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Haematology User Guide

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Overview

Haematology forms part of the Blood Sciences Service, along with Blood Transfusion, Biochemistry, Flow Cytometry and Stem Cell Processing. All Services are provided by the Christie Pathology Partnership.

The information in this user guide relates to Haematology services.

The laboratory offers a comprehensive test repertoire for adult haematological investigation and treatment of patients including Blood Counts, Coagulation, Stem Cell Therapeutics and Blood Transfusion services. The laboratory offers Blood Counts and Coagulation for paediatric patients.

There is a separate user guide for Biochemistry available via the Trust Intranet. Information relating to Blood Transfusion services can be found on the Trust Intranet. The Stem Cell Processing laboratory is closely linked with services provided by the Haematology Transplant Unit.

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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.

Contact details of key members of staff

Medical Staff	Name	Telephone	E-mail
Consultant Haematologist and Laboratory Lead	Dr Richard Chasty	446 3370	richard.chasty@nhs.net
Consultant Haematologist	Dr John Chadwick		john.chadwick4@nhs.net
Honorary Consultant	Dr Valarmathi Anandhan		valarmathi.anandhan@nhs.net
Scientific staff			
Blood Sciences Service Manager/Deputy Head of Service	Ms Deborah Seals	07918470626/ 446 3167	deborah.seals@nhs.net
Blood Sciences Laboratory Manager	Ms Madihah Abbas	446 3285	madihah.abbas3@nhs.net
Blood Transfusion Laboratory manager	Mrs Emma Stansfield	446 3566	emma.stansfield1@nhs.net
Stem Cell Laboratory manager	Mrs Sarah Wilson	446 8096	sarah.wilson128@nhs.net
Out of hours Biomedical Scientist (8pm – 8am)		07387140948	

NB all telephone numbers should be prefixed with 0161 from outside Manchester

The contact number for the haematology department is 0161 446 3285.
The full contact details of all laboratory personnel can be found on the staff directory.

The location of the laboratory

The Haematology laboratory is situated within the Pathology Department **(Department 45)** located at the Wilmslow Road end of the 1st floor corridor, above main out-patients. Follow the silver signage throughout the hospital for Pathology.
Alternatively, you could download the Christie app for real time navigation on your phone. Search for 'The Christie' on the App Store or Google Play.

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Times of opening of the Haematology/Transfusion laboratory

Monday to Friday 08:30 – 17:00	Routine service - Please ensure that samples for routine requests are sent to the laboratory within these hours
Monday to Friday: 17:00-21:00	Restricted service provided on site covering Haematology / Transfusion.
Saturday, Sunday & Bank holidays: 09:00-17:00	Restricted service covering Haematology / Transfusion
Mon – Fri 20:00 – 07:00 Weekends 17:00 – 08:00	One BMS providing a Blood Transfusion service for urgent work required for the immediate management of the patient. The BMS MUST be contacted prior to urgent samples being sent.

Haematology Medical staff are available for advice. During normal working hours they can be contacted using the phone numbers provided above and via switchboard at all other times.

Details of out of hours service

Please send haematology and blood transfusion samples via the pneumatic tube system to reception number 111 or 222.

Results will be available on CWP; Request forms should have a contact number to advise of grossly abnormal results.

24 hours service is provided for both routine and Urgent work. The following services are available:

- Full Blood Count, Reticulocyte & Coagulation Screen
- Clauss Fibrinogen, D. Dimer and Anti-Xa, acute DIC,
- ESR
- Blood Film e.g new leukaemia, manual differential etc
- Malaria Parasite

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Services offered by the Haematology laboratory

GENERAL HAEMATOLOGY TEST REPERTOIRE TESTS	SPECIMEN REQUIRED	TURNAROUND TIMES (measured from receipt in lab)	SPECIAL INSTRUCTIONS	KEY FACTORS AFFECTING TEST PERFORMANCE OR INTERPRETATION
Full Blood Count (FBC)	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	30 mins	Send to lab within 4hrs Processed within 12hrs Sample Stability: @Room Temp = 24hrs @Refridgerated = 72hrs	Cold red cell autoagglutinnins Lipaemia (these are corrected in lab)
Platelet clumping (Citrated Platelet Count)	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA + 3.0 ml green top or 2.7 ml blue top citrate	30 mins	State ‘’ for platelet clump’’ on the request form	To obtain an accurate platelet count due to the platelet clumps in the blood
Erythrocyte Sedimentation Rate (ESR)	3.4 ml red top or 3.0 ml pink top EDTA	3 hrs	Tube must be correctly filled	Cold red cell autoagglutinnins & haemolysis (test will not be reported)
Reticulocyte count	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	30mins		
Blood film (manual differential)	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	24 hrs		Prolonged exposure to EDTA anticoagulant may result in abnormal cell morphology
Infectious mononucleosis screen (Glandular fever)	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	8 hrs		Some patients do not produce antibody. In early-stage antibody may be undetectable.

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GENERAL HAEMATOLOGY TEST REPERTOIRE TESTS	SPECIMEN REQUIRED	TURNAROUND TIMES (measured from receipt in lab)	SPECIAL INSTRUCTIONS	KEY FACTORS AFFECTING TEST PERFORMANCE OR INTERPRETATION
Malarial Parasites	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	8 hrs	State travel history on the request form. Send sample for 3consecutive days if suspected	
Sickle screen	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	8 hrs	Urgent requests should be notified to the lab by phone	Requestor should indicate if patient has been recently transfused
Bone marrow aspirate for morphology slides ONLY	Bone marrow sample in EDTA	7 days for morphology report	Discuss with Consultant Haematologist Send to lab within 30 mins Processed within 4hrs Sample Stability: @Room Temp = 24hrs @Refridgerated = 72hrs	Send straight to lab after taking sample. Prolonged exposure to EDTA anticoagulant may result in abnormal cell morphology.
CSF Cell count and Cytopathology (Cytospin)	Min Vol 1.5 ml (30 drops) CSF fluid in plain bottle	Cell counts same day – 30 minutes Cytopathology – 3 days	ONLY send samples to lab before 17:00 Send to lab within 30 mins Processed within 3hrs Sample Stability: @Refridgerated = 24hrs	Urgent requests should be notified to the lab by phone. Cell count might not be processed if sample is insufficient.
Ascitic and Pleural Fluids	Fluid in plain bottle	Cytopathology – 3 days	Patients with haematological malignancies **ONLY**	

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COAGULATION TEST REPERTOIRE TESTS	SPECIMEN REQUIRED	TURNAROUND TIMES	SPECIAL INSTRUCTIONS	KEY FACTORS AFFECTING TEST PERFORMANCE OR INTERPRETATION
Clotting Screen (PT + INR + APTT + Fibrinogen + Clauss Fibrinogen)	3.0 ml green top or 2.7 ml blue top citrate; Fill exactly	60 mins	All coagulation tests require a good clean venepuncture to avoid sample activation. Send to lab within 2hrs Processed within 4hrs Sample Stability: @Room Temp = 24hrs	Patient on any anticoagulants – please inform the lab. Under filled samples may result in falsely prolonged clotting times and will not be processed. Contamination with heparin will result in a prolonged APTT
D-Dimer (DD)	3.0 ml green top or 2.7 ml blue top citrate. Fill exactly	4 hours		
Anti-Xa	3.0 ml green top citrate or 2.7 ml blue top Fill exactly. This sample must be tested within 4hrs of being taken.	60 mins	Anti-Xa testing should be carried out **4hrs post administration** for all LMWH.	State given dose on the request form.
Thrombin time (TT)	3.0 ml green top or 2.7 ml blue top citrate	4 hours		

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Referred tests

Some specialised or low volume assays are referred to suitably accredited external laboratories for analysis. See the list of referral laboratories. Reference ranges for referred tests are supplied by the referring hospital.

TESTS REFERRED TO OTHER HOSPITALS TEST	SPECIMEN REQUIRED	TURNAROUND TIME	SPECIAL INSTRUCTIONS	REFERRED TO
Haemoglobin Electrophoresis (Haemoglobinopathy Screen)	3.4ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	7 days	Separate request from routine FBC Please complete the form below and send to lab: Haemoglobinopathy Referral Form.doc›	Trafford General Hospital (MFT)
Plasma Viscosity (PV)	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	7 days	DO NOT refrigerate	Wythenshawe Hospital (MFT)
Glucose-6-phosphate dehydrogenase (G6PD)	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	7 days (for the G6PD screen a result can be made available within 24 hours but the lab must be informed this is urgent so that we can liaise with MFT on this)	1ml min volume. **FBC & Retics MUST be requested.** Please complete the form below and send to lab: G6PD-Referral-MRI.pdf	Manchester University NHS Foundation Trust (MFT)

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ADAMTS-13	2 x 3.0 ml green top or 2.7 ml blue top citrate plus %ml plain clotted	2 - 4 weeks	Discuss with Haematologist Please complete the form below and send to lab: ADAMTS-13 Assays Referral form.doc	Royal Hallamshire Hospital (Sheffield)
Haemochromatosis (HFE Mutation)	3.4 ml red top or 3.0 ml pink top or 4.0 ml purple top EDTA	2 weeks	Separate request from routine FBC Please complete the form below and send to lab: HFE Mutation Form.docx	Northwest Genomic Laboratory (GDL) St Marys Hospital

Please note: If the referred tests are requested without sending a completed request form to the lab (Department 45), the test will be rejected and this may cause unnecessary delays.

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Referred Specialist Coagulation Tests:

Coagulation factors	3.0 ml green top or 2.7 ml blue top citrate		2 weeks		Manchester University NHS Foundation Trust (MFT)
Intrinsic factors (VIII, IX, XI, XII)	X2	X4			
Extrinsic factors (I, II, VII, X)	X2				
FXIII & Inhibitors	X2				
Von Willebrand Screen (FVIII, FVIII:Ag, FVIII: Act)	2 x 3.0 ml green top or 2.7 ml blue top citrate		2 weeks		Manchester University NHS Foundation Trust (MFT)
Lupus Anticoagulant Screen	2 x 3.0 ml green top or 2.7 ml blue top citrate		2 weeks	Indicate if patient on anticoagulants	Manchester University NHS Foundation Trust (MFT)
Thrombophilia Screen (AT, PC, FPS, APC, Lupus, TT)	3 x 3.0 ml green top or 2.7 ml blue top citrate		2 weeks	Patient should be 1 month post anticoagulant therapy or post thrombotic episode	Manchester University NHS Foundation Trust (MFT)
Factor VIII Inhibitor Screen	3.0 ml green or 2.7 ml blue top CITRATE		4 weeks unless urgent		Manchester University NHS Foundation Trust (MFT)
Prothrombin Gene Variant	3.0 ml green or 2.7 ml blue top CITRATE		2 weeks		Manchester University NHS Foundation Trust (MFT)
VWF Multimers (VWD)	3.0 ml green or 2.7 ml blue top CITRATE		4 weeks		Manchester University NHS Foundation Trust (MFT)
Factor V Leiden Gene Mutation	**3.4 ml EDTA sample**		2 weeks		Manchester University NHS Foundation Trust (MFT)
Reptilase Time	3.0 ml green or 2.7 ml blue top CITRATE				Manchester University NHS Foundation Trust (MFT)

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- If multiple factor assays are requested. Please contact the lab to confirm exact number of samples required.
- For any test not listed, please contact Haematology (ext 3285) to discuss test availability and specimen requirements.
- For ALL Flow Cytometry (ext 3286) requests please refer to the Flow Cytometry User Guide (MI-Haem-CPP-Flow User Guide).

NORMAL ADULT HAEMATOLOGICAL REFERENCE INTERVALS

	Units	Male	Female	Range Basis
WBC	$x10^9$/L	4.0-11.0	4.0-11.0	
Hb	G/L	130-180	115-165	
PLATELETS	$x10^9$/L	150-400	150-400	
RBC	$x10^{12}$/L	4.50-6.50	3.80-5.80	
MCV	fl	76.0 – 96.0	76.0 – 96.0	
HCT(PCV)	ratio	0.40-0.54	0.37-0.47	
MCH	pg	27.0-32.0	27.0-32.0	
MCHC	G/L	320-360	320-360	
RDW	%	12.0 16.0	12.0 16.0	Haematological values for normal individuals taken from Dacie & Lewis *
Differential				
Neutrophils	$x10^9$/L	2.0-7.5	2.0-7.5	
Lymphocytes	$x10^9$/L	1.5-4.0	1.5-4.0	
Monocytes	$x10^9$/L	0.20 – 0.80	0.20 – 0.80	
Eosinophils	$x10^9$/L	0.04 – 0.40	0.04 – 0.40	
Basophils	$x10^9$/L	0.00 – 0.10	0.00 – 0.10	
LUC	$x10^9$/L	0.0 – 0.40	0.00 – 0.40	
Reticulocytes #	$x10^9$/L	9 – 130	8-116	Local range
Reticulocyte %	%	0.5-2.5	0.5-2.5	
ESR (Mini-Cube)	mm/Hr	0-14	0-20	See * above
Plasma Viscosity	mPa.s	1.5 - 1.72	1.5 – 1.72	From external provider
Blood coagulation				
Prothrombin Time	sec	9.0 – 14.0	9.0 – 14.0	
APTT	sec	18.5 – 30	18.5 – 30	
APTT Ratio for Heparin Dosage		1.50 - 2.50	1.50 - 2.50	Local range
Thrombin Time	sec	12 – 19	12 – 19	
Fibrinogen	g/L	2.0 - 4.0	2.0 - 4.0	See *above
D-Dimer	ng/ml	0 - 500	0 - 500	Local range
Anti – Xa		0.5 – 1.5 IU/ml		
Therapeutic **once daily** dosing		(Expected peak 1.0 IU/mL)		
High-level ranges		> 2.0 IU/ml		
Therapeutic **twice daily** dosing		0.5 – 1.0 IU/ml		
Serum B12, Serum Folate, Serum Ferritin		See Biochemistry ref. ranges		

**Local ranges are established from 20 – 50 normal samples*

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PAEDIATRIC/ YOUNG ADULTS HAEMATOLOGICAL REFERENCE INTERVALS

	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)
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
x10*12/L									
Hb	149 - 237	134 - 205	110 - 180	94 - 130	100-130	101-138	111-147	121-151	121-166
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	0.32-0.42	0.35-0.44	0.35-0.49
L/L									
MCV	100-130	95-120	90-105	84-98	73-95	73-88	77-91	78-95	78-95
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
pg									
MCHC	300 - 360	300 - 365	300 - 360	300 - 350	330 - 360	310 - 350	310 - 350	310 - 360	310 - 360
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
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
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
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
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
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
x10*9/L									
Plats	150 - 450	150 - 500	150 - 600	150 - 650	150 - 560	150 -550	150-430	150 - 430	150 - 430
x10*9/L									
Ret %	2.0 - 6.0	2.0 - 6.0	0.20-2.0	0.2 - 2.0	0.2 - 2.0	0.2 - 2.0	0.2 - 2.0	0.2 - 2.0	0.2 - 2.0
Ret Abs	80 - 360	80 - 360	33 - 180	6 - 100	7 - 105	8 - 105	8 - 105	8 - 110	8 - 110
x10*9/L									
RDW	11 - 14	11 - 14	11 - 14	11 - 14	11 - 14	11 - 14	11 - 14	11 - 14	11 - 14
%									

Children reference 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.

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	<Month	1month-3month	3months-6month	6months-12month	1-5 years	6-10 years	11-16years
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
APTT with Actin FS secs	28-38	28-38	24-38	24-33	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
D-Dimer ng/ml FEU	<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

Children reference 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

Consent

It is the responsibility of the requesting clinician to obtain consent from the patient for the collection of blood specimens. For certain tests (e.g. bone marrow aspiration) a consent form may be required in addition to the request form.

Instructions for requesting tests

Patient preparation and blood sampling:

Trust I.V. policies managed by clinical skills team can be found at the following link:
https://hive.xchristie.nhs.uk/Interact/Pages/Section/Default.aspx?Section=2399

- Select Haematology User Guide under User Guide

Any patient preparation requirements for tests are detailed in the Haematology Test Repertoire above

All specimens must be fully labelled and accompanied by a completed combined Blood Sciences request form. Inadequately or incorrectly labelled samples will not be processed

Request form:

Required:

- Forms should be labelled on both copies with an addressograph label showing patients full name, hospital number and date of birth.
- Handwritten forms should have the full name and hospital number and / or date of birth.
- Test required must be clearly indicated.
- High risk status MUST be indicated where appropriate on the form.
- Clearly state if on GCSF/or Anticoagulants.

Desirable:

- Consultant, location and date
- Reason for request / clinical information

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- Requestor's contact number.
- The time the specimen was taken and signature of sample taker.

The specimen
Details of specimen type and volume required are detailed in the Haematology Test Directory.
Check expiry dates on the specimen tube before use

Required:

- All specimens must have the full name, hospital number and /or date of birth completed by hand. These much match the details on the request form. Addressograph labels may only be used on samples from the Endocrine unit only.
- High Risk status must be indicated by a label on the sample if appropriate.
- Specimens from patients receiving GMOs as part of treatment must be identified with the 'GMO'label.
- Coagulation and ESR samples must be correctly filled.
- NB. At no time should blood be transferred from one container to another. This may result in contamination of the specimen with inappropriate anticoagulant and will invalidate the results obtained.
- Date and time specimens were taken
- Location of patient
- Signature of specimen taker.

Urgent Samples

Requests to process samples urgently should be conveyed by a phone call to the laboratory or a personal request when the sample is delivered

Non compliance:

1. Unlabelled specimens will be referred to designated senior staff and discarded unless it is not possible for them to be repeated. An attempt will be made to contact the requestor and request a repeat sample.
2. Specimens that cannot be easily repeated - an attempt will be made to contact the staff member who took the specimen so that the sample can be identified and labelled. The specimen will not be processed until it has been labelled. A note will be made on the final report that the specimen was received unlabelled, and that the laboratory cannot take responsibility for actions taken as a consequence of the report.
3. Incorrectly / inadequately labelled specimens - an attempt will be made to contact the requestor to allow correction / completion of the labelling. Where there is conflicting information the person taking the specimen will be asked to re-label it. If the name is correct but other details are incorrect the specimen can be sent back for correction. If the name is incorrect the sample must be discarded
4. Incorrectly filled coagulation and ESR specimens - the ward will be informed and repeat samples requested. The specimen will only be processed in extreme cases where it is difficult to obtain another sample. The decision as to the suitability of the

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sample rests with senior laboratory staff. If processed, the results will state that the laboratory cannot guarantee the accuracy of the results.

Instruction for transportation of samples

All specimens collected must be transported to the laboratory as soon as possible unless otherwise stated. All specimens must be in a sealed bag. Carry all specimens in the trays or boxes where provided, but never in pockets.

All specimens must be transported to the laboratory at ambient temperature unless otherwise stated.

Bone Marrow and CSF samples MUST be sent immediately after taking the samples and transported in person. Never send bone marrows and CSFs in the tube system.

Various personnel within the Trust will be involved in transport of specimens to and from the laboratory either by hand or via the POD system. In order to protect theirs and others safety the following guidelines should be followed.

Touch specimen containers as little as possible. If you do touch them, wash your hands as soon as practicable afterwards. Cover any cuts and grazes with a waterproof dressing. Diagnostic samples must be sealed in the plastic bag attached to the request form. Carry all specimens in the trays or boxes, where provided, never in pockets. If a specimen leaks into a tray or 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 try to clear up the mess stay with the specimen to prevent other people touching it and send someone to the laboratory for help. If you spill the specimen on to your overall, you must remove it at once and then wash your hands and put on a clean overall. Report the accident to your supervisor as soon as possible.

If a specimen is dropped or broken, do not touch it or try to clear up the mess. Stay with the specimen to prevent other people touching it and send someone to the laboratory for help. If you spill the specimen onto your overall, you must remove it at once and then wash your hands and put on a clean overall. Report the accident to a supervisor as soon as possible. Handle specimen containers gently at all times. See Trust Procedures available under Trust Documents on the Intranet: 'Safe use and disposal of sharps policy' (See also Trust Document on Intranet "Waste Management Policy").

The use of the pneumatic tube system for the transport of specimens to the Blood Sciences laboratory must be performed in accordance with Trust policy. Guidance on the use of the pneumatic tube transfer system can be found by contacting the Tec bar directly:

Reporting of Results

Some results are automatically validated if they fulfil stringent pre-set criteria; otherwise they are clinically validated by appropriately qualified laboratory personnel.

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Comments may be appended and additional analyses undertaken based on the clinical details provided and on previous results.

Results are produced in electronic form in the electronic patient record (CWP). Interim and final results are flagged in the appropriate column. *Please note: If any element of the test is marked with an 'I' then final validation for the whole test is incomplete and results may be subject to change, therefore clinicians are advised to contact the laboratory before making any clinical decisions based on an interim result.*

The laboratory will endeavour to telephone results when they have changed significantly from a previous episode or are grossly abnormal, to facilitate this please ensure the correct patient location is provided on the request form.

We aim to provide a user-responsive service with rapid turnaround of accurate results:

Test	KPI	Target
FBC	95% reported in	30 Minutes
Coagulation Screen	95% reported in	60 Minutes

For referral samples, please check the reports on CWP according to their turnaround times. If the reports are not available during the turnaround time, liaise with Haematology department.

Telephoning Limits
The laboratory will endeavour to telephone results when they have changed significantly from a previous episode or are grossly abnormal; to facilitate this please ensure the correct patient location and contact number is provided on the request form. Note: except for wards that have requested us not to phone (see validation SOP).

The following results will be telephoned by the laboratory to the requesting location under the following circumstances:

Haematology results

Non- Haematology Patients

Parameter	Unit	Level	Comment
Haemoglobin	g/L	<50	Microcytic or macrocytic anaemia
		<70	Normochromic, normocytic as this might suggest blood loss or bone marrow failure
		>190	Or haematocrit above 55 l/l. Only requires urgent referral if there appears to be compounding medical problems

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White cell count			
Neutrophils	$x10^9$/L	<0.5	
	$x10^9$/L	>50	
Lymphocytes	$x10^9$/L	>50	Requires urgent but not immediate referral
Platelets	$x10^9$/L	<50	1st Presentation

Haematology patients

Parameter	unit	Level	Comments
Haemoglobin	g/L	<70	If not previously at this level
Platelets	$x10^9$/L	<20	If not previously at this level
Schistocytes	/PHF	2	

Blood film

Schistocytes	2/PHF
Blast	1st presentation
Malaria parasites	Positive

Coagulation results

Parameter	Unit	Level	Comments
INR		>5	For patients on warfarin
INR		>2	Non-anticoagulant patients
APTT Ratio		>2	Non-anticoagulant patients
Clauss Fibrinogen	g/L	<1	1st presentation
Anti-Xa	IU/ml	<0.3 OR >2.0	

Please note that the primary method for transmission of all results is to the Clinical Web Portal (CWP).

Whilst internal and external quality assurance programmes are in operation to ensure accuracy and precision of results, occasionally random errors may occur and escape detection. The clinician is often best placed to detect such errors. Therefore, if there is any doubt about a result, it is vital the laboratory is contacted (ext 3285) at once to investigate and re-test samples where possible.

Certain factors may affect and possibly invalidate some test results, causing potential biological and analytical interference. For example, blood transfusion and other intravenous fluids, anticoagulants, drugs, timing of specimen in relation to drug dose, type of tube. Please remember to give details of recent or current treatment on the request forms.

Uncertainty of measurement

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All test results are subject to a degree of uncertainty of measurement. This may be due to a range of factors, including:

- Biological variation within individuals
- Analytical measurement imprecision
- Pre-analytical factors

If you require more information regarding the effects of these factors on the outcome of an individual test result, please contact the lab on 3285.

Clinical advice and interpretation

Clinical advice on examinations and interpretation of results is available by contacting a Consultant Haematologist or Specialist Registrar via the HTU or direct dial / bleep Interpretative comments are included in the laboratory reports of a number of specialist tests.

Anticoagulant control

Anticoagulant control (Warfarin, heparin etc.) is undertaken by the medical team managing the patient.

For patients on Warfarin, the request form must indicate that patient is on warfarin and that an INR is required. The INR result will be available on CWP to allow the patient to be dosed by the doctor responsible for their care.

A policy for the Management of Patients on Anticoagulants is on the Intranet under Trust documents.

A full set of Anticoagulation guidelines is available on every ward. For any further advice, please contact the Haematology registrar or Consultants

Common interferences in haematology tests

Certain factors may affect some test results, causing potential biological and analytical interference. For example, intravenous fluids, anticoagulants, iv feed. Please remember to give details of recent or current treatment on the request forms
See Haematology Test Directory

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Time limits for requesting additional examinations

Requests for additional tests on haematology samples will normally only be available for the day the specimen was taken. However, the following tests can be added on within the time limits stated:

SPECIMEN TYPE IN LAB	TEST TO BE ADDED	TIME LIMIT FROM SAMPLE BEING TAKEN
EDTA	Reticulocytes	Same day
EDTA	Infectious Mononucleosis screen	Same day
EDTA	Malarial Parasites	Same day
EDTA	Blood film	Same day
EDTA	Haemoglobinopathy screen	Within 2 days
EDTA	HFE gene	Within 2 days

Comments/Complaints Procedure

Any complaints or concerns about any aspect of the service should be raised initially with the Blood Sciences Service Manager/Deputy Head of Service Blood Sciences , Ms Deborah Seals, telephone 0161 446 3167

We are keen to know about any problems arising from the laboratory service. Feedback from our users will help in our constant efforts to improve our service.
Feedback: There is a User Satisfaction Survey is available for completion.

Data Protection

Christie Pathology Partnership (CPP) is committed to deliver a first class confidential service ensuring that all patient information is processed fairly, lawfully and transparently. Confidential information about patients can only be used for healthcare and relevant business purposes. All staff are required to comply fully with The Trust Governance Operating Framework for handling of patient confidential information.
In addition to this all HCPC registered staff follow the HCPC confidentiality guidance for registrants
In addition, the CPP also follow the Synlab group Privacy Policy

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Quality assurance and Accreditation

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 United Kingdom Accreditation Service against the International Standard ISO15189:2022. UKAS **Registration Number 8697**
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** (**including Flow cytometry to support Stem cell processing)** is accredited by UKAS in conformance with 'Standards for the Medical Laboratory' incorporating ISO15189:2022.

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 and is deemed compliant as such 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).

The department participates in internal quality control (IQC) and external quality assurance (EQA) for all the tests undertaken within the laboratory. Performance is monitored and subject to rigorous control, to ensure that analyses are accurate, precise and results are comparable with other laboratories.

The lab also regularly monitors the UKAS accreditation status of the referral laboratories used for specialist testing.

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Names and addresses of referral laboratories

Referral laboratory	UKAS Registration No.	Accreditation status
Haematology Department Manchester Royal Infirmary Oxford Road Manchester M13 9WH Tel: 0161 276	**8650**	**Accredited**
Coagulation Lab Sheffield Royal Hallamshire Hospital Glossop Rd, Sheffield, S10 2JF	**7873**	**Accredited**

Useful Links

Lab Tests Online: Lab Tests Online.org.uk

11. Document Locations

Hard copies are issued to the following locations:	1. Haematology
Electronic Version	1. Haematology Intranet Site
Any other printed copies of this document are unauthorised.	

12. Procedure Amendments

This replaces all previous versions of the document.

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