



<b>Haematology, Blood Transfusion and Phlebotomy User Guide – Colchester Hospital</b>		 <b>East Suffolk and North Essex</b> NHS Foundation Trust
HAT-COL-INFO-11		
Colchester/Haem, BT, Phlebotomy		
Version: 1.2	Issue Date: <b>See Q-Pulse</b>	

# Haematology, Blood Transfusion and Phlebotomy User Guide – Colchester Hospital


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Summary of Changes:
<ul style="list-style-type: none"> <li>CR14785: BT telephone answering times updated; added that Kleihauer test not performed overnight</li> </ul>

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## **1 INTRODUCTION**

### **1.1 PURPOSE AND SCOPE**

This User Guide has been produced to assist both hospital and community users of the Haematology, Phlebotomy and Blood Transfusion laboratory service at Colchester Hospital. It deals with access to the service, specimen requirements, information and labelling requirements. If this User Guide fails to provide information required, users are encouraged to contact relevant key personnel listed.

The Pathology Laboratory at Colchester Hospital consists of Biochemistry, Haematology, Microbiology, Histopathology/Cytopathology and Blood Transfusion and is the only pathology provision on-site. The service is provided by the East Suffolk North Essex NHS Foundation Trust which came into effect 1<sup>st</sup> July 2019.

### **1.2 RESPONSIBILITY**

It is the responsibility of management to effectively communicate information and sample requirements.

It is the responsibility of medical staff to give clinical advice where required.

It is the responsibility of senior technical staff to provide non clinical advice e.g. transport and packaging of samples.

It is the responsibility of clinical teams using the Haematology, Blood Transfusion and Phlebotomy services to follow the requirements laid out in this document.

### **1.3 RELATED DOCUMENTS**

ALL-NEESPS-EXT-1                      ESNEFT Data Protection Policy (Trust v2.0)


Venepuncture Policy                      Trust Intranet

### **1.4 REFERENCES**

ISO15189:2012

### **1.5 DEFINITIONS**

BMS                      Biomedical Scientist

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DPA	Data Protection Act
ESNEFT	East Suffolk and North Essex Foundation Trust
GDPR	General Data Protection Regulations
GP	General Practitioner
MHP	Major Haemorrhage Protocol

## 1.6 HEALTH & SAFETY/RISK ASSESSMENT


N/A

## 2 PROCESS


### 2.1 Key Personnel and Contact Details

The service is managed by East Suffolk and North Essex Foundation Trust. Key contacts are:

Consultant Medical Staff	Bleep	Email and Telephone
Dr M Mohan Consultant Haematologist Clinical lead for Blood Transfusion	914	mahalakshmi.mohan1@nhs.net Contact via secretary 01206 746162
Dr K Saja Consultant Haematologist Clinical Lead Haematology	497	khalidfahad.saja@esneft.nhs.uk Contact via secretary 01206 745337
Dr M Hamblin Consultant Haematologist	199	michael.hamblin@esneft.nhs.uk Contact via secretary 01206 745337
Dr G Campbell Consultant Haematologist	252	gavincampbell@nhs.net Contact via secretary 01206 745345
Dr J Padayatty Consultant Haematologist	161	Joseph.Padayatty@esneft.nhs.uk Contact via secretary 01206 745345

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<b>Biomedical Scientists</b>	<b>Email and Telephone</b>
Jackie Powell Haematology and Blood Transfusion Service Manager	<a href="mailto:Jackie.Powell2@nhs.net">Jackie.Powell2@nhs.net</a> Tel: 01206 742407
Wayne Jones Haematology Manager (interim)	<a href="mailto:Wayne.Jones@esneft.nhs.uk">Wayne.Jones@esneft.nhs.uk</a> Tel 01206 742406 (internal ext. 2406)
Mohammed Elkarim Transfusion Laboratory Manager	<a href="mailto:Mohammed.Elkarim@nhs.net">Mohammed.Elkarim@nhs.net</a> Tel 01206 742078 (internal ext. 2078)
Eleanor Byworth Transfusion Compliance Manager	<a href="mailto:Eleanor.Byworth@nhs.net">Eleanor.Byworth@nhs.net</a>
Nigel Brinkley Blood Transfusion Quality Manager	<a href="mailto:Nigel.Brinkley@nhs.net">Nigel.Brinkley@nhs.net</a> Tel 01473 703396 (Internal ext. 5396)
Nick Sheppard Blood Transfusion Quality Manager	<a href="mailto:Nick.Sheppard@esneft.nhs.uk">Nick.Sheppard@esneft.nhs.uk</a> Tel 01473 703396 (Internal ext. 5396)
Mr Richard Nevin Haematology Quality Manager	<a href="mailto:Richard.Nevin@esneft.nhs.uk">Richard.Nevin@esneft.nhs.uk</a> Tel 01473 704171 (internal ext. 6171)
Mrs Sheila Cook Phlebotomy Quality Lead	<a href="mailto:Sheila.Cook@esneft.nhs.uk">Sheila.Cook@esneft.nhs.uk</a> Tel 01473 704171 (internal ext. 6171)
Whitney Doncaster -Cole Pathology Customer Services Manager Phlebotomy Deputy Manager	<a href="mailto:Whitney.Doncaster@esneft.nhs.uk">Whitney.Doncaster@esneft.nhs.uk</a>
Shelley Garrey Support Services Lead	<a href="mailto:Shelley.Garrey@esneft.nhs.uk">Shelley.Garrey@esneft.nhs.uk</a>
Chris Sheed Advanced Biomedical Scientist Haematology	<a href="mailto:Chris.Sheed@nhs.net">Chris.Sheed@nhs.net</a> Tel 01206 742404 (internal ext. 2404)
Kathryn Hurst Advanced Biomedical Scientist Haematology	<a href="mailto:Kathryn.Hurst1@nhs.net">Kathryn.Hurst1@nhs.net</a> Tel 01206 742404 (internal ext. 2404)
Ana Pereira Advanced Biomedical Scientist Blood Transfusion	<a href="mailto:A.Pereira1@nhs.net">A.Pereira1@nhs.net</a> Tel 01206 742402 (internal ext. 2402)
Luke Groves Advanced Biomedical Scientist Blood Transfusion	<a href="mailto:LukeGroves@nhs.net">LukeGroves@nhs.net</a> Tel 01206 742402 (internal ext. 2402)

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Abraham Aweda Advanced Biomedical Scientist Blood Transfusion	<a href="mailto:A.Aweda@nhs.net">A.Aweda@nhs.net</a> Tel 01206 742402 (internal ext. 2402)
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<b>Transfusion Practitioner</b>	<b>Bleep</b>	<b>Email and Telephone</b>
Sue Turner Transfusion Practitioner	458	<a href="mailto:Susan.Turner1@nhs.net">Susan.Turner1@nhs.net</a> Tel: 01206 742709 (internal ext. 2709)

<b>Department</b>	<b>Telephone</b>
Haematology	External 01206 742404/5 Internal 2404/5
Blood Transfusion	External 01206 742402 Internal 2402
Secretary to Medical Staff (Monday to Friday 09:00-17:00)	Dr Hamblin/Dr Saja 01206 745337 Dr Campbell/Dr Padayatty 01206 745345 Dr Mohan 01206 746162

## 2.2 Data Protection and Patient Confidentiality


The EU General Data Protection Regulation (GDPR) is a pan-European data protection law, which superseded the EU's 1995 Data Protection Directive and all member state law based on it, including the UK's DPA 1998 (Data Protection Act 1998), on 25 May 2018.

The GDPR extends the data rights of individuals (data subjects), and places a range of new obligations on organisations that process EU residents' personal data.

Refer to ALL-NEESPS-EXT-1, ESNEFT Data Protection Policy (Trust v2.0), on Q-Pulse for further information.

## 2.3 Complaints

To make a complaint contact the Patient and Liaison Service (PALS) as follows:

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### 2.3.1 By phone

PALS can be contacted by telephone from 09:00 – 16:00, Monday to Friday (confidential answerphone out of hours).

Free phone 0800 783 7328  
 Direct line 01206 742683 or 746448  
 Internal ext. 2683 or 6448

If your call is urgent and you require assistance outside these hours please dial 01206 747474 and ask to speak to the Duty Matron.

### 2.3.2 By Email

Specify in the subject field of your email whether your email relates to Colchester or Ipswich Hospital.

Email: [pals@esneft.nhs.uk](mailto:pals@esneft.nhs.uk)

### 2.3.3 In Writing

Send correspondence to:

Patient Advice and Liaison Service (PALS)  
 Colchester Hospital  
 Turner Road  
 Colchester  
 Essex  
 CO4 5JL

## 2.4 Location of Laboratory

The Haematology and Blood Transfusion department is located in the Blood Sciences department, 1<sup>st</sup> floor main building, Colchester Hospital


The Phlebotomy department is located on the ground floor, main building, Colchester Hospital

For a location map click on the link below:

<https://docreader.reciteme.com/doc/view/id/5f9803e8ae9f9>

## 2.5 Services Offered by the Laboratory

The Haematology Department offers the following services:

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Haematology  
Blood Transfusion

For Immunology queries contact immunology at Addenbrookes Hospital directly.  
Tel: 0333 103 2220

## 2.6 Laboratory Opening Times

The Haematology laboratory is open 24 hours a day, 7 days a week. See below for opening times for phlebotomy services (blood tests).

### 2.6.1 Out of Hours Service Provision

#### **In the event of an MHP anytime, phone 2088**

The phone is answered in Blood Sciences 08:00 – 18:30 Monday to Friday and 09:00 – 12:00 at weekends.

The phone is answered in Blood Transfusion 09:00 – 17:00 Monday to Friday.

Haematology ext.: 2415

Blood transfusion ext.: 2402

At all other times for Haematology and Blood Transfusion: bleep 854

## 2.7 Clinical Advice and Interpretation

Clinical advice is available from the consultant medical staff and from the consultant on call during evenings and weekends via the hospital switchboard. Non clinical advice is available from senior BMS staff.

## 2.8 Information for Patients and Visitors


Patients requiring information on preparing to visit Colchester Hospital should see the hospital's ESNEFT internet pages.

## 2.9 Patient Consent

ESNEFT is committed to ensuring that all staff involved in the patient consent process adhere to the Department of Health guidance on consent to examination and treatment.

Patients have a fundamental legal and ethical right to determine what happens to their own bodies. Valid consent must be obtained before starting treatment or physical investigation, or



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providing personal care, for a person, and is a fundamental part of good practice. A healthcare professional (or other healthcare staff) who does not respect this principle may be liable both to legal action by the patient and to action by their professional body.

Consent is presumed with regards blood tests when the sample and request form – containing the requestor details – arrives in the laboratory.

Phlebotomy presume consent when the patient arrives for the phlebotomy appointment with a completed request form and presents for venepuncture.

### 2.9.1 Outpatients

An appointment system is in place for community and out-patient department phlebotomy and can be accessed by following the link below:

<https://www.esneft.nhs.uk/service/bloodtests/>


Patients must book an appointment using the link above, or call 0300 303 5299. Walk-in appointments are no longer available. Appointments are available at the following sites:

<b>Site</b>	<b>Opening Hours</b>
Colchester Hospital, Blood Clinic, Ground Floor	Monday – Friday 08:15 – 16:15
Primary Care Centre, Turner Road, Colchester	Monday – Friday 07:15 – 16:00
Clacton Hospital, Blood Clinic, Ground Floor	Monday, Wednesday and Thursday 09:30 – 13:30
Harwich Hospital, Blood Clinic, Ground Floor	Tuesday 09:30 – 12:30

For children up to the age of 6, appointments for blood tests must be made with the Children's Day Unit with a referral from the GP. Children up to the age of 18 may also use this service.

### 2.9.2 Inpatients

The phlebotomists visit all the wards with the exception of paediatric wards on a daily basis between 08:00 and 12:00. They are unable to return to wards, so all requests should be placed using Medway Order Comms by 08:00am.(N.B. Blood Transfusion requests are still in paper form). Please do not forward order unnecessarily and only when clinically required.

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A Saturday and Sunday morning service is provided for the acute medical and surgical wards from 07:30 to 10:30. Please keep weekend ordering to a minimum, i.e. clinically essential orders only.

The phlebotomists will only have two attempts at venepuncture and if unsuccessful will refer the request back to the originator.

## 2.10 The Request Form and Sample

### 2.10.1 Request Form

Electronic request forms should be used whenever possible (except for Blood Transfusion where manual requests are required). It is essential that the request form bears - as an absolute minimum - the patient's name, case number (whenever this is available, or address if the hospital number is not known), time of sampling, date, the signature of the person making the request and the location to which the report is to be sent.

All requests sent to the laboratory are considered a service agreement between the requester and the laboratory to undertake the analysis of the sample for the tests requested. The laboratory may refer the sample to another laboratory for specialised or confirmatory analysis in order to provide the results.

#### Antenatal screening requests

All antenatal booking requests must be accompanied with a fully completed family origin questionnaire. This must contain the estimated delivery date and ethnic origin of the parents.

#### Gender

Please complete as gender not always easy to ascertain from name and is essential for interpretation of results.

#### Requestor details


Clearly identify the name and location of the requester and the location for copies of the report to be sent if required.

#### Tests required

Tests required must be entered.

#### Clinical details

Appropriate clinical details must be provided to enable accurate interpretation of findings.

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### Priority status

Requests are assumed routine unless marked 'URGENT'. A telephone number or bleep number is useful to reduce delays in contacting the requester to communicate urgent results. Electronic request forms must be completed as prompted on screen.

## 2.10.2 Samples

### 2.10.2.1 Minimum labelling criteria for Haematology samples

The minimum labelling criteria for Haematology samples is FORENAME, SURNAME and one of the following DATE OF BIRTH, HOSPITAL NUMBER or NHS NUMBER.

### 2.10.2.2 Minimum labelling criteria for Blood Transfusion samples

All Blood Transfusion samples must be labelled by hand by the person taking the sample. The minimum labelling criteria for Blood Transfusion samples is FORENAME, SURNAME, DATE OF BIRTH, HOSPITAL NUMBER OR NHS NUMBER, DATE AND TIME OF SAMPLE COLLECTION and the sample must be SIGNED BY THE PERSON WHO TOOK THE BLOOD. Failure to meet these criteria will result in the specimen being rejected. Amendments to labelling of the sample are not acceptable and the sample will be rejected.

### 2.10.3 Sample rejection

Samples may be rejected due to minimum labelling criteria above not being met, or due to issues with sample integrity (e.g. haemolysis, icterus etc.). The requestor will be notified when an urgent sample is rejected.


### 2.10.4 Samples for send away tests

Samples for leukaemia immunophenotyping / cell markers (BCR / ABL, JAK2, PNH Screen, EMA dye test and FISH), genetics / chromosomes (HFGE and HFE) and tissue typing (HLA and HLA B27) must contain four points of reference, e.g. full name (surname and first name), hospital number or NHS number and date of birth and be sent with a Haemato-Oncology Diagnostic Service (HODS) form.

Send away samples for Blood Transfusion (for example, HIT, NAIT, etc.) must be signed by the requestor and be accompanied by the appropriate NHSBT request form (available by request from the Blood Transfusion Department).

### 2.10.5 High risk samples

High Risk samples from patients with (or suspected to have) Creutzfeldt- Jacob Disease (CJD), Transmissible Spongiform Encephalitis (TSE), Ebola, Viral Haemorrhagic Fever, or Rabies must

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be labelled clearly with Danger of Infection on the request form and sample bags. The Laboratory must be notified that the samples are coming prior to collection and the request must be discussed with the relevant Consultant.

Samples from patients who are ?Covid or covid positive must be labelled with yellow covid stickers.

## 2.11 Outline of tests provided

### 2.11.1 Haematology

FBC, blood film, Retics, ESR, malaria screening, IM (glandular fever) screening, sickle screening G-6-PD deficiency screening, haemoglobinopathy screening (referred to Ipswich Hospital).

### 2.11.2 Coagulation

Clotting screen, D-dimer, fibrinogen, heparin and warfarin monitoring for inpatients, factor assays, von Willebrand Disease (VWD) screen and lupus.

Thrombophilia screen (referred to Ipswich Hospital).

### 2.11.3 Transfusion

Blood group and antibody screen, provision of blood and blood products, antenatal blood group serology, maternal and cord testing post-delivery, Kleihauer testing and investigation of neonatal jaundice.


The Colchester Hospital Blood Policy covers all aspects of blood transfusion including ordering of blood, blood products, information on transfusion and procedure to follow after a possible transfusion reaction.

## 2.12 Sample Required

Sample collection is standardised on the Sarstedt Monovette system and samples should be collected only in these containers. For paediatric haematology and coagulation samples, small volume tubes of the same range are available. 1.6ml blue topped tubes are available for paediatric use for the blood transfusion department.

This is not a complete list of tests; a full list of tests can be found in the Sample Requirements of the ESNEFT Pathology Website:

<https://esneftpathology.nhs.uk/>

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For immunology queries contact the Immunology Department at Addenbrookes Hospital directly on telephone number 01223 245151 / 0333 103 2220.

## 2.13 Summary of Tests Referred to Other Laboratories


Tests not available at Colchester Hospital are referred to selected laboratories for testing. Samples to be sent to the Regional Genetics/Cytogenetics Laboratory at Cambridge, HODS at Addenbrookes and Tissue Typing at Addenbrookes, require specific request forms to be completed, which can be downloaded from:

<https://www.cuh.nhs.uk/addenbrookes-hospital/services/genetics-laboratories/sample-requirements-and-test-request-card/request-card-labelling-and-consent>

<b>Test</b>	<b>Sent To</b>
Genetic and chromosome studies	Regional Genetics/Cytogenetics Laboratory, Cambridge
Leukaemia diagnosis	HODS, Addenbrookes
Neurological gene assays	Queens Square, London Radcliffe Hospital, Oxford
Neurological antibodies	Queens Square, London Radcliffe Hospital, Oxford
Immunology	Immunology, Addenbrookes
Platelet Function	Coagulation, Addenbrookes
HLA typing	Tissue Typing, Addenbrookes
Platelet, WBC and RBC serological investigations, antenatal antibody serology	NHS Blood and Transplant (Colindale & Filton)
EPO assay	Biochemistry, Kings College Hospital

## 2.14 Range of Tests Available Outside Core Hours

- Full blood counts and blood film where appropriate
- Screening for malarial parasites
- ESR

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- Coagulation screen (PT and APTT), INR, APTR, D-dimer, fibrinogen
- Anti-Xa (Heparin assay)
- Provision of blood and blood products
- Kleihauer test (not performed overnight)
- Blood group and DAT (direct antiglobulin test) on babies

All other requests should be discussed with the BMS on duty or Consultant Haematologist on call.

## 2.15 Transport of Samples

Avoid extremes of temperature when transporting samples to avoid sample deterioration.

### 2.15.1 Transport of Samples from GP Surgeries

The Pathology Department provides a daily collection service from all GP surgeries. Samples for collection should be individually bagged then placed in a large sealed plastic bag with sufficient wadding to absorb spills.

### 2.15.2 Transport of Samples from Wards


Samples for collection should be individually bagged then placed in a large sealed plastic bag with sufficient wadding to absorb spills. The large bag should be delivered to the pathology reception by the portering staff.

### 2.15.3 Transport of Samples via Air Tube

Samples transported via the air tube must be placed in a sealed plastic sample bag with the request form in a separate pocket to the sample. Samples should be sent to the blood science station. All haematology and blood transfusion samples may be sent via the air tube system (except high risk samples, CSF or samples for platelet function, which should be delivered by hand).

## 2.16 Storage of Samples

Samples should be delivered to the laboratory on the day of collection; all ward samples should reach the laboratory within a few hours of collection. Samples from outside the hospital that cannot be delivered that day should be stored in a refrigerator overnight and delivered the next morning and within 24 hours of collection. The refrigerator should maintain a temperature between 2°C and 8°C, it is especially important that the samples do not freeze.


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Incorrectly stored samples may result in sample deterioration as seen by prolonged clotting times, degenerate blood films, loss of antibody strength and haemolysed samples, for example. These samples will be rejected with a suitable comment.

## 2.17 Turnaround Times

These times refer to the time from receipt of a sample in the department to validation (or interim validation) of a result which then becomes available electronically.

<b>Test</b>	<b>Urgent</b>	<b>Routine</b>
Full blood count	1 hour	24 hours <sup>3</sup>
Peripheral blood films	24 hours <sup>3</sup>	48 hours <sup>3</sup>
Malarial parasites	2 hours	N/A
G-6-PD	N/A	3 days
ESR	2 hours	24 hours
Clotting screen	1 hour	4 hours
D-dimer	1 hour	4 hours
Glandular fever screen	1 hour	3 days
Coagulation factor assays* (excluding VWF Antigen and Activity)	24 hours	7 days
VWF Antigen and Activity*	2 days	7 days
Emergency provision of blood (if previously grouped and antibody screened negative)	10 minutes	N/A
Provision of blood (if NOT previously grouped and antibody screened)	60 min (provided no antibodies detected) <sup>1</sup>	N/A
Provision of fully Crossmatched Blood (if previously grouped and antibody screen is positive or known antibodies)	Variable, contact department for advice <sup>2</sup>	N/A
Provision of blood products FFP Platelets Cryoprecipitate Fractionated and recombinant products	40 min Contact department 40 min 10 min	N/A

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(e.g. prothrombin complex, human albumin etc.)		
Maternal and cord post-delivery testing	N/A	3 days
Kleihauer film*	N/A	3 days
Investigation of neonatal jaundice (DAT)	1 hour	1 day
Blood group and antibody screen	1 hour	2 days

\* Urgent requests must be discussed with consultant haematologist.

<sup>1</sup> If antibodies are present the provision of compatible blood cannot be guaranteed.

<sup>2</sup> When antibodies are known to be present Blood Transfusion must be contacted as soon as possible; non urgent treatment should be delayed until blood is available.

<sup>3</sup> Clinically urgent results will be phoned without delay.

## 2.18 Time limits for Further Requesting of Tests


Further tests may be added to existing samples held in the department provided:

- a) The request is made within the time limits stated below
- b) There is sufficient sample for the test

Requests should be made to using the 'Addition of tests form for Blood Sciences' form.

<b>Original Sample</b>	<b>Other tests possible to request</b>	<b>Time limit for additional tests</b>
FBC	Blood film	24 hrs
FBC	G6PD	24 hrs
FBC	Malarial parasites	12 hrs
FBC	Haemoglobinopathy screening	24 hrs
FBC	ESR	21 hrs
FBC	Reticulocytes	24 hrs
Coagulation Screen	D-Dimer	12 hrs
Coagulation Screen	Factor assays	4 hrs



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APTT	INR	72 hrs
Immunology	Additional immunology	28 days

## 2.19 Factors Affecting the Performance of the Tests

The quality of the results obtained can be affected by the quality of the sample received.

### 2.19.1 Blood Sampling

Blood should be collected into Sarstedt blood tubes directly by clean venepuncture with minimum cuff pressure and not filled from a syringe. After collection mix samples gently and avoid vigorous shaking. Check the expiry date of sample vials before use. These blood tubes must not have been exposed to extremes of temperature prior to collection (above 30°C).

If used correctly the correct volume of blood will be collected, this is essential for coagulation and ESR tests.

Coagulation tests, other than basic clotting screen, APTT and INR, are best collected in the hospital to ensure minimum delay in the sample reaching the laboratory. Samples from wards should be delivered immediately to the laboratory.

Results of poor sampling will include haemolysed samples, activated coagulation samples, and partially clotted samples all of which can affect the result obtained.

## 2.20 Quality Standards

The blood transfusion service is accredited by the MHRA (Medicines and Healthcare Products Regulatory Agency). Compliance is assessed annually by MHRA.

## 2.21 Reference Ranges


All numerical results have reference ranges printed on the report with the result. Reference ranges may be sex and age related.

### 2.21.1 Summary of Main Adult Reference Ranges

NOTE: Paediatric and gender reference values may be different from adult ranges contact department for details.

#### **HAEMATOLOGY - FBC:**

<b>Parameter</b>	<b>FEMALE</b>	<b>MALE</b>
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(units)		
	<b>18 – 120 Years</b>	
<b>HB (g/L)</b>	115 – 165	130 – 180
<b>RBC (x10<sup>12</sup>/L)</b>	3.8 – 4.8	4.5 – 6.5
<b>MCV (fL)</b>	80 - 100	
<b>HCT (L/L)</b>	0.37 – 0.47	0.40 – 0.50
<b>RDW (%)</b>	10 - 15	
<b>PLT (x10<sup>9</sup>/L)</b>	135 – 450	
<b>MCH (pg)</b>	27 - 34	
<b>MCHC (g/L)</b>	300 - 360	
<b>RET# (x10<sup>9</sup>/L)</b>	30 - 100	
<b>WBC (x10<sup>9</sup>/L)</b>	4.0 – 11.0	
<b>NEUT# (x10<sup>9</sup>/L)</b>	2.0 – 7.5	
<b>LYM# (x10<sup>9</sup>/L)</b>	1.0 – 4.0	
<b>MONO# (x10<sup>9</sup>/L)</b>	0.2 – 1.0	
<b>EOS# (x10<sup>9</sup>/L)</b>	0.0 – 0.5	
<b>BASO# (x10<sup>9</sup>/L)</b>	0.02 – 0.1	

**ESR:**

<b>Age</b>	<b>FEMALE</b>	<b>MALE</b>
0-15 Years	3 – 15	
16-50 Years	0 – 20	0 – 15
51-120 Years	0 – 30	0 – 20
Unknown	1 – 30	1 – 20

**COAGULATION**

<b>Parameter (units)</b>	<b>MALE AND FEMALE – COAGULATION</b>
	<b>6 Months – 120 Years</b>
<b>PT (s)</b>	10.0 – 15.0

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<b>APTT (s)</b>	25.0 – 36.0
<b>PT 50:50 mix (s)</b>	10.0 – 15.0
<b>APTT 50:50 mix (s)</b>	25.0 – 36.0
<b>INR (ratio)</b>	0.9 – 1.2
<b>APTR (ratio)</b>	1.5 – 2.5
<b>Fibrinogen (g/L)</b>	2.0 – 4.5
<b>D-Dimer (ng/mL)</b>	<500
<b>Thrombin Time (s)</b>	11.0 – 18.0
<b>Factor II (IU/mL)</b>	0.50 – 1.50
<b>Factor V (IU/mL)</b>	0.50 – 1.50
<b>Factor VII (IU/mL)</b>	0.50 – 1.50
<b>Factor VIII (IU/mL)</b>	0.50 – 1.50
<b>Factor IX (IU/mL)</b>	0.55 – 1.63
<b>Factor X (IU/mL)</b>	0.70 – 1.52
<b>Factor XI (IU/mL)</b>	0.67 – 1.27
<b>Factor XII (IU/mL)</b>	0.52 – 1.64
<b>Factor XIII (IU/mL)</b>	0.57 – 1.37