


Ipswich Haematology, Phlebotomy and Blood Transfusion User Guide		 East Suffolk and North Essex NHS Foundation Trust
HAT-IPS-INFO-6		
IPS / Haematology, Phlebotomy and Blood Transfusion		
Version: 9.0	Issue Date: See Q Pulse	


Haematology, Phlebotomy & Blood Transfusion Handbook Ipswich Hospital

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Summary of Changes:


Major revision as below:

- CR15601: Update to contact details
- CR15602: Revision to Hb F reference range
- CR15643: Addition of source for Haematology reference ranges
- CR15853: Addition of correct reference to accreditation
- CR16063: Webpages location added
- CR17339: Update to specific requirements for Blood Transfusion samples to match ESNEFT policy


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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 Ipswich 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 Ipswich Hospital consists of; Biochemistry, Haematology, Blood Transfusion, Immunology, Microbiology, Molecular Biology, and Histopathology, 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 1st July 2019.

1.2 Responsibility

- It is the responsibility of the department's management to effectively communicate information and sample requirements to users.
- It is the responsibility of the department's medical staff to give clinical advice to users where required.
- It is the responsibility of the department's senior technical staff to provide non clinical advice to users (e.g. details of transport and packaging of samples).
- It is the responsibility of clinical teams using the Haematology service to follow the requirements laid out in this document.

1.3 Related Documents


- PATH-ALL-EXT-55 General Data Protection Regulations 2018
- ESNEFT Blood Policy v1.0
- Venepuncture Policy (Trust Intranet)

1.4 References

- ISO 15189:2012: Requirements for quality and competence
- MHRA: Medicines and Healthcare Products Regulatory Agency

1.5 Definitions

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


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2 PROCESS

2.1 Key Personnel and Contact Details

Consultant Medical Staff	Bleep	Email and Telephone
Dr A D Hodson Specialist Clinical Lead (Laboratory Director)	126	andrew.hodson@esneft.nhs.uk Secretary 01473 703718
Dr J. A. Ademokun Divisional Clinical Director, Cancer & Diagnostics, ANSCT Clinical Lead	160	debo.ademokun@esneft.nhs.uk Secretary 01473 703718
Dr I Chalmers Consultant Haematologist (Deputy Laboratory Director)	125	isobel.chalmers@esneft.nhs.uk Secretary 01473 703718
Dr I Whalley Consultant Haematologist	904	ioana.whalley@esneft.nhs.uk Secretary 01473 703718
Dr M Panatt Prahladan Consultant Haematologist	613	Mahesh.Prahladan@esneft.nhs.uk Secretary 01473 703718
Dr S Grigoriadou Consultant Immunologist	N/A	Contact via Immunology Department Ipswich: 01473 703356 Tel: 0207 377 7000 (Clinical advice)


Managers	Email and Telephone
Ms J Powell Specialty Service Lead Haematology and Blood Transfusion	Jackie.powell@esneft.nhs.uk Tel: 01206 742407
Mr S Bhattacharjee Haematology Operations Manager	Shubendu.Bhattacharjee@esneft.nhs.uk Tel 01473 703714 (Internal ext. 5714)
Ms C Holmes Blood Transfusion Operations Manager	Camilla.smith@esneft.nhs.uk Tel 01473 703396 (Internal ext. 5396)
Ms E Byworth Blood Transfusion Compliance Manager	Eleanor.byworth@esneft.nhs.uk N/a
Ms J King ANSCT Screening Lead	joanne.king@esneft.nhs.uk Tel 01473 703396 (Internal ext. 5396)
Mrs L F Pacquette Senior Biomedical Scientist	lucia.pacquette@esneft.nhs.uk Tel 01473 703713 (Internal ext. 5713)
Mrs Claire Kelly Senior Biomedical Scientist	claire.kelly@esneft.nhs.uk Tel 01473 703713 (Internal ext. 5713)

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Mr C Smith Senior Biomedical Scientist	Chris.N.Smith@esneft.nhs.uk Tel 01473 703713 (Internal ext. 5713)
Miss Lisa Lewis Senior Biomedical Scientist	Lisa.Lewis@esneft.nhs.uk Tel: 01473 703396 (Internal ext. 5396)
Mr M Bowen Senior Biomedical Scientist	Mareece.bowen@esneft.nhs.uk Tel: 01473 703713 (Internal ext. 5713)
Ms Janet Anthony Senior Biomedical Scientist	Janet.Anthony@esneft.nhs.uk Tel: 01473 703356 (internal ext. 5356)

Quality Team	Email and Telephone
Mrs Karen Edwards Head of Quality	Karen.Edwards@esneft.nhs.uk 07591 947809
Mr Nigel Brinkley Blood Transfusion Quality Manager	nigel.brinkley@esneft.nhs.uk Tel 01473 703396 (Internal ext. 5396)
Mr Nick Sheppard Blood Transfusion Quality Manager	Nick.Sheppard@esneft.nhs.uk Tel 01473 703396 (Internal ext. 5396)
Mr Richard Nevin Haematology Quality Manager	Richard.Nevin@esneft.nhs.uk Tel 01473 704171 (internal ext. 6171)
Mrs Sheila Cook Phlebotomy Quality Lead	Sheila.cook@esneft.nhs.uk Tel 01473 704171 (internal ext. 6171)

Transfusion Practitioners	Bleep	Email and Telephone
Ms R Smith Transfusion Practitioner	900	rebecca.smith53@esneft.nhs.uk 01473 703391 (Internal ext. 5391)
Mrs S Kaznica Transfusion Practitioner	900	sharon.kaznica@esneft.nhs.uk Tel 01473 703391 (Internal ext. 5391)
Mrs S Clarke Transfusion Practitioner	900	sarah.clarke@esneft.nhs.uk Tel 01473 703391 (Internal ext. 5391)

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2.2 Department Telephone Numbers

Department	Telephone	
Haematology	External	01473 703709 or 703710
	Internal	Ext 5709 or 5710
Immunology	External	01473 703356
	Internal	Ext 5356
Blood Transfusion Enquiries (09.00 – 17.00 Monday – Friday)	External	01473 703726
	Internal	Ext 5726
Other times bleep 905		
Secretary to Medical Staff (09.00 – 17.00 Monday – Friday)	External	01473 703718
	Internal	Ext 5718

2.3 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 ESNEFT Doc 3115, Data Protection Policy , on trust website for further information.


3 COMPLAINTS

To make a complaint contact the Patient and Liaison Service (PALS), details below.

3.1 Contacting PALS By Phone

All telephone lines have an option to leave a message if the PALS officers are unable to take your call. Please do leave your name and a telephone number and one of our PALS officers will return your call as soon as possible:

- Free phone 0800 3287624
- Direct line 01473 704781

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3.2 Contacting PALS in Writing

Patient Advice and Liaison Service (PALS)
 Postbag S617
 Ipswich Hospital
 Heath Road
 Ipswich
 Suffolk IP4 5PD

3.3 Contacting PALS by Email

pals@esneft.nhs.uk

4 LOCATION OF LABORATORY

The Haematology Department is located in the Pathology Department at ESNEFT - Ipswich Hospital, Heath Road, Ipswich IP4 5PD – in the central zone.

For a location map click on the link below.

<https://i3a5v6j6.stackpathcdn.com/wp-content/uploads/2020/06/IPSWICH-2020June-Guide-Colour-002.pdf>

5 SERVICES OFFERED BY THE LABORATORY


The Haematology Department offers the following services:

- Haematology
- Coagulation
- Immunology
- Blood Transfusion
- Antenatal Screening

The laboratory provides INR results to the Anticoagulation Monitoring Service (AMS). Please contact the AMS directly for any queries relating to outpatient anticoagulant monitoring. Tel: 01473 702677

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).

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7 OUT OF HOURS SERVICE PROVISION

7.1 Blood Transfusion

- Anytime, in the event of an MHP bleep 905
- Between 09:00 – 17:00, call Ext 5726
- Between 17:00 – 09:00, bleep 905

7.2 Haematology and Coagulation

- Anytime, call Ext 5709
- All Emergency Department (A&E) requests where there is a likelihood of 4 hour breach must be notified by telephone/bleep to the relevant department.

8 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.

9 INFORMATION FOR PATIENTS AND VISITORS


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

10 PATIENT CONSENT

East Suffolk and North Essex NHS Foundation Trust (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 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.

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10.1 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.esnft.nhs.uk/service/bloodtests/>

Appointments are available at the following sites:


Site	Opening Hours
Landseer Road Phlebotomy Clinic 476-478 Landseer Road Ipswich Suffolk IP3 9LU	Monday to Friday 07:30 to 17:30 (Children aged 11 – 16)
Phlebotomy Ipswich Hospital Heath Road Ipswich IP4 5PD	Monday to Friday 07:30 to 17:45

Note: Children under 11 years of age should not be referred for blood tests to the department but arrangements can be made with the Paediatric Assessment Unit (telephone 01473 702198 for advice).

10.2 Inpatients

The phlebotomists visit all the wards with the exception of paediatric wards on a daily basis between 07.30 and 12:00. They are unable to return to wards, so all requests forms should be available from 07.30. Please do not forward order unnecessarily as the presence of large numbers of forms on the request clip delays the round. A Saturday and Sunday morning service is provided for the acute medical and surgical wards from 07:30 to 11:30. 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.

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11 THE REQUEST FORM & SAMPLE

11.1 Request Form

Electronic request forms (ICE) should be used whenever possible. 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(manual forms) 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.

11.1.1 Antenatal Screening Requests

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

11.1.2 Patient's Gender

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

11.1.3 Requester Details

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

11.1.4 Tests Required

Tests required must be entered.


11.1.5 Clinical Details

Appropriate clinical details to enable accurate interpretation of findings. Note Blood Transfusion send away tests may need discussion with Haematology Consultant.

11.1.6 Priority Status

Requests are assumed routine unless marked 'URGENT' or 'PLEASE PHONE', a telephone number or bleep number must be stated to reduce delays in contacting the requester.

Electronic request forms must be completed as prompted on screen.

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11.2 Samples

11.2.1 Minimum Labelling Criteria for Haematology Samples

The minimum labelling criteria for Haematology samples is:

- Surname
- Forename
- Date of birth
- Plus one of the following:
 - Hospital number (with RGQ prefix if Ipswich Hospital patient)
 - NHS number

11.2.2 Specific Requirements for Blood Transfusion Samples

All blood transfusion samples **must** be labelled by hand. The minimum criteria is:

- Full name (surname and first name)
- Hospital number (with RGQ prefix if Ipswich patient) or NHS number
- Date of birth
- Date and time of collection
- Sample must be signed by the person who took the sample.

Note: Failure to meet the labelling criteria above will result in the specimen being rejected.

11.2.3 Minimum Labelling Criteria for Maternal Serum Screen Samples

Samples for Maternal Serum Screen must include:


- Patient surname and either the hospital number or NHS number as one of the three patient identifiers.

11.3 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.

11.4 Samples for Send Away Tests

Samples for leukaemia Immunophenotyping / cell markers (BCR / ABL, JAK2, PNH Screen, EMA dye test and FISH), genetics / chromosomes (HFGS 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.

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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).

11.5 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 be labelled clearly with '**Danger of Infection**' on the request form and sample bags.

The Laboratory must be notified that high risk samples are coming prior to collection and the request must be discussed with the relevant consultant.

All samples from these patients **must** be sent in the red high risk transporter boxes available from Pathology.

12 OUTLINE OF TESTS PROVIDED

12.1 Haematology

FBC, ESR, malaria screening, CSF morphology for malignant cells, glandular fever screening, sickle screening, G6PD deficiency screening, haemoglobinopathy screening, and leukaemia diagnosis (referred out test).


12.2 Coagulation

Coagulation screening, heparin and warfarin monitoring for inpatients, D-dimer assay, factor assays, and thrombophilia screening.

12.3 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 ESNEFT 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.

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13 SAMPLES 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 section of the ESNEFT Pathology Website:


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

14 SUMMARY OF TESTS REFERRED TO OTHER LABORATORIES

Tests not available at Ipswich 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>

Test	Sent To
Genetic and chromosome studies	Regional Genetics/Cytogenetics Laboratory, Cambridge
Leukaemia diagnosis	HODS, Addenbrookes
Neurological gene assays	Rare & Inherited Disease Laboratory of the London North Genomic Laboratory Hub
Neurological antibodies	Rare & Inherited Disease Laboratory of the London North Genomic Laboratory Hub
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

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15 RANGE OF TESTS AVAILABLE OUTSIDE CORE HOURS

- Full blood counts and blood film where appropriate
- Screening for malarial parasites
- ESR
- Coagulation screen, D-dimer, INR and APTT , anti-FXa (Hep)
- Provision of blood and blood products
- Kleihauer test
- 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.

16 TRANSPORT OF SAMPLES

16.1 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.

16.2 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.

16.3 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 either the Haematology or Blood Transfusion stations. All Haematology 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).

16.4 Extremes of Temperature

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

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17 STORAGE OF SAMPLES


If possible deliver sample to the laboratory the same day, all wards 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. The refrigerator should maintain a temperature between 2°C and 8°C, it is especially important that the samples do not freeze.

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.

18 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.

Test	Urgent	Routine
Full blood count	1 hour	24 hours ³
Ascetic fluid	N/A	24 hours ³
Peripheral blood films	24 hours ³	48 hours ³
Malarial parasites	2 hours	
G-6-PD	N/A	3 days
ESR	2 hours	24 hours
Clotting screen	1 hour	4 hours
D-dimer	1 hour	4 hours
CSF and other fluids	1 hour	3 days
Glandular fever screen	1 hour	3 days
Haemoglobinopathy screen*	1 day	14 days
Coagulation factor assays* (excluding VWF Antigen and Activity)	24 hours	7 days
VWF antigen and activity*	2 days	7 days
Thrombophilia screen*	1 day	14 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) ¹	N/A

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Test	Urgent	Routine
Provision of fully cross matched blood (if previously grouped and antibody screen is positive or known antibodies)	Variable, contact department for advice ²	N/A
Provision of blood products: <ul style="list-style-type: none"> • FFP • Platelets • Cryoprecipitate • Fractionated and recombinant products (e.g. prothrombin complex, human albumin etc.) 	<ul style="list-style-type: none"> • 40 min • Contact department • 40 min • 10 min 	N/A
Maternal and cord post-delivery testing	N/A	2.5 days
Kleihauer film*	1 hour	2.5 days
Investigation of neonatal jaundice	1 hour	1 day
Blood group and antibody screen	1 hour	2 days
Immunology autoimmune assay*	1 day	7 days
Allergy	N/A	14 days

* *Urgent requests must be discussed with consultant haematologist*

¹ *If antibodies are present the provision of compatible blood cannot be guaranteed*

² *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.*

³ *Clinically urgent results will be phoned without delay*


19 TIME LIMITS FOR FURTHER REQUESTING OF TESTS

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

1. The request is made within the time limits stated below
2. There is sufficient sample for the test

Requests should be made to Haematology Reception.

Original Sample	Other tests possible to request	Time limit for additional tests
FBC	Blood film, G6PD, malarial parasites. haemoglobinopathy screening	24 hrs
FBC	ESR	21 hrs
FBC	Reticulocytes	96 hrs
Coagulation Screen	D-Dimer	24 hrs
Coagulation Screen	Factor assays	4 hrs
APTT	INR	72 hrs
Immunology	Additional immunology	28 days

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20 FACTORS AFFECTING THE PERFORMANCE OF THE TESTS

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

20.1 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 include; haemolysed samples, activated coagulation samples, and partially clotted samples, all of which can affect the result obtained.

21 QUALITY STANDARDS

The Haematology Department is accredited by the following professional, accreditation and regulatory bodies:

21.1 IBMS (Institute of Biomedical Sciences)

The department is approved for pre-registration and post-registration BMS training and support staff training.

- IBMS website: <http://www.ibms.org/>

21.2 MHRA (Medicines and Healthcare Products Regulatory Agency)


Compliance assessed annually by MHRA.

- MHRA website: <http://www.mhra.gov.uk/>

21.3 UKAS (United Kingdom Accreditation Service)

Accredited to ISO 15189:2012. Laboratory reference: 9332

- UKAS Website: <https://www.ukas.com>

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22 REFERENCE INTERVALS

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


FBC and coagulation screen reference intervals have been verified based on the local adult population according to age and gender.

22.1 Summary of the Main Adult Reference Intervals

Note: Paediatric and gender reference intervals may be different from adult intervals. Contact the department for more details.

Haematology Reference Intervals


Assay	Reference Range	Reporting Units
FBC		
Hb	115 – 160 (F) 135 – 175 (M)	g/l
WBC	4.0 – 11.0	X10 ⁹ /l
Platelets	135 – 450	X10 ⁹ /l
RBC	3.8 – 4.8 (F) 4.5 – 5.5 (M)	X10 ¹² /l
HCT	0.35 – 0.45 (F) 0.38 – 0.50 (M)	
MCV	80 – 100	fl
MCH	27.0 – 34.0	pg
Neutrophils	2.0 – 7.5	X10 ⁹ /l
Lymphocytes	1.0 – 4.0	X10 ⁹ /l
Monocytes	0.1 – 1.0	X10 ⁹ /l
Eosinophils	0.0 – 0.5	X10 ⁹ /l
Basophils	0.0 – 0.2	X10 ⁹ /l
Reticulocytes	10-100 (0-16) 10-100 (17-120)	X10 ⁹ /l X10 ⁹ /l

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Assay	Reference Range	Reporting Units
ESR		
	Female	mm/hr
	Aged 0-60: 1-19	
	Aged 61-70: 1-20	
	Aged 71-120: 1-35	
	Male	
	Aged 0-50: 1-10	
	Aged 51-60: 1-12	
	Aged 61-70: 1-14	
	Aged 71-120: 1-30	

Coagulation

Assay	Reference Range	Reporting Units
Clotting Screen		
INR	0.9 – 1.2	Ratio
PT	11 – 15	sec
APTT	26 – 37	sec
Fibrinogen	2.0 – 4.5	g/l
*D-dimer (for exclusion of DVT/PE)	<500	ng/ml (FEU)
Thrombin Time	10.5 – 16.5	secs
Coagulation Factors		
II	0.5 – 1.5	u/ml
V	0.5 – 1.5	u/ml
VII	0.5 – 1.5	u/ml
VIII	0.5 – 1.5	u/ml
IX	0.5 – 1.5	u/ml
X	0.5 – 1.5	u/ml
XI	0.7 – 1.5	u/ml
XII	0.7 – 1.5	u/ml
XIII	0.5 – 1.4	u/ml
VWF Antigen		
	Blood Group A, B and AB: 0.66 – 1.76	u/ml
	Blood Group O: 0.42 – 1.41	u/ml

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VWF Activity		
	Blood Group A, B and AB: 0.49 – 1.63 Blood Group O: 0.40 – 1.26	u/ml u/ml
Thrombophilia		
Antithrombin	75 – 125	IU/dl
Protein C	70 – 130	IU/dl
Free Protein S	55 – 125 (F) 75 – 145 (M)	IU/dl
APCR ratio	2.0 – 3.5	
DRVVT ratio	<1.2	
Corrected DRVVT ratio	<1.2	
DRVVT ratio/ Corrected DRVVT ratio	<1.2	
Cardiolipin Ab IgM	0 – 9	MPL u/ml
Cardiolipin Ab IgG	0 – 9	GPL u/ml
β2 Glycoprotein Ab IgM	0 – 6	u/ml
β2 Glycoprotein Ab IgG	0 – 6	u/ml

Special Haematology

Assay	Reference Range	Reporting Units
HbA ₂	2.2 -- 3.5	%
Hb F	0 – 1.0	%
G6-PDH	5.2 - 11.6	IU/gHb

22.2 Reference Interval Sources

Haematology reference intervals are derived from a combination of 'in-house' sources and Dacie and Lewis Practical Haematology, 10th Edition.

Coagulation reference intervals are derived from a combination of 'in-house' sources and from ranges taken from Blood (Journal), 2008, Andrew, M et al.