health nurse, or other person designated by the Occupational Health nurse.

7.13 Delivery of samples out of hours

7.13.1 Cambridge

Non-urgent samples taken out of normal working hours can be placed in the specimens' refrigerator in the outpatients department.

7.12.2 Ipswich

Non-urgent samples taken out of normal working hours can be placed in the refrigerator outside theatres or sample fridge in pathology.

7.12.3 Brentwood

Non-urgent samples taken out of normal working hours should be placed in the specimens fridge located in the fridge room within pathology. The code is provided to the RMO.

Blood cultures must be kept at room temperature and placed in the laboratory reception areas.

Histological samples should be placed in the relevant collection box in theatres and entered into the correct specimen log and left until normal working hours (unless refrigeration needed when they must be stored locally *e.g.* aspirates).

IF IN DOUBT please contact the on-call duty Biomedical Scientist for advice, as samples stored incorrectly may not be suitable for processing. Contact the on-call Biomedical Scientist if samples are urgent

8.0 Analytical and processing stages of samples (examination)

8.1 Sample reception

Upon receiving any samples, scan the sample form on the date and time stamp and ensure you double check patient details on the form and the sample.
These are expected to match and any discrepancy will result in sample rejection.
Pathology staff must register the sample in Winpath and dot the requested test out. They must call the requester and inform them of the sample unsuitability and record the details of the call on the note pad in Winpath.

On arrival in the laboratory all samples checked to ensure that: –

- The specimen is adequately labelled to provide unique identification.
- The patient details on the request form and specimens are identical.
- The specimen is in the correct container and is suitable for testing.
- Any high-risk samples are adequately labelled and identified.
- Any urgent samples are identified and fast tracked to processing.

8.2 Sample rejection

Samples may be rejected by the laboratory if: –

- They are received in an incorrect container.
- Inadequate essential information.
- The sample is not suitable for testing e.g. if an EDTA sample is clotted.
- Specimen is grossly haemolysed.
- They are high risk samples, and not properly labelled.
- Inadequately labelled
- Mismatched patient details on sample against the patient form

All suitable samples are registered in Winpath and passed to the BMSs for processing. Samples are processed in the respective areas and validated and authorised by suitably qualified BMSs.

8.2.1 Critical/precious samples exceptions

Precious samples such as histology biopsies, CSF and any sample with a time factor implication may be accepted if it does not fit the acceptance criteria. However the requester must be notified and all results must be accompanied with a comment related to the discrepancy; an additional comment to interpret the result with caution should be added to the final result. The requester must be called in to sign on the form that they satisfy the origin of the sample.

8.2.2 Handling high risk samples in the laboratory

Always wear a fastened laboratory coat and disposable gloves at all times.

Label all samples and accompanying request forms with “High Risk” labels. Any samples which arrive in the laboratory that are considered to be high risk and are not labelled as such must be labelled on receipt prior to any testing.

On receipt in the laboratory, keep the specimens separate from the routine work. Specimens that require centrifugation are to be spun independently of other samples. Centrifuge bucket lids must always be used. Staff members must be alerted to the presence of a high risk sample.

Samples should be transported to the relevant section of the laboratory sealed in two specimen bags (double bagged).

Immediately following handling of any high risk specimens, all the benches must be swabbed with Trigene and all instruments decontaminated following processing.

8.3 Blood transfusion processes

Once samples have been group and saved, they are authorized in Winpath and blood is made available to patience according to requirements on the MSBOS. A blood authorisation list is processed and faxed to respective hospitals at the end of day for the following day. Once a patient has been authorised their blood is available to be taken out by clinical staff using Bars.

8.3.1 Blood Stocks

With EI a blood unit is only allocated to a specific patient when blood removal is requested at the BARS box and the patient's details are scanned. Thus a single unit of blood in stock may be 'available' to multiple patients at any one time. As units are used they can be quickly replaced with blood from either the Hub laboratory, National Blood or through local NHS Trust agreement as appropriate.

Blood requirements and stock levels are assessed daily in relation to requests received and weekly theatre lists. Units of group compatible blood will be made available in accordance with the local maximum surgical blood ordering schedule (MSBOS) Each fridge contains at least two group O RhD negative units for ‘emergency issue’. These can be used in any urgent clinical situation where there is not time to provide group compatible or cross-matched blood.

Late admissions/alterations to theatre lists or any returns to theatre must be communicated to Hub pathology staff as soon as possible to ensure adequate blood cover. In the event of unforeseen blood requirements the emergency units are available at all times until additional blood stocks can be provided.

8.3.2 Other Components

Platelets, Fresh Frozen Plasma (FFP) and other non-standard components can be supplied on demand provided there is a current blood group on record. Requests must be authorised by the Consultant Haematologist. Such items may be supplied by the National Blood or through local NHS Trust agreement and may take up to 2 hours for processing and issue. Anticipated requests must therefore be communicated to the Hub laboratory as far in advance as possible.

Procedure on receipt of request for blood products by telephone

Telephoned transfusion requests can only be accepted if:

- The laboratory has already received a valid sample and request form for a group and save or crossmatch sample from that patient.
- A Clinician, or their designated representative, must make the request.
- The full details of the name of the requesting person, their status, time and date of request must be clearly stated and the laboratory will record this on the original request form. This will be signed by the person receiving the call.
- The urgency of the test must be made clear.

8.4 BLOOD TRANSFUSION REQUESTING

8.4.1 Routine Requesting of Blood

This happens when a patient's haemoglobin is gradually deteriorating after surgery. A consultant must authorise the need of a transfusion and the HB of the patient must be checked. If HB has dropped below 80 g/L the clinical team can call pathology to notify them of the need to transfuse a patient. If a Group and Save has already been sent to the Laboratory and it is no more than 28 days old, this can be used to provide units for Transfusion by telephoning the Blood Transfusion section on ext. 5753 (01277 695753). The staff there will ask for the following details:

- Patients Surname and Forenames
- Date of Birth
- Hospital Number
- Name of person making the request
- Number of units required
- When the blood is required along with the TRUE level of urgency

Please have all these details ready before calling as NO request will be accepted without them, however urgent.

Use Bars to release the packs required. The Bars system will release the available units as required. However sometime the group specific blood may not be available immediately and must be ordered from the Transfusion centre there will be an additional time delay.

Units of blood which have been electronically issued (EI) to patients will be available for 72 hours in the Theatres Blood bank and will be released back to the main blood bank if not used within this time.

Once a unit of blood has been removed from the blood bank and has remained at room temperature for longer than 30 minutes the blood bag must be clearly marked "UNFIT FOR TRANSFUSION" and returned to the laboratory without delay.

A Blood pack tag must be filled out and attached to the unit.

Always return used Blood Packs to the Laboratory after transfusion to ensure the traceability of blood and this ensure we close the cycle of transfusion i.e. the journey of the blood unit from start to end.

Domestic Refrigerators are NOT suitable for blood storage.

8.4.2 Emergency requesting of Blood

Blood may be needed in an emergency either because there is an unexpected major bleed that is over and above the units of blood that have already been made available, or that no Group and Save has been previously requested. The action to take will differ depending on the level of emergency and the site concerned.

8.4.3 Severe loss of blood – major life saving emergency

There are at least 2 units of O negative "Flying Squad blood available at all sites and these can be used in situations where there is insufficient time to provide compatible, group specific blood. This blood is safe to use in all cases where there is a known negative antibody screen, but can be unsuitable if a patient has abnormal red cell antibodies – this is why a Group and Save is very important to be collected at pre-admission at the appropriate time. The decision to use Flying Squad must be made on a case by case basis and responsibility is taken by the most senior member of the medical team.

8.4.4 Moderately severe blood loss at Brentwood

It is important to contact the laboratory on 5753– if there is a current Group and save sample and the patient is suitable for Electronic Issue of Blood the Transfusion staff will issue more units of Group Specific blood. More units of blood will be ordered to replace stocks.

Outside normal working hours, contact the on-call BMS who will go into the hospital and release more blood as soon as possible. If there is not time for this revert to the use of "Flying Squad" blood as above.

In situations where blood needs to be crossmatched, either because the patient is unsuitable for Electronic Issue because they have abnormal antibodies or because there is no previous sample from the patient, it will take longer to provide blood – this will be at least 30 minutes and in some cases longer. For further details refer to BR-PATH A1 App3.

8.4.5 Moderately severe blood loss at Ipswich or Cambridge

It is important to contact the laboratory on 01277 695753 – if there is a current Group and save sample and the patient is suitable for Electronic Issue of Blood the Transfusion staff will issue more units of Group Specific blood. For further details refer to BR-PATH A1 App3.

More units of blood to replace stocks will then be ordered, if time allows this will arrive as normal from Brentwood – however if this is not possible stock will arrive directly from either the local NHS or a local Transfusion centre. It will then be necessary for staff (sometimes nursing staff) to enter these units into the BARS system. Outside normal working hours, contact the on-call BMS who will go into the hospital and release more blood as soon as possible. If there is not time for this revert to the use of "Flying Squad" blood as above.

Please Note that for Ipswich and Cambridge an SLA is in place with each of the local Trusts to provide blood in an emergency, but this is best co-ordinated through the BMS in Pathology. Also collect 2 handwritten samples straight away collected at least 20 minutes apart by 2 different individuals on two separate forms and arrange for this to be sent to the local Trust – this will:

- Ensure they have a fresh sample should crossmatched blood be required at any stage
- Ensure they have a fresh sample should blood products be required at any stage
- Ensure they have a fresh sample should the patient subsequently be transferred

8.5 Removing electronic issue blood from blood bank using BARS

- Call the lab to say you want blood on the patient they will tell you if blood is available for EI or has been crossmatched
- Take prescription chart carrying patient barcode ID with you to Blood Bank
- Ensure you have your Barcoded staff ID badge

Never take more than 1 unit at a time

Go to BARS box:

- Scan Blood removal
- Scan staff ID
- Scan blood transport box
- Scan patient ID
- Blood Bank lock will release and screen will display the unit to be used
- Open Blood Bank and remove this unit – the draws of the Blood Bank are divided up by group to make it easier to search for the correct unit.
- Check you have the correct unit by scanning it as instructed on the BARS screen
- Follow the remainder of the on-screen instructions including End of input
- A label will be printed – attach this to the Blood Unit label

Go to patient location (ward or theatre):

- Log onto computer running BARS program to download to PBARS Scanner

- Collect the PBARS unit – ensuring a few seconds have elapsed to allow data to transfer
- Go to patient's bedside
- Press 2 to Transfuse
- Follow all on screen instruction on PBARS to scan
    - Staff ID
    - Unit number and Product
    - Patient Wristband
- PBARS will tell you if it is safe to give blood
- Return the PBARS scanner to the cradle to complete the audit trail
- When the transfusion is complete will in the transfusion details on the tag attached to the Blood pack
- Return all blood packs plus labels back to the Lab

8.6 Removing crossmatched blood from the blood bank using BARS

- Call the lab to say you want blood on the patient they will tell you units have been crossmatched for that patient
- Take prescription chart carrying patient barcode ID with you to Blood Bank
- Ensure you have your Barcoded staff ID badge

Never take more than 1 unit at a time

Go to BARS box:

- Scan Blood removal
- Scan staff ID
- Scan blood transport box
- Scan patient ID
- Blood Bank lock will release and screen will tell you to select a unit – NOTE it will not give you a unit number as EI does
- Open Blood Bank and remove a unit – the draws of the Blood Bank are divided up by group to make it easier to search for the correct unit. There is a draw specifically for Crossmatched blood. Select the first unit for your patient
- If you take a unit that is expiring later than one left in the fridge, BARS will alert you
- Check you have the correct unit by scanning it as instructed on the BARS screen
- Follow the remainder of the on-screen instructions
- A label will not be printed as the unit is already labelled

Go to patient location (ward or theatre)

- Log onto computer running BARS program to download to PBARS Scanner
- Collect the PBARS unit – ensuring a few seconds have elapsed to allow data to transfer
- Go to patient's bedside
- Press 2 to Transfuse
- Follow all on screen instruction on PBARS to scan
    - Staff ID
    - Unit number and Product
    - Patient Wristband
- PBARS will tell you if it is safe to give blood
- Return the PBARS scanner to the cradle to complete the audit trail
- When the transfusion is complete will in the transfusion details on the tag attached to the Blood pack
- Return all blood packs plus labels back to the Lab

8.7 Removing emergency o neg "flying squad" blood from the blood bank using BARS

- Call the lab to say you want blood in an emergency and that you are taking the O Neg "Flying Squad".
- Take prescription chart carrying patient barcode ID with you to Blood Bank
- Ensure you have your Barcoded staff ID badge

Never take more than 1 unit at a time

Go to BARS box:

- Scan Blood removal
- Scan staff ID
- Scan blood transport box
- Press or Scan the Emergency Patient Release
- Blood Bank lock will release and screen will tell you to select a unit –
- Open Blood Bank and go to the bottom draw labelled Emergency O Neg
- Select the First Unit – DO NOT take any other unit of blood as this will not be released for Emergency Issue
- Check you have the correct unit by scanning it as instructed on the BARS screen
- NOTE – NO label is printed for Emergency O Neg. There is an Emergency tag already on the pack and this must be filled in with the patient details before returning it to the lab after the transfusion

Go to patient location (ward or theatre):

- Log onto computer running BARS program to download to PBARS Scanner
- Collect the PBARS unit – ensuring a few seconds have elapsed to allow data to transfer
- Go to patient's bedside
- Press 2 to Transfuse
- Follow all on screen instruction on PBARS to scan
    - Staff ID
    - Unit number and Product
    - Patient Wristband
- PBARS will tell you if it is safe to give blood
- Return the PBARS scanner to the cradle to complete the audit trail
- When the transfusion is complete will in the transfusion details on the tag attached to the Blood pack
- Return all blood packs plus labels back to the Lab

8.8 Bars troubleshooting

8.8.1 BARS box not showing Blood Release screen

Log onto BARS again using Logon BARS and Password BARSBOX

Proceed as normal

8.7.2 BARS Box not responding

Reboot as above like you would a normal computer screen

8.8.3 Blood not available for a patient

Contact Transfusion on 5753 for help

8.8.3 No Unit Number shown when fridge magnet is released

Check to see if blood has been crossmatched rather than EI

8.8.4 PBARS not working

- PBARS was not on cradle correctly
- Insufficient time to transfer data
- Computer running PBARS has not been logged on to allow data transfer

- Blood was not removed from the Blood Bank correctly
- System down

In all cases

- Return the PBARS to the cradle (if necessary switch off and on again
- Return Blood to the Blood Bank via Blood return
- Start again ensuring you follow all screen correctly
- Try to use PBARS again.
- Use Auto Transfer on the PBARS Scanner

If it still fails to work give blood via the 2 nurse check and contact Transfusion for help

8.9 Requesting blood products from the laboratory

Fresh Frozen Plasma (FFP) and Platelet Concentrates are not held in stock and have to be obtained from Blood Transfusion Service. Requests for these blood products should be made to the Laboratory and prior notice is appreciated where possible.

8.8.1 Fresh Frozen Plasma – (FFP)

Procedure to be followed to Request Urgent Fresh Frozen Plasma

Fresh Frozen Plasma (FFP) is a source of coagulation factors and its use should be limited to the treatment of clinically significant bleeding episodes associated with abnormal coagulation. Examples are:

- Massive rapid transfusion 6-8 units / 24 hours
- DIC
- Liver disease
- Over anticoagulation

FFP should NOT be given unless the results of a current coagulation screen (PT & APTT) are known. There is NO place for the routine use of FFP with red cell transfusion or to treat excessive bleeding, unless there is an associated coagulation abnormality, major trauma or massive transfusion.

Requests for FFP should initially be made directly to the laboratory; outside normal working hours it is necessary to contact the person On-Call for Pathology via the On-Call rota. Usually FFP

Further advice can be obtained from the Consultant Haematologist appropriate for each site. If a current Group & Save is not held in the laboratory, a fresh sample and form may be requested.

The normal dosage of FFP is usually 12 – 15 ml/Kg body weight. Two pack sizes are available – 180ml & 300ml. Please indicate the pack size a quantity required at time of ordering.

FFP does not need to be compatibility tested. ABO specific units should be used or if these are unavailable group AB plasma will be issued. Women of child-bearing age should receive Rh D compatible plasma.

To obtain the maximum effect from the coagulation factors, the transfusion of FFP should be completed within 4 hours of issue, but is viable for 24 hours. If bleeding continues a further coagulation screen should be checked before more FFP is ordered.

Allergic reactions may occur, similar to those following red cell transfusions. NOTE – the largest avoidable risk to patients from transfusion is probably due to the transfusion of FFP for totally inappropriate or unproven clinical indications, as FFP is NOT virus inactivated.

8.8.2 FFP for patients from Ipswich or Cambridge

As part of the SLA with the local Trusts at the Spoke Sites, they will supply thawed FFP on a named patient basis. It will therefore be necessary to send a handwritten Starstedt tube to them for processing. FFP will then arrive labelled for the patient.

8.8.3 Platelet Concentrate

Procedure to be followed to Request Platelet Concentrate

Platelet transfusions are given where there is bleeding or a high risk of bleeding due to Thrombocytopenia or a Platelet Function Defect, such as:

- In a medical patient
    - not undergoing surgery - and not bleeding - plts <10
    - in the presence of bleeding or coagulopathy - plts < 30
- Undergoing minor surgery Plts <50
- Undergoing Major surgery Plts < 80
- Decrease in platelet count secondary to Marrow failure / suppression
- Massive transfusion of red cells - >8 units / 24 hours
- DIC

Platelets are NOT usually indicated in the treatment of Autoimmune Thrombocytopenia

Requests for Platelet Transfusion should initially be made directly to the laboratory; outside normal working hours it is necessary to contact the person On-Call for Pathology via the On-Call rota. A current Platelet Count MUST be known and usually Platelets will NOT be issued unless this is abnormal and there is associated bleeding.

Further advice can be obtained from the Consultant Haematologist for each site. If a current Group & Save is not held in the laboratory, a fresh sample and form may be requested.

The standard dose of Platelets is a single pool from 4 donors or a single adult donor unit. Order as one adult unit.

Compatibility testing is NOT required, but ideally Platelets are given as group specific. Stocks of Platelets are not held at the Nuffield Health Brentwood Hospital. They have to be ordered from the National Blood Service – Brentwood on a case by case basis. This will usually take up to 30

minutes to arrive in the laboratory and will then be issued immediately. However please note that there will then be the time required to transport them to Ipswich or Cambridge

Administration of Platelets should commence ASAP after issue and should be given through a 170nm filter, over a period of approx. 15 – 30 minutes.

Platelets must be stored at Room Temperature and must NOT BE REFRIGERATED.

The laboratory is not involved with the issue of Human Albumin Solution; this may be obtained through pharmacy.

8.8.4 Anti –D

British Committee for Standards in Haematology report Guidelines for the use of prophylactic anti-D immunoglobulin, recommends the following:

Before 12 weeks gestation,
Confirmed by scan, in uncomplicated miscarriage where uterus is not instrumented, or mild painless vaginal bleeding, prophylactic anti-D immunoglobulin is not necessary because the risk of feto-maternal haemorrhage (FMH) is negligible.
However 250 iu prophylactic anti-D immunoglobulin should be given in cases of therapeutic termination of pregnancy, whether by surgical or medical methods, to confirmed D negative women who are not known to be already sensitised to D (RCOG, 2002).

Between 12 and 20 weeks gestation,
For any potentially sensitising event listed blood sample should be tested to ensure the woman is D negative and that she is not already sensitised with anti-D. Anti-D immunoglobulin, 250 iu, should be administered (RCOG, 2002).

Anti-D is NOT kept in the pathology, it is issued by Pharmacy and will not be issued until a group and save sample has been tested and the woman is confirmed Rhesus negative. Details of the batch of Anti-D is recorded in the patient's notes and on Winpath

8.8.5 Blood transfusion reactions

A box is found on the top of every Blood Bank which contains everything you need to deal with a suspected Transfusion Reaction – collect this box – follow the instruction inside and return to the Laboratory

A Guide to Transfusion Reaction & Actions to be taken in the suspected case

These notes are intended to give staff some basic guidelines towards the main types of Transfusion Reactions seen.

Serious reactions are uncommon, but may be life threatening. The majority of serious incompatible transfusions are caused by human error such as:

- Errors on the request for and / or sample

- Failure to check blood pack details match those of the patient

Such errors are therefore easily avoidable

If a serious reaction occurring within 30 minutes of starting to transfuse a blood units, the transfusion should be STOPPED IMMEDIATELY and medical advice sought.

Blood transfusion reactions fall into two categories: -

1) Febrile

- These reactions are not uncommon and usually occur during or immediately following a transfusion.
- The patient may feel cold or hot, shivery, with occasional vomiting or itchiness. They may have a pyrexia and rash.

Action

- Immediately stop the transfusion.
- Immediately contact the RMO for advice.
- Anti-histamines may be indicated before continuing the blood transfusion.
- Check that the patient and unit details match.
- Contact the laboratory.
- Document all findings.

2) Acute Haemolytic ** THIS IS A MEDICAL EMERGENCY **

- These reactions are rare but may be life threatening.
- Symptoms include extreme restlessness, back and/or loin pain, coldness and sweating. Tachycardia and hypotension may occur.
- Profound shock and death may follow.

Action

- Immediately stop the blood transfusion.
- Immediately contact the RMO for advice.
- Check that the patient and unit details match.
- Save the blood bag and all documentation.

The following samples must be taken and sent to Pathology

☐ **G & S (Pink top)x2**	☐ **U&E (Red/Yellow top)**	☐ **Coagulation (Blue top)**
☐ FBC (Purple top)	☐ Blood Cultures	☐ First urine voided

The unit of blood in question must be sent to Pathology

- Inform laboratory as soon as possible.

- Fill in the necessary paperwork for the investigation of a transfusion reaction, this should be found on the wards or can be copied from this manual.

Transfusion reaction report form

In the event of a **severe** reaction following a blood transfusion, please complete a copy of the following form and send to the laboratory, together with post-transfusion samples of the recipient's blood, the residue from the units transfused, and the first urine voided post-transfusion.
PATH F2 BT 2.01 Investigation of a Suspected Transfusion Reaction obtainable from Pathology.
Please send this completed form to the Pathology Department IMMEDIATELY, together with the unit of blood, plus any others given to this patient.

8.10 Retention of specimens

Serum blood samples are retained for a minimum of 7 days and are only valid for testing depending on the individual test requirements; full blood count samples are only valid for 48 hours. Many analytes deteriorate over time and any extra tests should be added within a week for clinical chemistry and within 48h for haematology FBC and within 4h for coagulation unless plasma was separated immediately and frozen for later analysis. Specimens must be refrigerated as soon they are processed to preserve their integrity.

Coagulation samples must be tested within 4 hours of collection, if any delays in testing, they must be spun and frozen immediately.

Microbiology samples are retained for 7 days at referral site. Any extra requests needed should be added within 24 hours ideally.

Group and Save samples are retained for 28 plus 7 days extra if the patient has been transfused.

8.11 Criteria to run add on tests

8.11.1 Haematology

Full blood count is valid for 48 hours, any additional tests need to be added within this time frame, if not, a fresh specimen will be required for any additional tests.

Coagulation specimens are valid for 4 hours and any additional need to be made thin this time frame.

8.11.2 Microbiology

Any extra requests needed should be added within 24 hours ideally.

8.11.3 Biochemistry

Samples are retained for 14 days in the laboratory and extra tests in Chemistry can only be added within the stated time frames indicated below, if not a fresh specimen will be required.

Test	**Sample Stability at 2 - 8 (in gel tube)**
Albumin	5 months
ALP	7 days
ALT	7 days
Amylase	1 month
AST	7 days
Bilirubin	7 days
Calcium	3 weeks
Cholesterol	7 days
CK	7 days
Creatinine	7 days
CRP	2 months
GGT	7 days
Glucose	3 days (not stable if haemolysed)
HDL	7 days
Na/K/Cl	2 weeks (1 week for Cl)
LDH	4 days *
Magnesium	7 days
Phosphate	4 days
Total Protein	1 month
Triglycerides	5 days
Urea	7 days
Uric Acid	5 days
TSH	7 days
FT3	7 days
FT4	7 days
CA153	5 days
CA199	30 days
CA125	5 days
CEA	7 days
Ferritin	7 days
Folate	2 days
Free PSA	5 days
PSA	5 days
B12	24 hours
Vitamin D	4 days
Testosterone	7 days
SHBG	3 days
Cortisol	5 days

LDH * best stored at room temperature due stability of some Isoenzymes

This retrospective testing is as recommended by test kit manufacturer Roche (kit insert information).

8.12 Referred tests

- Specimens for tests not performed on-site are referred to external providers whose standards have been assessed and have achieved an appropriate level of quality. Normally CPA (UK) Ltd. accreditation is accepted as appropriate.
- Every effort is made to refer specimens to other Nuffield Hospital Laboratories.
- Service level agreements are raised and External Quality Assessment reports are forwarded along with CPA/UKAS status.
- Turnaround times are regularly audited and documented.
- The data management of all referred samples is automatically updated on the computer system via specimen tracker.
- All specimens are packaged and sent away according to the referral protocol.

Referral Site	Tests
Unilabs Independent Histopathology Services 142-144 New Cavendish Street London W1W 6YF	Histology
Warwick Nuffield Pathology Nuffield Health Warwickshire Hospital The Chase Old Milverton Lane Leamington Spa Warwickshire CV32 6RW	Haematinics, immunoglobulin's Protein electrophoresis, Homocysteine, Viral serology Some specialist Microbiology
The Doctors Laboratory 60 Whitfield Street London W1T 4EU	Allergy Tests Immunology Viral screens Miscellaneous Stone analysis
Basildon and Thurrock University Hospitals NHS Foundation Trust Nethermayne Basildon Essex SS16 5NL	Blood cultures Urgent Microbiology out of hours Histology Troponin T D-Dimer
Cellular Pathology Services Unit 12 Orbital 25 Business Park Dwight Road Tolptis Lane Watford	Histology

WD18 9DA	
Queens Hospital NHS Trust RomValley Way Romford Essex RM7 0AG	Histology
National Transfusion Microbiology Reference Laboratory National Blood Service **Colindale** Avenue London NW9 5BG	Antibody identification
Ipswich NHS Trust Heath Road, Ipswich Suffolk IP4 5PD	**Histology** **Urgent:** Transfusion FBC Coagulation Microbiology
Addenbrookes Hospital Cambridge University **Hospitals** NHS Foundation Trust Cambridge Biomedical Campus Hills Road Cambridge CB2 0QQ	Histology **Oncology**: Transfusion **Urgent:** FBC, Chemistry, Immunoglobulin, Bone marrow aspirations, immunology Microbiology

9.0 Post- examination processes

9.1 Pathology Reports

Pathology reports are computer generated and include a unique identification number, the date of testing and the name and location of the requesting Clinician. Notes on interpretation are included where relevant. Reports of referred results are entered onto the computer, validated and printed with the report indicating the identity of the referral laboratory. Confidentiality is maintained at all times

All report forms are issued from the local pathology department as soon after authorisation as possible. Details include full patient identification, time of specimen receipt and report production, requesting clinician and patient location.

Results are given in System International (SI) units, with reference ranges, age and sex related, where applicable.

Out of range results are coloured red and highlighted by an asterisk (*).

Results requiring immediate clinical attention are relayed to the originating department as soon as they are available, usually by hand.

All abnormal results are reviewed by appropriate consultants at each site.

In-Patients and Pre-Admission: One copy of the report is taken to the ward/clinic for the patient's notes, a second copy is sent to the requesting Clinician.

Out-patients: Reports are sent directly to the requesting Clinician.

A copy of the result report can be sent to the patient's GP on request, either by indicating on the request form or by telephoning the Pathology Office.

The Biomedical Scientist performing the tests validates and authorises the results prior to printing. Reference ranges are always included, and abnormal results are highlighted in red. There are Standard Operating Procedures for dealing with urgent results, telephoned or faxed results and amended reports. Reports of referral results are checked and validated by a qualified Biomedical Scientist before sending out.

9.2 Telephoned Results

9.2.1 Action limits for telephone communication of results

This note is to be read in conjunction with the written procedures for reporting and transmission of results.
All results falling outside the following limits will be telephoned unless an explicit decision is made by the duty biochemist / haematologist / microbiologist to do otherwise in an individual case.
Because the results are likely to be unexpected they will be telephoned, whenever possible, to the requesting clinician or a medical officer acting on his behalf. If this proves impossible the result should be given to an appropriate person who must be asked to inform the clinician at the earliest possible opportunity. All alert limits are listed in PATH F2.1 SR5.29 Appendix 1.

The need to telephone results is kept to a minimum. Hard-copies are sent out promptly and key hospital staff has access to look up results. Results can also be faxed to a secure fax to offsite users.

When necessary results may be phoned to properly identified sources.

Markedly abnormal results will be telephoned to the originating source as appropriate.

Please note:

We are unable to give results directly to patients under any circumstances.

There is a written procedure for the transmission of results by telephone that identifies the circumstances in which oral results may be given. This includes to whom, and the grades of staff they may be communicated to. Records are kept of when results have been telephoned using the telephone icon, at what time and to whom on the laboratory computer system. The person telephoning the result and the one receiving the result are clearly identified over the telephone and this is recorded.

Printed copies are produced to back up the telephoned results, both internally and from referral laboratories.

9.2.2 Amended reports

If a report has to be amended or an additional result added after completion of the report, it is clearly labelled 'AMENDED REPORT'. It is then reissued and forwarded to the requesting Clinician.

9.2.3 Ward Enquiry

All relevant staff must have access to Cyberlab

Results are viewable as soon as they are authorised.

Staff must have a unique login and password. To maintain Cyberlab access staff must login at least once in 90 days

9.3 Clinical advice and interpretation.

Pathology Consultants

Nuffield Health employs the services of specialised consultants to direct pathology services, to provide clinical advice in the interpretation of Pathology results and to offer guidance to clinicians and patients regarding investigations and treatment.

Clinical comments are typed onto the reports where relevant.
The Pathology Consultants regularly visit the laboratory; however, if they are not present when advice is required they can be reached by telephone at work, home or by mobile telephone.
The Transfusion Consultants attend the Hospital Transfusion Committee meetings.
The Microbiology Consultants attend the Infection Control Committee meetings.

9.4 Point of care

Specific point of care testing (POCT) equipment suitable for urgent testing, are provided at each site for the use of trained staff.

Contact the laboratory for advice on interpreting results.

The Pathology department is responsible for the training of staff and monitoring of External Quality Assurance.

For the Istat blood gas analysers It is essential that a point of care co-ordinator and the Resident Medical Officer (RMO) on duty is trained and competent in the use of this equipment.

Full patient details and test results must be recorded on the **POCT Record Sheet**.

Results will be entered onto the patient records on Winpath.

9.5 Reference ranges

All tests that are listed in our repertoire are released with a reference ranges. The source of the reference ranges vary according to parameter.
Please note that definitive reference ranges will be provided with printed laboratory reports when performed within the Nuffield Health laboratories.
The scope of reference ranges is not designed to cover all gender or age related ranges – these are available on request. Unless otherwise stated, ranges quoted here are for adults only (>18 years of age).

Please call the laboratory if you have any questions in this regard

Below is a list of all reference range sources:-

- Harmonisation process for Nuffield Health
- Local NHS processing certain samples whose results are not entered on Winpath
- Respective manufacturers

An appendix of reference ranges is listed separately

10. Monitoring and Review

10.1 Monitoring

The Group Pathology Governance Manager is responsible for monitoring the effectiveness to this procedure. Local Pathology Managers are responsible for ensuring that their staff adhere to the procedural statements and to comply with locally written procedures outside the scope of the national audit program.

The effectiveness of this procedure will be monitored through the Nuffield Diagnostics audit program and via external audit by CPA and MHRA inspections. The internal audit schedule will ensure that the effectiveness of the procedure will be assessed on a 2 year cycle. Where appropriate, additional local audit can be undertaken, providing further reassurance of the effectiveness of the procedure.

Compliance gaps at a national level will be reported to Pathology Operational Managers Group. Compliance gaps at a local level should be reported at monthly staff meetings to highlight best practice.

Repeated non-compliance will be escalated to the Group Pathology Manager.

Continued non-compliance will be escalated to the Pathology Director

Document Review

Documents are reviewed as a minimum on a 3 year basis.

In addition to the 3 year review, results of audits, complaint, incidents may identify a requirement for the document to be amended. All documented procedures fall under the Nuffield Health Quality

Assurance Internal Audit programme which requires services to select documented procedures for internal review as part of on-going audit programmes. Where changes are required the author is responsible for undertaking the review prior to the formal 3 year review.

Policy Author Declaration

The policy author is responsible for ensuring that the documented procedure has been developed in line with Nuffield Health Group Quality Policy SOP 2 and also ensures the author confirms they have complied with Nuffield Health Equality and Diversity requirements.

Author Declaration
The document style and format are consistent with policy (including footer and explanation of terms used) and are relevant to the document type e.g. policy, SOP, protocol.
The title/outcome/objective/target audience and monitoring arrangements are clear and unambiguous
The relevant expertise has been used and the evidence base is relevant, up to date. There are supporting references and a cross reference to associated documents e.g. other policies.
Stakeholder, user and ratification forum consultation confirms accuracy and clarity of document/statements
Superseded documents have been referenced in the reader box, and master location for this document has been documented
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