Manchester Hospitals Haematology Service

Directorate of Laboratory Haematology

User Guide

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About Us

The Oxford Road Campus (ORC) laboratory (on the Manchester Royal Infirmary site) offers a comprehensive test repertoire for neonatal, paediatric, and adult haematological investigation and treatment of patients including Blood Counts, Coagulation, Haematinic Investigations, Stem Cell Therapeutics and Blood Transfusion services.

The Trafford (TGH), Wythenshawe, and North Manchester General Laboratories offer a comprehensive test repertoire for haematological investigation and treatment of patients including Blood Counts, Coagulation, Red Cell Investigations (TGH only) and a Blood Transfusion service. More complex and specialised investigations such as, Stem Cell Therapeutics and specialised coagulation are available through the ORC Haematology Laboratory at the Manchester Royal Infirmary site.

We aim to provide a user-responsive service with rapid turnaround of accurate results. Expert clinical and scientific advice is available on the investigation of haematological disorders, the interpretation of test results, and on any further investigations which may be required.

Oxford Road Campus (ORC)

Site Specific Information

Location

The laboratory is situated in the Manchester Royal Infirmary and is part of Manchester University Hospitals NHS Foundation Trust (MFT), within the Clinical Science Buildings.

For a full map of the hospital site please click on this link:

or if you have a paper copy type the following into your browser:

https://intranet.mft.nhs.uk/content/hospitals-mcs/clinical-scientific-services/laboratory-medicine/dlm-staff-information-and-resources#

Postal address

Directorate of Laboratory Haematology
Division of Laboratory Medicine
1st Floor Cobbett House
Oxford Road Campus
Oxford Road
Manchester
M13 9WL

Working hours

Routine services Monday – Friday 09:00 to 17:00
The Out-of-Hour's service covers the remainder of the 24-hour period, weekends, and Bank Holidays for urgent, emergency work and some specialised work where required.

Trafford Hospital

Site Specific Information

Location

The department is situated on the lower floor of the Pathology Building, at the rear of Trafford General Hospital. Parking is available directly outside the building
Specimen Reception is on the lower reception floor, clearly signposted behind the patient reception desk.
All samples delivered out of the routine opening hours below must be placed in the refrigerator besides the specimen reception window

Postal address

Directorate of Laboratory Haematology
Division of Laboratory Medicine
Trafford General Hospital
Moorside Road
Davyhulme
Manchester
M41 5SL

Working Hours

Routine 09:00am - 5.00pm Monday - Friday
Out of hours 7.00am – 9.00 am 5.00pm – 9.00pm Monday – Friday
Weekends & Bank Holidays 8.00am – 8.00pm
Out of hours bleep number 0060
Please note the laboratory is closed during the night from 9.00pm until 7.00am, weekdays and from 8.00pm until 8.00am weekends and bank holidays (emergency work required during these hours is processed by the Out of Hours team)

Wythenshawe Hospital

Site Specific Information

Location

The department is situated in the yellow zone on the Wythenshawe hospital site.

Postal address

Directorate of Laboratory Haematology
Wythenshawe Hospital
Southmoor Road
Manchester
M23 9LT

Working Hours

Routine services Monday – Friday 09:00 to 17:00
The Out-of-Hour's service covers the remainder of the 24-hour period, weekends, and Bank Holidays for urgent, emergency work and some specialised work where required.

North Manchester General Hospital (NMGH)

Site Specific Information

Location

The department is situated in zone D on the NMGH site (Entrance 3)

Postal address

Directorate of Laboratory Haematology
Essential Service Laboratory
North Manchester General Hospital
Delaunays Road
Crumpsall
M8 5RB

Working Hours

Routine services Monday – Friday 09:00 to 17:00
The Out-of-Hour's service covers the remainder of the 24-hour period, weekends, and Bank Holidays for urgent, emergency work and some specialised work where required.

Quality Statement

The laboratory examinations, procedures and reports of test results are compliant with the requirements for quality and competence in medical laboratories according to UKAS International Standard ISO15189:2012.

The department participates in all appropriate National External Quality Assurance Schemes (NEQAS) where available. Documentation relating to Internal Quality Control and performance in NEQAS are available for scrutiny by users of the service.

Accreditation

The Haematology department is accredited by UKAS in conformance with ISO 15189:2012.
Our UKAS Medical Laboratory Reference Number for ORC/TGH is 8650.
Our UKAS Medical Laboratory Reference Number for Wythenshawe is 9072
The department is approved by the Institute of Biomedical Sciences (IBMS) as a Training Laboratory and all our qualified scientists are registered with the Health & Care Professions Council (HCPC).

The Blood Transfusion service conforms with the UK Blood Safety and Quality Regulations 2005 and an annual compliance report is submitted for review by the Medicines and Healthcare products Regulatory Agency (MHRA).

Our Stem Cell Therapeutics service is accredited by the Joint Accreditation Committee of ISCT and EBMT (JACIE) and holds an Establishment License issued by the Human Tissue Authority (HTA).

Feedback

The department's service is included in the Division of Laboratory Medicine (DLM) User Satisfaction Survey, and we provide representatives to attend all DLM Clinical Liaison meetings with service users.

We are always willing to meet with our service users to discuss their needs and issues. If you have any comments on the haematology and blood transfusion services that we provide or would like to discuss new services you would wish to see developed please contact the Laboratory Manager or Directorate Manager.

Confidentiality

The Manchester Hospitals Haematology Service follows local and national patient confidentiality standards. For further information please search:
Confidentiality Code of Conduct and Information Disclosure Code of Practice

Complaints Procedure

If you have an issue you wish to raise with us, please contact the laboratory in the first instance on 0161 276 4421. If we cannot resolve your query directly, the Division of

Laboratory Medicine or Trust complaints procedure can be utilized to escalate the complaint as appropriate.

Scope of Service

Any test performed in the laboratory is subject to a variety of factors that may influence the outcome of the result. Some of these factors include the sample itself, the test method, reagents used and different operators carrying out the same process. Variations can also be caused by procedures that involve the measurement of analytes and reagents whereby environmental factors such as temperature and humidity may affect results. Any equipment used in the process will further introduce the opportunity for variation.

To provide a measure of confidence in results produced by a laboratory it is necessary to identify all factors which may contribute to variation in a process and assess their potential to influence uncertainty. Once identified these factors must be reduced or controlled to an acceptable level and a value for the range of acceptable uncertainty assigned where possible.

The MHHS has chosen, where possible, to utilise internal Quality Control material and data to establish Uncertainty of Measurement in between run data. If possible a clinical sample has been used for within run data.

For the purposes of uncertainty calculations all data is assumed to describe a normal distribution. We can therefore calculate a 95% confidence interval for these distributions and obtain the standard error (uncertainty) for any given laboratory test.

Upon request the laboratory shall make its estimates of measurement of uncertainty available to laboratory users.

Services Available

The range of haematology tests offered, together with the specimens required, are described in the list of tests.

Specimen Acceptance Policy

All specimens for Haematology testing must conform with the instructions of the **Specimen Acceptance Policy**

The Transfusion Laboratory follow a zero-tolerance policy due to the potential consequence and severity of misidentification in Blood Transfusion. The Hospital Transfusion Laboratory: sample acceptance and requesting policy has been written in

line nationally recognised guidelines and can be found on the intranet ref: DS9-7051 (HAEM_POL5)

The Hospital Blood Transfusion service cannot accept incorrectly labelled samples and request forms and operates a 'zero tolerance policy'. Blood Transfusion specimen and request labelling guidelines are also included in the **Trust Blood Transfusion Policy**

Consultant and Management Staff

Contact Details

Haematology Management Team

Title: Haematology Consultant Laboratory Lead
Name: Dr Rachel Brown
Tel: 161 276 4984 or 0161 746 2472
e-mail: rachel.brown2@mft.nhs.uk

Title: Directorate Manager Laboratory Haematology
Name: Claire Whitehead
Tel: 0161 276 4421
e-mail: claire.whitehead@mft.nhs.uk

Title: Deputy Directorate Manager,
Laboratory Manager
Name: Jennie Rogers
Tel: 0161 701 3548
e-mail: jennie.rogers@mft.nhs.uk

Haematology Clinical Team

Title: Haematology Consultant Laboratory Lead
Name: Dr Rachel Brown
Tel: 161 276 4984 or 0161 746 2472
e-mail: rachel.brown2@mft.nhs.uk

Title: Paediatric Haematology Consultant Laboratory Lead
Name: Professor Rob Wynn
Tel: 0161 701 8416
e-mail: rob.wynn@mft.nhs.uk

Senior Laboratory Staff

Title: Chief Biomedical Scientist General Haematology
Name: Yolandé Davies
Tel: 0161 276 8599
e-mail: yolande.davies@mft.nhs.uk

Title: Chief Biomedical Scientist Coagulation
Name: Lynne Keighley
Tel: 0161 276 4080
e-mail: lynne.keighley@mft.nhs.uk

Title: Chief Biomedical Scientist Red Cell Laboratory
Name: John Welsh
Tel: 0161 276 5393
e-mail: john.welsh@mft.nhs.uk

Title: Chief Biomedical Scientist Blood Transfusion
Name: Tom Trimble
Tel: 0161 746 2478
e-mail: thomas.trimble@mft.nhs.uk

Title: Blood Transfusion Improvement & Development Lead
Name: Emma Copperwaite
Tel: 0161 476 4374
e-mail: emma.copperwaite@mft.nhs.uk

Stem Cell Therapeutic Laboratory

Title: **Lead Biomedical Scientist Stem Cell Therapeutics**
Name: **Claire Donohue**
Tel: **0161 701 1248**
e-mail: **claire.donohue@mft.nhs.uk**

Title: **Chief Clinical Scientist Stem Cell Therapeutics**
Name: **Laura Ford**
Tel: **0161 701 1248**
e-mail: **laura.ford@mft.nhs.uk**

Title: **Chief Biomedical Scientist Stem Cell Therapeutics**
Name: **Rachel McDowell**
Tel: **0161 701 1248**
e-mail: **rachel.mcdowell@mft.nhs.uk**

Wythenshawe Laboratory

Title: **Lead Biomedical Scientist (Haematology)**
Name: **Gareth Davies**
Tel: **0161 291 4777**
e-mail: **gareth.davies@mft.nhs.uk**

Title: **Lead Biomedical Scientist (Transfusion)**
Name: **Margaret Evans**
Tel: **0161 291 4719**
e-mail: **margaret.evans@mft.nhs.uk**

North Manchester General Hospital Laboratory

Title: **Chief Biomedical Scientist (Haematology)**

Name: **Sophie Moores**

Tel: **0161 9223415**

e-mail: **sophie.moores@mft.nhs.uk**

Blood Transfusion Team

Title: **Lead Blood Transfusion Practitioner**

Name: **Carmel Parker**

Tel: **0161 701 8556**

e-mail: **carmel.parker@mft.nhs.uk**

Title: **Senior Blood Transfusion Practitioner**

Name: **Louise Polyzois**

Tel: **0161 701 1961**

e-mail: **louise.polyzois@mft.nhs.uk**

Title: **Senior Blood Transfusion Practitioner**

Name: **Bernadette Mir**

Tel: **0161 701 1961**

e-mail: **bernadette.mir@mft.nhs.uk**

Title: **Specialist Blood Transfusion Practitioner**

Name: **Lauren Sekloawu**

Tel: **0161 701 1961**

e-mail: **lauren.sekloawu@mft.nhs.uk**

Haematology Administration

Title: **Administration & Information Lead**

Name: **Hannah Belli**

Tel: **0161 276 8980**

e-mail: **hannah.belli@mft.nhs.uk**

Central Sample Reception

Title: **Central Specimen Reception Manager**

Name: **Aatar Hashmi**

Tel: **0161 276 4692**

e-mail: **aatar.hashmi@mft.nhs.uk**

Results Hotline (ORC)	**Tel:**	**0161 276 8766**
ORC Laboratory	**Tel:**	**0161 276 4030**
Trafford Laboratory	**Tel:**	**0161 746 2493**
Wythenshawe Laboratory	**Tel:**	**0161 291 2141**
North Manchester General Lab	**Tel:**	**0161 720 2100**

General Haematology					Site			
Test	**Specimen(s)**	**Result(s) available*** **Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
Full blood count and automated differential	1 x 3.4ml red cap EDTA [1x 1.8ml red cap EDTA[1]] [1x 0.5ml EDTA[1]]	1 hr	4 hr	24 hr	✓	✓	✓	✓
Manual blood film (2)	Any of the above specimen types	by arrangement	24 hr	24hr	✓	✓	✓	✓
Reticulocyte count including RetHe (diagnostic for renal patients) Research parameter ONLY	Any of the above (from FBC sample)	1 hr	4 hr	24 hr	✓	✓	✓	✓

Haematology Tests

Haematology Cancer Diagnostic Pathway for Greater Manchester (HCDP)

The haematology laboratory forms part of the Haematology Cancer Diagnostic Pathway for Greater Manchester (HCDP). Also know as the Haematological malignancy diagnostics service (HMDS). For **adult** haemtaological cancer diagnosis and **adult** bone marrows refer to the HODS system for full sample requirements and clinical pathways.
Click on the link for further information. HCDP information
For **adults** CSF testing also follows this pathway. HCDP information

Guidelines to availability of Tests

The results availability times given below represent the time generally required to produce a result following receipt of the sample in the laboratory. Sample transport times are not included. Where appropriate, if a result is required the same day samples must be received sufficiently early to allow completion of the test. Please contact the lab if the test you require is not listed below.

The tests below are available during the normal working day, a ✓ in the O or T or W or N column denotes on which site the test are performed.

O: Oxford Road Campus Laboratory
T: Trafford Site Laboratory
W: Wytheshawe Laboratory
N: North Manchester General Hospital

N/A = not applicable [1] Paediatric samples [2] Please ring lab
*From time of receipt in the laboratory

Erthrocyte Sedimentation Rate (ESR)	1x 3.4ml red cap EDTA (from FBC sample) [1x 1.8ml red cap EDTA[1] - paediatric]	1.5 hr	4 hr	24 hr	✓	✓	✓	✓
Screening test for glandular fever	1 x 3.4ml red cap EDTA [1x 1.8ml red cap EDTA[1]]	30 min	Same day	24hr	✓	✓	✓	✓
CSF	1ml in grey top anticoagulant free tube	2 hr	6 hr	24 hr	✓			
Haemosiderin	must be an early morning urine sample	24hrs	24hrs	24hrs	✓			
Bone marrow report	4 slides for paediatric patients. 6 slides for adult patients + 1 x 3 ml EDTA	by arrangement	7 days	7 days	✓			
Detection of malarial parasites (2)	From full blood count specimen	2 hr by arrangement	N/A	24 hr	✓	✓	✓	✓

Coagulation

Coagulation					Site			
Test	**Specimen(s)**	**Result(s) available* Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
APTT	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	90 min	3 hr	24 hours	✓	✓	✓	✓
Prothrombin time	As above	90 min	3 hr	24 hours	✓	✓	✓	✓

Test	**Specimen(s)**	**Result(s) available Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
Heparin Induced thrombocytopenia (HIT test) referred from O, N and T to Wythenshawe hospital	1 x 4.9 ml brown top gel tube	1 day	1 days	1 days			✓	
Plasma Viscosity referred from O, N & T to Wythenshawe hospital	1 x 3.4ml red cap EDTA [1x 1.8ml EDTA[1]]	2 hr	24 hr	24 hr			✓	
FDP D-Dimers	Green cap vacutainer	90 min	3 hr	24 hours	✓	✓	✓	✓

	[1.3ml Neonate or 2.9ml Paediatric and adult]							
Fibrinogen	As above	90 min	3hr	24 hours	✓	✓	✓	✓
Bleeding time	Test carried out on patient when requested by Haematology consultant (contact lab ext. 12123)	by arrangement	by arrangement	24 hours	✓			

Anticoagulant					**Site**			
Test	**Specimen(s)**	**Result(s) available*** **Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
Heparin control	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	90 min	3 hr	24 hours	✓	✓	✓	✓
Oral Anticoagulant Control (INR)	As above	90 min	3 hr	24 hours	✓	✓	✓	✓
LMWH assay	As above	90 min	3 hr	24 hours	✓		✓	
DOAC assay	As above	120 min	48 hr	24 hours	✓			

Factor Assays					**Site**			
Test	**Specimen(s)**	**Result(s) available*** **Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
Factor II assay	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3hr	< 10 days	< 10 days	✓			
Factor V assay	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3 hr	< 10 days	<10 days	✓			
Factor VII assay	As above	3 hr	< 10 days	< 10 days	✓			

Factor VIII assay	As above	3 hr	< 5 days	< 5 days	✓		✓	
Factor IX assay	As above	3 hr	< 5 days	< 5 days	✓		✓	
Factor X assay	As above	3 hr	< 10 days	< 10 days	✓			
Factor XI assay	As above	3 hr	< 10 days	< 10 days	✓		✓	
Factor XII assay	As above	3 hr	< 10 days	< 10 days	✓			
Factor XIII assay	As above	3 hr	< 10 days	< 10 days	✓			
Factor VIII inhibitors	2x Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3 hr	< 1month	< <1 month	✓			
Factor IX inhibitors	2x Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3 hr	< <1 month	< <1 month	✓			
Platelet Aggregation Studies	Contact Lab - 12123	Same day by arrangement	by arrangement	< 5 days	✓			
von Willebrand factor activity	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3 hr	< 1 month	< 1 month	✓			
von Willebrand Factor	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3hr	< 1 month	< 1 month	✓		✓	
Collagen Binding Assay	1 x 4.9 ml brown top gel tube	N/A	< 1 month	< 1 month			✓	
Ristocetin induced platelet aggregation (RIPA)	Contact Lab – 12123	Same day	by arrangement	<5 days	✓			

Thrombophilia Assays					**Site**			
Test	**Specimen(s)**	**Result(s) available*** **Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
Antithrombin	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3 hr	< 1 month	< 1 month	✓			
Factor V Leiden Mutation screen[1]	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	-	<14 days	<14 days	✓			

Prothrombin G20210A Mutation screen	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult	-	<14 days	<14 days	✓			
Lupus anticoagulant	4X Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	by arrangement	<2 wks	<2 wks	✓			
Protein C	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3 hr	< 1 month	< 1 month	✓			
Protein S	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	3 hr	< 1 month	< 1 month	✓			

***** From time of receipt in the laboratory

Haematinics

Haematinics					**Site**			
Test	**Specimen(s)**	**Result(s) available* Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
Serum intrinisic factor antibodies[1]	1 x 4.9 ml brown top gel tube 1 x 1.2ml brown top gel tube (paeds only)	N/A	5 working days	7 days	✓			
Erythropoietin (EPO)	1 x 4.9 ml brown top gel tube 1 x 1.2ml brown top gel tube (paeds only)	N/A	5 working days	7 days	✓			
Haemochromatosis[2] C282Y and H63D genotyping	Green cap vacutainer [1.3ml Neonate or 2.9ml Paediatric and adult]	-	<3 weeks	< 3 weeks	✓			

N/A = not applicable
* from time of receipt in the laboratory
[1]Serum intrinsic factor antibodies are carried out on patients with a low B12 level (less than 120ng/l)
[2] Performed by the North-West Genetic Diagnostic Service

Blood Transfusion

Blood Transfusion					**Site**			
Test	**Specimen(s)**	**Result(s) available* Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
Cross matching	Adult 4.9 ml EDTA blue cap Paediatric 3.4ml EDTA bluetop Neonatal 1.2ml EDTA bluetop	60 min The presence of antibodies will cause a delay in the provision of red cells. In	Non urgent cross-matching can take from 2 hours or longer depending	N/A	✓	✓	✓	✓

		an emergency Group specific blood (ABO and Rhesus matched) can be prepared within 30 minutes of receipt of the pre-transfusion sample in the laboratory.	on the workload priorities at that time.					
Blood group	Adult 4.9 ml EDTA blue cap Paediatric 3.4ml EDTA bluetop Neonatal 1.2ml EDTA bluetop	10 min	Within 24 hrs	24 hr	✓	✓	✓	✓
Group and Save	Adult 4.9 ml EDTA blue cap Paediatric 3.4ml EDTA bluetop Neonatal 1.2ml EDTA bluetop	30 min	Within 24 hrs	24 hr	✓	✓	✓	✓
Cord blood Investigations	4.9 ml EDTA blue cap (maternal) 4.9 ml EDTA blue cap (cord-labelled with babies details))	2 hours	Within 24 hrs	24 hr	✓		✓	✓
Kleihauer test	Adult 4.9 ml EDTA blue cap	60 min	Within 48 hrs	48 hr	✓		✓	✓
Direct Antiglobulin Test	Adult 7.5 ml EDTA blue cap	20 min	Within 24 hrs	24 hr	✓	✓	✓	✓
Haptoglobin Estimation (sent away)	7 ml clotted red cap	N/A	Within 10 days	10 days	Sent away			
Antibody titre, paternal testing, quants and other NHSBT referrals.	Adult 4.9 ml EDTA blue cap	N/A	NBS 5 working days	NBS 5 working days	NHSBT			
Cell free DNA samples (cffDNA) for Antenatal patients.	Adult 7.5 ml EDTA blue cap	N/A	NBS 10 working days	NBS 10 working days	NHSBT			
NHSBT reserves the right to refuse to handle any inappropriately package/labelled samples.								

N/A = not applicable * From time of receipt in the laboratory

FOR URGENT REQUESTS, FURTHER ADVICE OR INFORMATION, TELEPHONE YOUR HOSPITAL TRANSFUSON LABOARATORY

Haemolytics

Heamolytics					Site			
Test	**Specimen(s)**	**Result(s) available*** **Urgent**	**Non-urgent**	**Report(s) Available**	**O**	**T**	**W**	**N**
Urgent/pre-operative HbS screening test (Pts > 1 yr. old)	1 x 3.4ml red cap EDTA [1x 1.8ml red cap EDTA[1]]	30 min	24 hr	10-14 workdays	✓	✓	✓	✓
Routine Haemoglobinopathy Screening	1 x 3.4ml red cap EDTA [1x 1.8ml red cap EDTA[1]]	N/A	10 workdays	10 -14 workdays		✓		
Universal Antenatal Haemoglobinopathy Screening	1 x 3.4ml red cap EDTA [1x 1.8ml red cap EDTA[1]]	Provisional report: 3 workdays	5 workdays	7 workdays		✓		
[3]DNA Testing for the Haemoglobinopathies	4 x 3.4ml EDTA	N/A	N/A	N/A	✓			

G6PD Screen	1 x 3.4ml red cap EDTA [1x 1.8ml red cap EDTA[1]]	[1/2]Within 4 hours	3 workdays	5 workdays	✓			
G6PD Assay	1 x 3.4ml red cap EDTA [1x 1.8ml red cap EDTA[1]]	N/A	3 workdays	5 workdays	✓			

N/A = not applicable
* From time of receipt in the laboratory
[1] **INFORM THE LABORATORY IF A TEST IS TO BE PERFORMED URGENTLY**
[2]Telephone laboratory, samples screened on Fridays by arrangement with laboratory
[3]**North-West Genetic Diagnostic Service for Haemoglobinopathy**

The MFT Haemoglobinopathy Diagnostic Service is offered to all at risk of sickle cell disease or thalassaemia. The Haemoglobinopathy Laboratory carries out first and second line confirmatory screening abnormal haemoglobin variants and thalassaemia, we also undertake confirmatory testing for the Newborn Screening Laboratory at MFT and for external laboratories.

All positive haemoglobinopathy screening results are reviewed at the weekly Mult-disciplinary Team meetings held with Clinical, Scientific, Nursing and Specialist Counsellors from across MFT, the genetics service and the Manchester Sickle Cell and Thalassaemia Centre (including adults and paediatric specialists). The laboratory team work to quality standards set by, and report to , the National Screening Programme for Antenatal Haemoglobinopathy Screening.

Genetic services: Available free of charge to healthcare providers in the North West, Lancashire, and Cumbria, providing referral meet the Genetic Haemoglobinopathy Testing Guidelines. For information see: : https://mft.nhs.uk/nwglh/documents/test-request-forms/. The guidelines for haemoglobinopathy genetic testing are also located on this page. Please note that there is a genetic testing consent form available on the following page: https://mft.nhs.uk/nwglh/documents/consent/.

All requests for genetic diagnosis in haemoglobinopathy which are approved under the **NW SHA Indications for Genetic Diagnosis of Haemoglobinopathies** algorithm are centrally funded. For associated forms and guidance please see:

Haematology - Haemoglobinopathy

Clinical Haematology: Services, Policies and Procedures for the treatment of patients with sickle cell disease or thalassaemia see the Clinical Haematology page for MFT:
https://intranet.mft.nhs.uk/content/hospitals-mcs/mri/in-patient-medical-specialities/clinical-haematology/haemoglobin-disorders-sickle-cell-disease-thalassaemia
Support with advising on Haemoglobinopathy results please see our Information leaflet on Haemoglobinopathy Carrier States for Health Professionals available on-line at

Information-on-Haemoglobinopathy-Carrier-States.pdf

For haemoglobinopathy genetic studies contact the Molecular Diagnostics Centre 0161 276 4809.

For Red Cell Haemolytic Screen contact laboratory on 0161 746 2492

Stem Cell Therapeutics

Stem Cell Therapeutics	
Stem Cell Procurement, Processing and Cryopreservation	Contact 0161 276 4078/0161 701 1248

The laboratory is open for routine services Monday – Friday 09:00 to 17:15

Haematology tests available outside core working hours

- Full blood count, Auto differential and platelet count
- Sickle test
- Malarial parasites (Screening kit and Film)
- ESR
- Prothrombin time / INR
- APTT/RATIO
- Factor assays when authorised by a consultant haematologist.
- D – dimer (FDP)
- Fibrinogen
- Crossmatch
- Blood Group
- Direct Coombs Test
- Blood product issue
- Glandular fever screen
- Reticulocytes
- Specialised tests following discussion with on duty haematologist and duty BMS staff (ORC site only)

Reference Ranges

Reference ranges are provided for guidance in the interpretation of results for clinical decision making. They are conventionally set to give the range of values which would be found in approximately 95% of a statistically 'Normal' population.
Age-related reference ranges are provided as appropriate, but ranges do not consider normal racial variation or differences between venous and capillary sample type. Please seek advice from the laboratory as necessary.

Unless otherwise stated the haematology reference ranges are selected from:
- published papers providing ranges established by national and/or international consensus,
- reference intervals provided by the instrument/assay manufacturer

Where applicable, reference ranges
- have been verified based on the local adult and paediatric population according to age/gender and detailed age-related reference ranges are available from the Department
- all ranges have been agreed by the department's team of Consultant Haematologists

For further details on haematology reference ranges refer to:
- Dacie and Lewis Practical Haematology, 12th Edition: 2016, ISBN: 9780702066962 and
- Pediatric Hematology, 3rd Edition: 2006, ISBN: 9781405134002

Age-related reference ranges have been condensed to cover generally recognised stages of development and are generally added to the report automatically by the laboratory IT system when the result is generated. The following terms are used for age-related guidance:

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

Full Blood Count reference ranges

Adult's ranges were selected from Phase II of the Pathology Harmonisation Project published under pathologyharmony.co.uk and for children the ranges were selected from Pediatric Haematology.
- Pediatric Hematology, 3rd Edition: 2006
  RJ Arceci (Ed), IM Hann (Ed) & OP Smith (Ed). ISBN: 9781405134002
  Chapter 37, Reference values (PS Simpkin & RF Hinchliffe).
  The selected ranges were verified based on the local adult and paediatric population according to age and gender.

Coagulation reference ranges

Adult's ranges are taken from Sysmex published ranges and were then verified locally using normal donors and for children the ranges were selected from:
- Age dependency of coagulation parameters during childhood and puberty
  IM Appel , B Grimminck et al. Journal of Thrombosis and Haemostasis 2012;10:2254–2263
- Age dependency for coagulation parameters in paediatric populations
  Results of a multicentre study aimed at defining the age-specific reference ranges
  P Toulon, M Berruyer et al. Thrombosis and Haemostasis 2016;116:9-16

- Ranges published by Sysmex Corporation (Sysmex UK Ltd) and provided by Great Ormond Street NHS Foundation Trust

Abnormal Haemoglobin and related reference ranges

Haemoglobin A2 and F reference ranges were verified on the local adult and paediatric population with reference to the leading article:

- Significant haemoglobinopathies: guidelines for screening and diagnosis
  K Ryan, BJ Bain et al. British Journal of Haematology 2010;149:35–49

Glucose 6 Phosphate Dehydrogenase (G6PD) assay reference ranges were selected from those used by Sheffield Teaching Hospitals NHS Foundation Trust and verified on the local adult population.

Erythropoietin assays reference ranges were selected from Leeds Teaching Hospital NHS foundation Trust, using the manufacturer Beckman Coulter published ranges as a guide and were verified on the local adult population.

Blood Counts

	Birth (Term)	2-14 days	15-30 days	1-3 month	3 -12 months	1-6 years	6-12 years	12-18 years (female)	12-18 years (male)	18-150 Female	18 - 150 Male
RBC	3.7 - 6.5	3.9 - 6.0	3.3 - 6.0	3.1 - 4.5	3.8 - 4.9	3.9 - 5.1	3.9 - 5.2	4.1 - 5.1	4.2 - 5.5	3.8-5.5	4.5-6.0
x10*12/L											
Hb	149 - 237	134 - 205	110 - 180	94 - 130	100-130	101-138	111-147	121-151	121-166	115-165	130-180
g/L											
Hct	0.47-0.75	0.41-0.68	0.3-0.5	0.28-0.42	0.30-0.38	0.3-0.4	0.32-0.43	0.35-0.44	0.35-0.49	0.37-0.47	0.4-0.52
L/L											
MCV	100-130	95-120	90-105	84-98	73-95	73-88	77-91	78-95	78-95	80-98	80-98
fL											
MCH	32.0-39.0	30.0 - 40.0	30.0-36.0	27.5-34.0	23.0 - 31.5	24.0 - 30.0	24.0 - 30.0	26.0 - 32.0	26.0 - 32.0	27.0-33.0	27.0-33.0
pg											
MCHC	300 - 360	300 - 365	300 - 360	300 - 350	330 - 360	310 - 350	310 - 350	310 - 360	310 - 360	320-365	320-365
g/L											
WBC	6.0 - 26.0	6.0 - 21.0	5.0 - 20.0	5.0 - 17.0	6.0 - 17.0	6.0 - 17.0	4.5 - 14.5	4.5 - 13.0	4.5 - 13.0	4.0-11.0	4.0-11.0
x10*9/L											
Neuts	2.7 - 14.4	1.5 - 10.0	1.0 - 9.0	1.0 - 8.0	1.0 - 6.0	1.0 - 8.5	1.5 - 8.0	1.5 - 6.0	1.5 - 6.0	1.8-7.5	1.8-7.5
x10*9/L											
Lymphs	2.0 - 7.3	2.8 - 9.1	2.8 - 10.0	3.3 - 10.3	3.3 - 11.5	1.8 - 10.5	1.5 - 5.0	1.5 - 4.5	1.5 - 4.5	1.0-4.0	1.0-4.0
x10*9/L											
Monos	0.1 - 2.5	0.1 - 2.0	0.1 - 1.5	0.2 - 1.5	0.2 - 1.3	0.1 - 1.3	0.1 - 1.3	0.1 - 1.3	0.1 - 1.3	0.2-1.0	0.2-1.0
x10*9/L											
Eos	0.0 - 0.9	0.0 - 0.9	0.0 - 0.9	0.02 - 0.9	0.05 - 1.1	0.05 - 1.1	0.05 - 1.0	0.05 - 0.8	0.05 - 0.8	0.0-0.4	0.0-0.4
x10*9/L											
Baso	0.0 - 0.1	0.0 - 0.1	0.0 0.1	0.02 - 0.13	0.02 - 0.2	0.02 - 0.13	0.02 - 0.12	0.02 - 0.12	0.02 - 0.12	0.0-0.1	0.0-0.1
x10*9/L											
Plats	150 - 450	150 - 500	150 - 600	150 - 650	150 - 560	150 -550	150 - 450	150 - 430	150 - 430	150-400	150-400
x10*9/L											
Ret %	2.0 - 6.0	2.0 - 6.0	1.0 - 3.0	0.2 - 2.0	0.2 - 2.0	0.2 - 2.0	0.2 - 2.0	0.2 - 2.0	0.2 - 2.0	0.5-1.5	0.5-1.5
Ret Abs	80 - 360	80 - 360	33 - 180	6 - 100	7 - 105	8 - 105	8 - 105	8 - 110	8 - 110	20-80	20-80
x10*9/L											
RDW-CV	11.0-14.8	11.0-14.8	11.0-14.8	11.0-14.8	11.0-14.8	11.0-14.8	11.0-14.8	11.0-14.8	11.0-14.8	11.0-14.8	11.0-14.8
%											
IPF										0-6	0-6
%											
RETHB	28.0-30.8	28.0-30.8	28.0-30.8	28.0-30.8	28.0-30.8	28.0-30.8	28.0-30.8	28.0-30.8	28.0-30.8	28.0-30.8	28.0-30.8
pg											
MPV	7.1-10.7	7.1-10.7	7.1-10.7	7.1-10.7	7.1-10.7	7.1-10.7	7.1-10.7	7.1-10.7	7.1-10.7	7.1-10.7	7.1-10.7
fl											

	<Month	1month-3month	3months-6month	6months-12month	1-5 years	6-10 years	11-16years	Adult
PT secs	8.2-14.1	8.2-14.1	9.6-11.8	9.6-11.8	9.9-11.8	9.9-11.8	9.9-11.8	9.9-11.8
APTT with Actin FS secs	28-38	28-38	24-38	24-33	21-30	21-30	21-30	21-30
Fibrinogen g/L	1.7-4.2	1.7-4.2	1.7-4.2	1.7-4.2	1.7-4.2	1.7-4.2	1.7-4.2	1.7-4.2
D-Dimer ng/ml FEU	<190-500	<190-500	<190-500	<190-500	<190-500	<190-500	<190-500	<190-500
Thrombin time secs	15.5-19.4	15.5-19.4	15.5-19.4	15.5-19.4	15.5-19.4	15.5-19.4	15.5-19.4	15.5-19.4

Erythrocyte Sedimentation Rate (ESR).

Female/Males less than 16 years old 4-10 mm per first hour
Females greater than 16 years old) 0 – 7 mm per first hour
Males (greater than 16 years old) 0 - 5 mm per first hour.

Plasma Viscosity

(mPa/s at 25 ^{0}C)
Two Key advantages when compared to the ESR test:

1. Plasma Viscosity Results are calibrated to a primary standard
2. Plasma Viscosity is not altered by co-existing non-related factors e.g., anaemia

<1.50 mPa/s	Children <3 years Hypoproteinaemia (can be due to chemotherapy)
1.50 – 1.72 mPa/s	Normal Adult range
1.72 – 1.80 mPa/s	Equivocal result suggest repeat after appropriate time
1.80 – 2.00 mPa/s	Suggestive of chronic condition
2.00 – 2.30 mPa/s	Suggestive of acute condition
>2.30	Suggestive of Myeloma
>2.90	Hyperviscosity. Exclude Macroglobulinaemia as the cause

Glandular Fever Screen

Limitations for infectious mononucleosis (glandular fever): the test detects heterophile antibodies in whole blood. Approximately 10% of adults and up to 40% of children under the age of 5 years do not produce these antibodies so will give a negative screening test. Always consider the test result in combination with clinical symptoms and results of the white cell differential.

Reptilase Time secs	18.0-22.0	18.0-22.0	18.0-22.0	18.0-22.0	18.0-22.0	18.0-22.0	18.0-22.0	18.0-22.0
FII (u/dL)	26-93	34-102	45-105	50-116	78-130	78-130	78-130	78-130
FV (u/dL)	34-145	50-134	50-132	50-127	65-140	65-140	65-140	65-140
FVII (u/dL)	28-143	42-138	39-143	47-127	65-160	65-160	65-160	65-160
FVIII (u/dL)	50-154	50-157	50-125	50-109	50-170	50-170	50-170	50-170
VWAg (u/dL)	61-223	61-223	61-223	59-163	50-154	50-154	50-154	50-154
RCF (u/dL)	50-287	50-206	50-197	50-150	50-150	50-150	50-150	50-150
FIX (u/dL)	15-91	21-81	21-113	36-136	60-160	60-160	60-160	60-160
FX (u/dL)	12-79	31-87	35-107	38-118	70-140	70-140	70-140	70-140
FXI (u/dL)	10-87	27-79	41-97	49-134	60-140	60-140	60-140	60-140
FXII (u/dL)	13-83	17-81	25-109	39-115	55-160	55-160	55-160	55-160
FXIII (u/dL)	27-147	36-172	46-162	42-128	60-156	60-156	60-156	60-156
Chromogenic FVIII (u/dl)	56-150	56-150	56-150	56-150	56-150	56-150	56-150	56-150
AT3A (u/dL)	39-93	48-108	73-121	84-124	79-131	79-131	79-131	79-131
Protein C (u/dL)	17-64	21-65	28-80	37-81	70-130	70-130	70-130	70-130
Free Protein S (u/dL)	32-100	60-98	60-125	70-140	65-135	65-135	65-135	65-135

Coagulation

For significantly abnormal results suggest discussion with Haematology Consultant or Senior Registrar.

Adult - Haemostasis SPR bleep number 2022.
Paediatrics – ask switch to page Dr Grainger.
If we are unable to reach any ward/department with significantly abnormal results which require immediate action we will bleep the Lead Nurse on 2677.

ISTH DIC scoring system

The ISTH group produced a simple scoring system for the diagnosis of DIC depending on the Platelet count, the PT, the fibrinogen level and critically the FDP/D-Dimer results:

PARAMETER **RESULT** **SCORE**

1. Platelet count	>100x10^9/l	0
	<100x10^9/l	1
	< 50x10^9/l	2
2. PT	<3s prolonged	0
	>3s but <6s	1
	>6s	2
3. Fibrinogen	>1.0g/l	0
	<1.0g/l	1
4. FDP/D-Dimer	No increase	0
	Moderate increase	2 (500-10000)
	Strong increase	3 (>10000)

A total score of ≥5 = DIC as long as the score is associated with a clinical disorder known to cause DIC. If the score is ≥5 you must ring the ward/medic and make them aware of the risk of DIC.

Guidance Note: D-dimer testing in the diagnosis of venous thromboembolism (VTE) in hospital patients

- VTE is highly unlikely in patients who are judged by means of a clinical scoring system to be clinically unlikely to have VTE, and who have a negative D-dimer test.
- D-dimer testing has very limited usefulness to aid diagnosis in patients where the clinical probability of VTE is high.
- D-dimer is frequently raised in hospital inpatients without VTE.
- D-dimer is increased in infection, cancer, inflammation, surgery, trauma, ischaemic heart disease, stroke, pregnancy, sickle cell disease & trait.
- D-dimer testing is not useful in the diagnosis of VTE in patients with concomitant diseases.
- There is a decrease in the specificity of D-dimer testing for VTE with increasing age (i.e., D-dimer testing is less reliable in older patients).
- D-dimer should not be used to exclude VTE in children. The negative predictive value of D-dimer in children with suspected VTE has not been validated and levels may vary with age.

Guidance

- D-dimer testing should only be requested in patients with a low clinical probability of VTE, or in the assessment of recurrence risk for VTE post completion of anticoagulant therapy.
- In patients with a high clinical probability of VTE, or in patients with co-existing illness, D-dimer testing is unlikely to add any useful diagnostic value and should not be requested.

Reference

Thacil J et al, Appropriate use of D-dimer in hospital patients. *Am J Med* 2010, 123, 17-9.

Guidance on Laboratory testing for Heritable Thrombophilia is available to view on the Trust intranet

Guidance on Laboratory testing for Heritable Thrombophilia

Detailed information and guidance on "Thromboprophylaxis in Pregnancy and the Puerperium" is available on the Intranet in the maternity section of Staffnet Policies: http://staffnet.cmft.nhs.uk/Policies/Default.aspx

Warfarin Scheme

WARFARIN SCHEME				
DAY	**APTT (9-10am) Target**	**Heparin Dose**	**IF INR**	**Warfarin dose given at 5.00pm**
1 Start	2-3 ratio	As per APTT	< 1.4	10 mg
2		As per APTT	< 1.8 1.8 > 1.8	10 mg 1 mg 0.5 mg
3	2-3 ratio	As per APTT	< 2.0 2.0-2.3 2.4-2.7 2.8-3.1 3.2-3.4 3.5-4.0 > 4.0	10 mg 5 mg 4 mg 3 mg 2 mg 1 mg NIL

4		Stop Heparin		Predicted Maintenance
				>8 mg
			<1.4	8 mg
			1.4	7.5.mg
			1.5	7 mg
			1.6-1.7	6.5 mg
			1.8	6 mg
			1.9	5.5 mg
			2.0-2.1	5 mg
			2.2-2.3	4.5 mg
			2.4-2.6	4 mg
			2.7-3.0	3.5 mg
			3.1-3.5	3 mg
			3.6-4.0	
				Nil then 2mg
			4.1-4.5	
			>4.5	Nil for two days and then 1 mg

Guidelines for Heparin Dosage for Heparinization for Thrombotic Conditions

GUIDELINES FOR HEPARIN DOSAGE FOR HEPARINIZATION FOR THROMBOTIC CONDITIONS			
Take baseline PT APTT Give 5,000 i.v. bolus then start pump at 30,000 units over 24 hrs (eg 30,000 units in 24 mls of N Saline and set pump at 1ml per hour) Repeat APTT after 6 hrs			
	Bolus	**Rate**	**Repeat APTT**
APTT Ratio <1.5	5,000	+2,500 units over 24 hrs	6hr-12hr
APTT Ratio 1.5-2.0	Nil	+2,500 units over 24 hrs	6hr-12hr
APTT ratio 2.0-3.0	Nil	Same dose	Next Morning
APTT Ratio 3.0-3.5	Nil	-2,500 units over 24 hrs	Next Morning
APTT Ratio 3.5-4.0	Nil	Stop for 1 hr then -2,500 units over 24 hrs	6hr-12hr
APTT Ratio >4.0	Nil	Stop for 2hr then -5,000 units over 24 hrs	6hr-12hr

For S.C.Heparin 250 iu/kg b.d. [200 for females > 60yrs] Take specimen 4-6hrs post injection		
APTT RATIO	**DOSE ADJUSTMENT**	**REPEAT APTT**
<1.5	+2,500 units b.d	Next Morning
1.5-2.0	+1.250 units b.d.	Next Morning
2.0-3.0	No change	Next Morning
3.0-3.5	-1,250 units b.d.	Next Morning
3.0-4.0	-2,500 units b.d	Next Morning
>4.0	-5,000 units b.d	Next Morning

Haematinics

Erythropoeitin (EPO)	3-18 mIU/mL

Haemolytics

Haemoglobin A2	2.3 - 3.3 %	
Haemoglobin F	< 1.5 %	
G6PD Assay	11.2 – 18.8 IU/g Hb 7.3 – 14.1 IU/g Hb	0-6 months old >6 months old

G6PD Assay and the testing of travel controls from external sites

When referring tests to MFT we require a completely anonymised sample, that is suspected to be normal but taken under similar circumstances and of similar age to accompany the test samples as a "travel control". The travel control will only be tested in the event of abnormal results on the patient test samples to ascertain that abnormal results are not due to unknown issues which may affect samples during transit. Should the travel control then also show abnormal results the patient test results will be rejected, and a repeat sample requested as it may be assumed that the test results are not reliable due to poor travel conditions. No results will ever be reported on the anonymised travel control. It is a UKAS requirement that the influence of travel conditions is considered when interpreting results.
This list is not exhaustive-there may be other factors affecting the reporting of results which are not listed

List of Referral Samples

Referral Test	Referral Centre	Results Available
Paroxysmal nocturnal hemoglobinuria (PNH)	Leeds Teaching Hospitals	Directly reported to clinicians
Pyruvate Kinase (PK)	King's College Hospital London (Viapath labs)	Directly reported to clinicians
Vaccine-Induced Immune Thrombotic Thrombocytopenia (VITT) Screening (PF4)	Royal Hallamshire	Directly reported to clinicians
Malaria Confirmation	Liverpool School of Tropical Medicine	Urgents within 24 hours 3 Days
Alpha 2 Antiplasmin	Royal Hallamshire	6 weeks
Adamts13	Liverpool Royal Hospital	Urgents within 24 hours 7 Days
Haptoglobin	Pennine Acute Trust	3 days
HIT Confirmation test	NHSBT Filton	Directly reported to clinicians
Free fetal DNA (cffDNA)	NHSBT - Filton	14 days
Fetal genotyping	NHSBT - Filton	7 working days
Cold agglutinins	NHSBT - Liverpool	5 working days
RCI ABO/D and Antibody confirmation	NHSBT - Liverpool	5 working days
RCI Crossmatch	NHSBT - Liverpool	1 day
Antenatal Quantification/Titre	NHSBT - Liverpool	5 working days
Neonatal alloimmune thrombocytopenia (NAIT)	NHSBT - Filton	5 working days
Neonatal alloimmune neutropenia (NAIN)	NHSBT - Filton	14 working days
Confirmation of IgA deficiency / antibodies	NHSBT - Liverpool	5 working days
Paternal phenotyping	NHSBT - Liverpool	5 working days
Quantification of Fetomaternal haemorrhage	NHSBT - Liverpool	5 working days
Extended red blood cell phenotype	NHSBT - Liverpool	5 working days
RCI Positive DAT	NHSBT - Liverpool	5 working days
HLA Typing	NHSBT - Barnsley	10 days
HNA Typing	NHSBT - Barnsley	14 days
HPA Typing	NHSBT - Filton	3 working days
Haemolytic disease of the newborn (HDFN)	NHSBT - Liverpool	5 working days
Transfusion related acute lung injury (TRALI)	NHSBT - Barnsley	30 working days
Post Transfusion Purpura (PTP)	NHSBT - Filton	5 working days
Transfusion-associated Graft Versus Host Disease (TA-GvHD)	NHSBT - Barnsley	30 working days
Platelet refractoriness	NHSBT - Barnsley	7 working days
3C Haematopoetic stem cell transplantation	NHSBT	14 days
3B Organ transplantation	NHSBT	14 days
3D Platelet immunology	NHSBT	14 days
3E Granulocyte immunoloy	NHSBT	14 days

Factors Affecting the Results or Processing of Haematology Tests

Test	Factor Affecting Result/Processing	Outcome
ALL SECTIONS OF HAEMATOLOGY		
All Tests	• Failed Specimen Acceptance Policy (Routine samples and Blood Transfusion samples)	• Would not process
	• Unlabelled	• Would not process
	• Poorly printed label	• Would not process
	• Label not straight on sample	• Would not process
	• Wrong sample for requested test	• Would not process
	• Wrongly labelled	• Would not process
	• Sample leaked in transit	• Would not process (If multiple samples were put in the specimen bag **ALL** samples would not be processed)
	• Sample broke in transit	• Would not process (If multiple samples were put in the specimen bag **ALL** samples would not be processed)
COAGULATION		
Routine clotting tests	Under filled sample	• Would not process
Routine clotting tests	Haemolysis	• Would process Depending on the degree of haemolysis an estimated result may be reported off the analyser with a comment '? Validity of result due to haemolysis'
Routine clotting tests	Lipaemia	• Would process Depending on the degree of lipaemia an estimated result may be reported off the analyser with a comment '? Validity of result due to lipaemia'
All clotting tests	Clotted	• Would not process
Clotting assays	Secondary clot in frozen sample	• Depending on size of clot would process and add comment '? Validity due to secondary clot' or would not process and add comment 'Clotted'

BLOOD COUNTS		
FBC	Small sample	• Paediatric- minimum required sample volume - 500µlotherwise comment 'Insufficient' • Neonate- minimum required sample volume - 160µL- otherwise comment 'Insufficient' Adult – minimum required sample volume – 1.5ml- otherwise comment' Insufficient'
FBC & ESR	Small sample	• Paediatric – separate sample ESR. • FBC + ESR requires 2.5ml in FBC tube otherwise will be reported as 'Insufficient'
FBC &Film	Old Sample (Greater than 24 hours)	• FBC would not be processed and comment-'Too old for analysis' • Film would be reported as –'Too old for morphology'
FBC, ESR & Retic	Clotted Sample, or severe case of Cold Agglutination	• Would not be processed • Severe cases of Cold Agglutination the sample must be sent warm (37^0C) to the laboratory
FBC	EDTA may cause clumping of platelets	• This would result in a falsely low platelet count- laboratory will check a blood film and ask for citrated (Coag) sample to attempt an accurate measurement of the platelets
CSF	Contaminated with red cells	• Would process-appropriate comment will be added
Bone marrow smears	Not enough marrow material to perform stains on	• Could not perform stains-repeats would be requested
BLOOD TRANSFUSION		
X-Match Samples & Grouping Samples	Extreme Haemolysis	• Would not use- repeats will be requested
Grouping Sample	Clotted Sample	• Would not process
Samples for Cold Agglutinins	Sent to the lab 'cold' i.e., not in warm water	• Would not process
HAEMATINICS and HAEMOLYTICS		
Haematinic assays	Haemolysis	• Would process and add appropriate comment
Haemolytic assays	EDTA clotted	• Would not process
Plasma Viscosity	Sample stored in fridge	• Would not process
G6PD Assay	Temperature during transit	• Depends on the results from the travel control sample.

MSBOS

Paediatric and Adult Maximum Surgical Blood Order Schedule

When blood is available for a placenta praevia grades III & IV case, an antibody screen sample is required on Mondays and Thursdays.

All other major surgical procedures will be a 'Group and Save' unless discussed with Blood Transfusion staff beforehand on

Oxford Road Campus	0161 276 4400 or Bleep 2525 Out of Hours
Trafford Site	0161 746 2479 or Bleep 060
Wythenshawe	0161 291 2160 or 291 2161 Bleep 2033
North Manchester Gen	0161 720 2100 or Bleep 4018

If a particular case requires more than the amount indicated on the schedule you must contact the laboratory personnel.

Remember to obtain positive patient identification when taking blood samples. Good documentation is essential. Include on request forms any special requirements e.g., irradiated, previous transfusion history, reason for request and when the blood is required.

NB. In the interest of patient safety, all unused units of blood in the Blood Satellite Fridges **MUST** be returned to the Transfusion Laboratory within **24 hours**.