

HAEMATOLOGY AND BLOOD TRANSFUSION LABORATORY HANDBOOK

Document owner	Karl Jewell
Amendments on this document from previous version (List details in box)	
<ol style="list-style-type: none">1. Merger of LGT BQ-QP-005 to this2. New numbering onto the spine from HAEM.QDOC.13. CR18030- Consider DAT test see pg 234. CR18106- added to section 16 reference added5. CR18222 –change to methotrexate sample requirements6. CR16852- HH details added	

Document title	Haematology and Blood Transfusion Laboratory Handbook		
Q Pulse ID	EHA.QSOP.5	Sites	HH, NUH, RLH, SBH, WXH, QEH, UHL
Version	1	Author	Minal Dave, Juswal Dadhra, Julia Lancut
Date of Issue	April 2024	Approver	Karl Jewell, Davinia Burgon
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1 Introduction

The Pathology specialties provide a comprehensive screening and diagnostic service. This includes the availability of medical and scientific advice at all times. Members of each specialty participate in audit, research, teaching, training and quality assurance schemes.

The Haematology department provides Haematology and Blood Transfusion services in laboratories in harmony currently at five hospital sites of the East & South East London Pathology partnership with the Queen Elizabeth & University Hospital Lewisham sites to formally open as an Essential Service Laboratories (ESLs) from January 2024. The department operates with a hub and spoke model, with the majority of non-urgent and specialist work being performed at The Royal London laboratory. Urgent and in-patient work is performed at the spoke sites at St Bartholomew's Hospital, Newham University Hospital, Whipps Cross University hospital Queen Elizabeth Hospital, Lewisham University and Homerton University Hospital.

The Haematology department at The Royal London provides general haematology services and a number of specialist areas (haemophilia, sickle cell disease, thalassaemia, and immune thrombocytopenia). The Royal London also provides general and referral blood transfusion testing, and serves the Royal London trauma unit, which is the busiest major trauma centre in London.

St Bartholomew's Hospital has a large haemato-oncology department that treats patients with haematological malignancies and with the recent introduction of Bart's Heart Centre has become the largest Cardiac centre in Europe.

The Essential Service laboratories provide services for urgent haematology and haemostasis testing and general blood transfusion services.

2 Location, Address and Telephone Numbers

Site	Address	Telephone Number
Royal London Hospital	Pathology and Pharmacy Building 80 Newark Street Whitechapel London E1 2ES	020 7377 7000
St Bartholomew's Hospital	West Smithfield London EC1A 7BE	020 7377 7000
Newham University Hospital	Glen Road Plaistow London E13 8SL	020 7476 4000
Whipps Cross University Hospital	Whipps Cross Road Leytonstone London E11 1NR	020 8539 5522
Homerton University Hospital	Homerton Row Homerton London E9 6SR	0208 510 5555
Queen Elizabeth Hospital	Stadium Way, Woolwich	0208 836 6000

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	SE18- 4QH	
Lewisham University	High Street, Lewisham, SE13 6LH	0208 333 3000

Maps for each location can be found at our website <https://www.bartshealth.nhs.uk/contact-us/>

3 Laboratory Hours

Haematology and Blood Transfusion services are offered 24 hours per day at the Royal London Hospital, St Bartholomew's, Newham University Hospital, Whipps Cross University Hospital, Queen Elizabeth, Lewisham University and Homerton University Hospital

Specialist testing is provided during 09:00-17:30 unless by prior arrangement.

4 Results, Enquiries and Clinical Advice

Please note we are unable to provide results directly to patients, please contact your relevant health care provider. To obtain results via telephone, please use the contact numbers in the table below. We are unable to provide Blood Group results over the telephone.

Results and enquiries can be made during routine working hours (Monday - Friday 0900:-17:30).

GPs wishing to make a non-urgent enquiry may use the Advice & Guidance function within the e-referrals (ERS) system or alternatively email: bartshealth.pathologyresults@nhs.net

For non-urgent haemato-oncology queries please contact bhnt.advice-Bloodcancer-Barts@nhs.net

Need information about blood tests?

Lab Tests online UK has been designed to help patients better understand the many clinical lab tests, but is also used widely by healthcare professionals as a source of information. <https://labtestsonline.org.uk/>

Laboratory Site	Phone number for results
Main Switchboard RLH/SBH	020 7377 7000
Royal London Hospital	Ext. 60341 Ext. 60346 (GP's only)
St Bartholomew's Hospital	Ext. 57242
Newham University Hospital	Ext. 8733/8120
Whipps Cross University Hospital	Ext. 5810
Homerton University Hospital	Ext 7892
Queen Elizabeth Hospital	0208 836 5738

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Lewisham University	0203 192 6702
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6 Laboratory Contact Numbers

Royal London	020 7377 7000
Haematology Laboratory	60342
Haemostasis	61049
Blood Transfusion	60344
Red Cell Laboratory	61116
St Bartholomew's	020 7377 7000
Haematology Laboratory	57243
Blood transfusion	56130
Newham University Hospital	020 7476 4000
Blood transfusion	8123
Haematology Laboratory	8273
Out of hours BMS	Bleep 003
Whipps Cross University Hospital	020 8539 5522
Haematology	5888
Transfusion	5670
Out of hours BMS	Bleep 168
Homerton University Hospital	020 8510 5555
Haematology	Ext 7892
Blood Transfusion	Ext 7894
	Bleep 234
Queen Elizabeth Hospital	0208 836
Haematology	5717
Blood Transfusion	5719
Lewisham Hospital	0208 333 3257
Haematology	0203 192 6212
Blood Transfusion	
Specialist Registrars (Royal London and St Bartholomew's)	61099 General Adult Haematology - Bleep 1243 (Ext 45856) Red Cell Disorders - Bleep 1241 Haemostasis/Thrombosis - Bleep 1155 Paediatric Haematology - Bleep 1239 SIHMDS & laboratory – Bleep 0328
Specialist Registrar (St Bartholomew's)	Haemato-Oncology – Bleep via switchboard
Specialist Registrars (Newham)	Bleep 130 Bleep 247
Specialist Registrars (Whipps Cross)	Bleep 075 Bleep 076 Bleep 352
Specialist Registrars (Queen Elizabeth)	Bleep 6721 / 6848 – Via Switchboard (Out of Hours)
Specialist Registrars (Lewisham Hospital)	Bleep 7013 – Via Switchboard (Out of Hours)

7 Complaints and Compliments Procedure

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Bart's Health NHS Trust (The Trust) is committed to delivering the safest and best quality care possible. The Trust welcomes concerns and complaints, as it seeks to learn from them in order to drive improvements and further enhance our Patients' and carers' experience. The Trust will aim to resolve concerns at the point of contact wherever possible. The Trust will ensure concerns that cannot be resolved at point of contact or via the Patient Advice and Liaison Service ('PALS') are investigated and managed appropriately, in accordance with the wishes of the individual raising the concern. To contact PALS please email: BHNT.PALS@nhs.net

The Trust will ensure that all complaints feel they are listened to, that we have responded to all their concerns and shown an appropriate level of empathy in our response to their complaint.

Anyone choosing to make a complaint, or a patient who complains, will not be treated differently as a result of a complaint having been made. To support this process, complaint documents will be held separately to the patient's clinical records and the importance of this is highlighted in relevant training programmes for our staff. GPs and patients may notify the trust of a complaint or compliment by contacting the Central Complaints Team via email BHNT.CentralComplaints@nhs.net

8 Confidentiality

A duty of confidence arises when one person discloses information to another (e.g. patient to clinician) in circumstances where it is reasonable to expect that the information will be held in confidence. It is a legal obligation that is derived from case law, it is a requirement established within professional codes of conduct and it must be included within NHS employment contracts as a specific requirement linked to disciplinary procedures.

NHS organisations are trusted to deal with information in an efficient, safe and reliable manner. If the information is not available, incorrect or given to an unauthorised person patient care may suffer.

As a public body that processes information, we have a legal obligation to comply with the Data Protection Act 2018 and the Freedom of Information Act 2000, by ensuring that all information is used lawfully, shared appropriately, recorded accurately and stored securely. All our staff team takes responsibility for this and are provided with annual training.

The Haematology and Blood Transfusion laboratories adhere to the Bart's Health Trust corporate Data Protection policy, which sets out the standards all staff must adopt in the handling and management of information about people, to ensure compliance with the Data Protection Act 2018 as amended by the Freedom of Information Act 2000 (section 68).







The role of our Caldicott guardian is to ensure the highest levels of confidentiality and security for patient identifiable information held in the NHS. The Caldicott guardian covers a number of areas of concern, including keeping patients aware of what the NHS does with their information, making sure that our staff are familiar with their responsibilities and good practice, and ensuring that we have good security measures in place on our computer systems so that patient information is not easily accessible by unauthorised users.

9 Processing Requests



9.1 Specimen bottles/sample types

The sample requirements for each test are specified in Section 1.

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 <p>Figure 1a: Microtainer EDTA for Neonatal samples.</p>  <p>Figure 1b: Micro tube EDTA for BT Neonatal Sample (not QEH/UHL)</p>	<p>A pink top EDTA sample tube is primarily used for whole blood tests such as Full Blood Count. The minimum sample volume is 0.75mL.</p> <p>The sample bottle can also be used for neonatal/paediatric blood transfusion testing. Please note it may not be possible to complete all investigations with this sample bottle size. See section 9.2 for details on labelling.</p>
 <p>Figure 2: Sodium citrate adult and paediatric sample bottles</p>	<p>Blue top sample tube is used primarily in Haemostasis testing. It is essential that the tube is filled only to the line (total volume either 3.0mL or 1.8 mL). Under or over filled samples are not able to be processed (see section 9.4).</p> <p>Green screw top cap 1.3 ml or blue 1ml blue top Sodium Citrate samples may be used for routine paediatric haemostasis. The minimum sample volume is 1.3ml for green tops, 1 ml for blue top.</p> <p>Microtainer tube for neonatal/paediatric patients is also available; this need to be filled to the line, total volume is 1.3mL.</p> <p>All Haemostasis samples have a 10% under or over filled tolerance to the total sample volume.</p> <p>Contact the Haemostasis laboratory (x61049) for paediatric sample volume requirements for Special Haemostasis</p>
 <p>Figure 3: EDTA 4mL</p>	<p>This purple top sample tube is used primarily for whole blood tests such as Full Blood Count, but can be used for plasma tests. The minimum sample volume is 2mL for FBC and ESR requests.</p>
 <p>Figure 4: EDTA 6mL</p>	<p>This purple top sample bottle is primarily used for Transfusion testing. The minimum sample volume is 3mL. Please note, it may be necessary to provide further samples where additional investigations are required. See section 9.3 for details on labelling.</p>
 <p>Figure 5: Serum Gel Separating Tube (SST) 6mL</p>	<p>This yellow top sample bottle is used for serum tests. The minimum sample volume is 2mL.</p>

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 Figure 6: Serum (clotted) tube 6mL	This red top sample bottle is used for serum tests. The minimum sample volume is 2mL.
 Figure 7: Universal Container	This universal container contains no additives and is used for collection of urine and CSF samples.

9.2 Sample labelling

All requests for patients within the Trust should be made via CRS. If CRS is not available, please follow the guidelines below.

All GP patient requests can be made via T-Quest. Alternatively, please complete a pre-printed request form and send it to the relevant site laboratory along with the sample(s) in a sealed specimen bag. Please follow the guidelines below.

The printed barcoded label must be attached lengthwise down the tube so that the barcode scanners can read the barcode and samples can be processed. Please do not wrap the barcode label around the tube, the barcode scanners cannot read the label and this will delay sample processing and the availability of results.

Please note- All samples must fulfil all labelling criteria as detailed below. This must include adequate quality barcode labels - any samples received with poor barcode quality (e.g. misaligned, faded, upside down) the laboratory will not be able to guarantee that results will be reported within published turnaround times.



	Essential	Desirable
On Sample Container	Patient's full name - spelled correctly or an anonymised coded identifier Date of Birth and/or Hospital or NHS number Sample type Date and Time (See section 9.3 for Blood Transfusion sample labelling requirements.)	
On Request form	Patient's full name - spelled correctly or an	Requester's bleep

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anonymised coded identifier	number
Date of Birth	Clinical information
Patient's sex	Time sample was
Hospital number or NHS number	collected
Patient's location (Destination for report)	Identity of person that
The requesting doctor (Consultant or GP)	collected sample
Sample type	
Date sample was collected	
Urgency of sample	

9.3 Sample Labelling for Blood Transfusion

Most errors associated with blood transfusion are due to clerical mistakes at the time of collection of the Group and Screen sample, when the product is collected or at the time of administration. To minimise this, the Blood Transfusion department operates a **zero-tolerance policy** on inadequately or incorrectly labelled samples. Re-labelling of samples is not permitted.

Samples for blood transfusion must be accompanied by a signed request form; the label must be hand-written and include the following information:

- Surname
- Forename
- DOB
- NHS or Hospital Number
- Date and time of sample collection
- Phlebotomists signature

These details must be handwritten directly onto the sample. No 'sticky' labels are permitted. Samples that do not meet these criteria will be rejected.

This is in compliance with 2017 Guideline on the Administration of Blood Components issued by British Committee for Standards in Haematology. <https://b-s-h.org.uk/guidelines/guidelines/administration-of-blood-components/>

-Only MRN accepted for inpatients. NHS and or MRN accepted for GP samples.

- Handwritten sticky labels are also not accepted. Exceptional circumstances is paediatric samples (red top EDTA) <4 months of age.

-Where cord and maternal samples are received post-delivery, both samples must be also timed (required for Kleihauer testing).

9.4 Sample rejection criteria

It is the responsibility of the clinician requesting the test to ensure that the details on the request form are accurate and complete.

It is the responsibility of the person taking the sample to ensure that the sample is correctly labelled.

Samples may be rejected for the following reasons

- Sample container broken or leaking
- Incorrect sample received for requested test(s)

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- Insufficient samples
- Grossly haemolysed or lipaemic samples
- Old / aged samples
- Inadequate sample quality e.g. clotted EDTA or citrate sample
- Inadequately labelled or unlabelled samples

9.5 High Risk Patients

Samples from patients who may be suspected to have acquired viral haemorrhagic fever must not be sent to the laboratory without prior discussion; this includes samples for all routine testing. Under no circumstances must these samples be sent via the air chute. Please contact the on-call Virology registrar via switchboard for more information.

9.6 Urgent Tests

The expected turn-around-time (TAT) for testing is described in [section 1](#). Samples from A&E are processed as urgent samples. If the clinical situation requires urgent testing, please contact the relevant department to arrange for priority testing.

9.7 Sample Storage Policy and Add-on Requests

Plasma and whole blood samples are generally stored for 48 hours after the report has been issued. Samples for coagulation testing are generally kept for approximately 48 hours. Additional requests may be made by contacting the relevant department within the laboratories; however the sample may not be suitable for testing after some duration of time. The sample validity time for requesting additional tests is described in [section 1](#).

9.8 Requesting Cross-matches

Crossmatches can be made in advance for patients with planned elective surgery dates. Please note that sample validity is dependent on a patient's transfusion history. Please contact the transfusion laboratory to determine if the sample will be valid for the required date and time. This includes transfusions that have taken place outside of Bart's Health.

Patient last transfused	Samples to be taken
Within the last 3 months	<72 hours before transfusion
Greater than 3 months or never transfused	<One week before transfusion

Urgent crossmatches can be requested by telephone, please contact the transfusion laboratory directly.

At the Royal London and St Bartholomew's sites, remote issue blood is available. Blood is available in specified fridges, and can be accessed for patient's, meeting the relevant requirements.

Patients with antibodies or other special requirements may take longer to provide compatible units. Please contact the transfusion laboratory to discuss patient's requirements and the timeframe for when blood may be made available.

Sample validity for pregnant patients is 72 hours.

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9.9 Massive Haemorrhage Protocols including major-obstetric-haemorrhage (MOH)

9.9.1 St Bartholomew's (SBH)

To activate Cardiac Code Red please contact the laboratory the red phone extension 57416. State clearly patient's hospital number, first and last name, patient's DOB and location of patient. Give your name, your contact/bleep number. Determine with the laboratory if a group and screen is required. Request Pack A and/or Pack B.

Pack A contains 6 units Red Cells, 4 units FFP, 2 pools of Platelets

Pack B contains 6 units Red Cells, 4 units FFP, 2 units Cryoprecipitate, 1 pool of Platelets

Pack C – Catastrophic bleed where only red cells are required - contains 10 units of red blood cells.

Emergency blood is always available from any of the remote issue fridges

9.9.2 Newham University Hospital (NUH)

Activate a Code Red by calling 2222 and stating whether it is an adult, paediatric or obstetric patient.

Then contact the Blood Transfusion laboratory 3280 (normal working hours) or Bleep 4003 (out of hours). State clearly:

CODE RED

- Patient's hospital number and first and last name
- Location of patient
- Your name and your contact/bleep number.

Request Pack A or Pack B. It will take 30 minutes to thaw frozen products.

Pack A contains 6 units Red Cells, 4 units FFP

Pack B contains 6 units Red Cells, 4 units FFP, 1 unit Platelets, 2 units Cryoprecipitate

2 units of emergency (Group O) blood are available in A&E, main theatre and Gateway theatres fridges.

9.9.3 Whipps Cross University Hospital (WXH)

Activate a Code Red by calling 2222 and stating whether it is an adult, paediatric or obstetric patient. Then contact the Blood Transfusion laboratory 5670 (normal working hours) or Bleep 2168 (out of hours).

CODE RED

- Patient's hospital number and first and last name
- Location of patient
- Your name and your contact/bleep number.

Request Pack A or Pack B. It will take 20 minutes to thaw frozen products.

Pack A contains: 4 units Red Cells, 4 units FFP

Pack B contains: 6 units of Red Cells, 4 FFP, 2 cryoprecipitate and 1 platelet.

2 units of emergency (Group O) blood are available in the A&E blood fridge, maternity fridge, theatres 1 and 2 and Planetree theatres.

9.9.4 Royal London Hospital (RLH)

Contact the Blood Transfusion laboratory on Trauma phone 61108 to activate a massive haemorrhage or Code Red. State clearly:

CODE RED

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- Patient's hospital number and first and last name
- Location of patient
- Your name and your contact/bleep number. Request pack A and/or Pack B

Pack A contains 4 units FFP and 4 units of emergency Red Cells.

Pack B contains 6 units of Red Cells, 6 units FFP, 2 units cryoprecipitate and 1 pool of platelets.

Pre thawed FFP is available at RLH for patients suffering major haemorrhage.

Emergency blood is always available from any of the remote issue fridges

9.9.5 Homerton University Hospital

Activate a Code Red by calling 2222 and stating 'CODE RED MAJOR HAEMORRHAGE or MAJOR OBSTETRIC HAEMORRHAGE' together with the LOCATION of the patient.

The Blood Transfusion laboratory will contact the location for the patient's PID, and blood components required.

The Blood Transfusion Laboratory can be contacted on 7894 (normal working hours) or Bleep 234 (out of hours).

State clearly:

CODE RED- (Type of haemorrhage)

- Patient's hospital number and first and last name
- Location of patient
- Blood components required.
- Your name and your contact/bleep number.

It will take 30 minutes to thaw frozen products.

2 units of emergency Group O Negative Red Cells are available in the Blood Issue fridge located in the reception area of the Laboratory.

9.9.6 Queen Elizabeth Hospital

Activate a Code Red by calling 2222, which directs the call to switchboard. State "I want to activate the Code Red protocol in (location)".

The Blood Transfusion Laboratory must be phoned immediately on 65719 / 65716. The following information must be provided:

- The Co-Ordinator's name, extension/bleep, location
- Exact location of the patient
- Patient's Hospital Number
- Patient's Full Name/Date of Birth/Sex/Exact Location
- Indication for Code Red Activation/Clinical Condition

2 x Adult Emergency O RhD Negative 'Flying Squad' blood units are available in the Bloodbank Issue Fridge, access via Blood Track.

A further 6 x units are available in the Blood Bank Stock Fridge, access via On-Duty BMS.

Please be aware that it will take 30 minutes to thaw frozen plasma products.

9.9.7 University Hospital Lewisham

Activate a Code Red by calling 2222, which directs the call to switchboard. State "I want to activate the Code Red protocol in (location)".

The Blood Transfusion Laboratory must be phoned immediately on 26212. The following information must be provided:

- The Co-Ordinator's name, extension/bleep, location

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- Exact location of the patient
- Patient's Hospital Number
- Patient's Full Name/Date of Birth/Sex/Exact Location
- Indication for Code Red Activation/Clinical Condition

2 x Adult Emergency O RhD Negative 'Flying Squad' blood units are available in the Bloodbank Issue Fridge, access via Blood Track. A further 6 x units are available in the Blood Bank Stock Fridge, access via On-Duty BMS.

2 x Adult Emergency O RhD Negative 'Flying Squad' blood units are available in the Theatre Blood Fridge (3rd Floor, Green Zone), access via Blood Track.

Another 1 x Adult Emergency O RhD Negative 'Flying Squad' blood unit is available in the DSU Blood Fridge (Ground Floor, Orange Zone), access via Blood Track.

Please be aware that it will take 30 minutes to thaw frozen plasma products.

9.10 Requesting other Blood Components

The following requests for blood products should be referred to the Haematology Registrar for clinical advice and approval.

- **Requests for more than four 300mL units of FFP.** The exceptions are trauma patients and cardiac patients at SBH
- **All requests for Cryoprecipitate**, except for trauma patients, cardiac patients at SBH and neonates.
- **All requests for platelets in non-haematology patients**, except for trauma patients, cardiac patients at SBH and neonates.
- It has been agreed that trauma patients, cardiac patients at SBH and neonates should be given blood products as requested by the clinicians who are currently treating the patient.
- **Human Albumin:** Albumin is issued as requested.

Laboratory staff may refer any request that appears to be outside normal clinical practice to the Haematology Registrar.

See Bart's Health NHS Trust Major Haemorrhage Policy located on the Trust intranet <https://weshare.bartshealth.nhs.uk/> for further details.

9.11 Blood Product Administration

The type of blood product and the rate of transfusion must be clearly prescribed by medical staff. Any discrepancy in the identity checks of the patient, the unit of blood, or the compatibility report, must be reported to the Blood Transfusion laboratory and the blood must not be transfused until the discrepancy has been resolved. **The compatibility report must remain attached to the patient's prescription chart during the transfusion and the traceability label must be completed at the start of each unit and returned to the laboratory.** The compatibility report must be fixed in the patient's medical notes after the transfusion.

Each transfusion must be documented in the patient's health care record including the following: -

- Date of the transfusion
- Clinical indication for the transfusion

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- Type of blood component or product used
- Transfusion reactions and their management
- Effectiveness of the transfusion

9.12 Cold chain

To comply with legislation, red cells must be stored in a refrigerator with the temperature controlled at 4°C (+/-2°C). Units should only be removed within 30 minutes of transfusion. If a transfusion is delayed on the ward for any reason, all units must be returned to a blood bank refrigerator, as soon as possible. If units have been removed from a refrigerator for more than 30 minutes, they must be returned to the Transfusion Laboratory.

Platelets and Cryoprecipitate must never be refrigerated.

9.13 Transfusion Reactions

If the patient feels unwell or has a rise in temperature of >1°C, the transfusion must be stopped immediately and the patient reviewed clinically. If the reaction is moderate or severe the Blood Transfusion Laboratory and Haematology SpR should be notified and a transfusion reaction investigation form completed.

9.14 Referral laboratories

Referral laboratories used:

Malaria Reference Laboratory and
Diagnostic Parasite laboratory
Faculty of Infectious and Tropical
Diseases,
London School of Hygiene & Tropical
Medicine,
Keppel St, London, WC1E 7HT

Synnovis plc
Guy's Hospital
Great Maze Pond, London SE1 9RT

Kings Path
Red Cell Protein Laboratory
Kings College Hospital
Denmark Hill, London SE5 9RS

NHSBT
Colindale Avenue,
Colindale, NW9 5BG

International Blood Group Reference
Laboratory (IBGRL)

Synnovis
King's College Hospital
Bessemer Wing
Denmark Hill, London SE5 9RS

University College London Hospitals
Haemoglobinopathy Genetics Centre
307 Euston Road, London NW1 3AD

Synnovis
Nutristasis Laboratory
First Floor, North Wing
St Thomas' Hospital
Westminster Bridge Road, London SE1
9RS

NHSBT
75 Cranmer Terrace,
Tooting
London, SW17 0RB

Great Ormond St
Haematology Camelia Botnar

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500 North Bristol Park,
Northway, Filton, Bristol BS34 7QH

Clinical Transplantation Laboratory
3rd Floor,
Pathology and Pharmacy Building
80 Newark St, London, E1 2ES

East and South East London
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Laboratories
Great Ormond Street Hospital
Great Ormond Street, WC1N 3JH

Katherine Dormandy Haemostasis and
Thrombosis Centre
Royal Free Hospital NHS Foundation
Trust
Pond Street, NW3 2QG

10 Specimen Transport

Blood and urine samples must be placed in sealed plastic specimen bags with a request form, if not requesting electronically via CRS. Please keep the request form and sample in separate sections of the specimen bag to avoid cross contamination in the event of a sample leak.

Routine samples can be left at designated ward specimen collection points in the container or specimen fridge as appropriate. Urgent samples can be delivered to the laboratory by the air chute where available, or hand-delivered by porters. Please contact the porters to arrange delivery of urgent samples. Samples are delivered from GP surgeries and phlebotomy centres by scheduled courier deliveries, as well as from the spoke laboratories to the hub.

The following specimens **MUST NOT** be placed in the fridge:

Haematology and Biochemistry samples (unless specifically instructed otherwise), CD4/CD8 subsets, cell markers and plasma viscosity samples.

Please contact the laboratory if further advice is required.

11 Factors affecting tests

Factors Affecting Test Performance

Test	Factor Affecting Test	Reported Parameters
Full Blood Count	Gross lipaemia	Hb, RBC, PLT & WBC Differential may be available, depending on degree of lipaemia
Clotting Screen		INR, APTT ratio depending on degree of lipaemia
Platelet function		Unable to report results; a laboratory comment will be provided
Full Blood Count and Clotting Screen	Clotted samples	
Coagulation tests	Under filled or over filled samples	
Full blood count Coagulation Tests Group and screen	Haemolysis	
Sickle Solubility	<ul style="list-style-type: none"> False negatives can occur if severe anaemia, False negatives can occur on samples taken from neonates, 	

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	<p>because of the high levels of foetal haemoglobins and low levels of adult haemoglobins in the sample, which include haemoglobin-S. Therefore, the sickle solubility test should not be performed in children under the age of six months;</p> <ul style="list-style-type: none"> False negatives can occur on samples taken from patients who have recently been transfused, particularly following massive transfusion, due to the high levels of normal haemoglobins in the donor blood. Tests should be repeated on samples taken pre-transfusion, or at least six months post transfusion. The test is only sensitive to haemoglobin-S levels of more than 20%. False negatives can occur in rare patients with haemoglobin-S percentages below 20%. False positives can occur in patients with high levels of plasma proteins, e.g. those with myeloma. Even in washed packed cells taken at least six months post transfusion, it cannot be assumed that a positive sickle solubility test means that haemoglobin-S is present in the patient's sample. Other rare haemoglobin variants can also give a positive sickle solubility test, e.g. haemoglobin-Charlem. Haemolysed or contaminated samples may give erroneous results. For these reasons, all requests for sickle solubility test must have the results confirmed by analysis on the BioRad Variant II before the presence of haemoglobin-S can be confirmed Test can be referred to Referral Lab 12 for further 	
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12 Reports and Results

Inpatient and Outpatient pathology results are available to view on Millennium's Flowsheet (CRS/EPR) in real time. They are also available on Cyberlab as a back-up.

Inpatient pathology results at Queen Elizabeth and Lewisham Hospital are available on iCare in real time, and on Review as a back up.

Significantly abnormal results will be phoned to the ward or bleeped, if the contact number has been provided. GP pathology results are delivered daily via GP Links. Results are also available on Cyberlab for GPs that have access.

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13 Test Repertoire

Test Repertoire, Testing Location and Special Instructions.
 Contact the laboratory if further guidance is required.

Test Name	Section	Sample Type	Container Type	Special Instructions	Turn-Around Time	Time limit for add-on request
ADAMTS13 assay	Send Away	Contact referral lab		Send samples directly to HSL Haemostasis Laboratory, Haematology Department, 60 Whitfield Street, London W1T 4EU, Phone: 020 3912 0298. Request form can be found at https://www.uclh.nhs.uk/application/files/9316/0595/7341/ADAMTS-13_Request_Form.pdf	4h from sample receipt at HSL laboratory (urgent) 1 week (routine)	[Not applicable]
Anti D Quantitation	Send Away	Whole blood	EDTA - 2x6mL Pink	NHSBT		2 days
Anti Xa	Special Haemostasis	Plasma	3.0mL or 1.8mL Citrate	Refer to details for anticoagulant patient is receiving		
Antibody Titration	Transfusion (RLH)	Whole blood	EDTA - 2x 6mL Pink	Contact laboratory	3 days (Complex antibodies may require further investigation at external reference laboratory)	2 days
Anti-c Quantitation	Send Away	Whole blood		NHSBT	5 working days	

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Test Name	Section	Sample Type	Container Type	Special Instructions	Turn-Around Time	Time limit for add-on request
Antigen Phenotyping	Transfusion (RLH)	Whole blood			3 days	
Antithrombin Activity	Special Haemostasis (Royal London)	Plasma	3.0mL or 1.8mL Citrate	Normally requested as part of Thrombophilia Screen. Urgent assays can be performed following agreement with a Haematology Consultant	One week, Same day if urgent	48h if not frozen, [7d if sample available] 6 months if plasma frozen
Antithrombin antigen	Special haemostasis, (Royal London)	Plasma		Not requestable in Millennium. Will be ordered by laboratory in patients with persistently reduced free protein S antigen after discussion at Thrombosis MDT.	2 weeks	
Apixaban assay	Haemostasis	Plasma		Assay only available at RLH, NUH, WCUH. Samples from SBH, QE and UHL sent to RLH	1h (urgent), 4h (routine), 24h (SBH, UHL, QEH),	24h if not frozen, 6 months if plasma frozen
APTT	Haemostasis (All Sites)	Plasma		Samples must be received within one hour of sample collection if APTT is being used to monitor heparin levels	1h (urgent), 4h (routine)	4 hours if not frozen, 6 months if plasma frozen
APTT 50/50 mixing studies	Haemostasis (All Sites)	Plasma			1h (urgent) 4h (routine)	24 hours if not frozen, 6 months if plasma frozen
Argatroban assay	Special Haemostasis, (Royal London)	Plasma		Urgent assays can be performed following agreement with a Haematology Consultant	One week, Same day if urgent	

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Test Name	Section	Sample Type	Container Type	Special Instructions	Turn-Around Time	Time limit for add-on request
BCR-ABL	Molecular	Whole blood	EDTA - 6mL Purple	Sample should be received less than 24 hours after collection	See SIHMDS user guide	
Blood film morphology	Haematology (All Sites)	Whole blood	EDTA - 4mL Purple		12 hours (urgent), 72 hours (routine)	<24 hours
Blood Group and Antibody Screen	Transfusion (All Sites)	Whole blood	EDTA- 6mL pink 1.3mL neonatal pink top	Contact the laboratory to indicate urgent samples. Provide a date and time when blood products required and any special requirements	24 hours (Blood group anomalies or positive antibody screens may require further investigations)	2 days
Bone marrow aspirate	SIHMDS	Please refer to: SIHMDS.POLICY.002 Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) User Guide				
Cell-free Foetal DNA	Send Away	Whole blood	EDTA -6mL Pink		2 weeks	2 days
Citrated platelet count	Haematology (All Sites)	Whole blood	Citrate - 3mL, EDTA- 4mL Purple	Send both citrate and EDTA samples together with clear indication for citrated platelet count. The citrate sample cannot be shared with any coagulation testing	1 hour (urgent), 2 hours (routine)	<24 hours (not centrifuged)

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CSF Cytospin	Immunophenotyping	CSF	PLAIN - Universal	Please refer to: SIHMDS.POLICY.002 Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) User Guide	see SIHMDS user guide	
Cytochemistry				Contact Haematology laboratory		
Dabigatran assay	Special Haemostasis (Royal London)	Plasma	3.0mL or 1.8mL Citrate	Urgent assays can be performed following agreement with a Haematology Consultant	One week, Same day if urgent	24 hours if not frozen, 6 months if plasma frozen
Dalteparin assay	All sites			Refer to details for "Heparin assay"		
DAT Screen	Transfusion	Whole blood	EDTA - 6mL Pink	Can be performed on 4mL EDTA if necessary	24 hours	2 days
D-Dimer	Haemostasis (All Sites)	Plasma	3.0mL or 1.8mL Citrate		1h (urgent), 4h (routine)	24h if not frozen, 6 months if plasma frozen
Edoxaban assay	Haemostasis (RLH, WXH, NUH)	Plasma	3.0mL citrate / 1.8 mL citrate	Assay only available at RLH, NUH, WCUH, Samples from SBH, QE and UHL are sent to RLH	1h (urgent), 4h (routine), 24h (SBH, UHL and QEH)	24 hours if not frozen, 6 months if plasma frozen
Elution Studies	Transfusion (RLH)	Whole blood	EDTA - 6mL pink	(Complex antibodies may require further investigation at external reference laboratory)	3 days	2 days
Enoxaparin assay	Haemostasis (All Sites)	Plasma	3.0mL or 1.8mL Citrate	Refer to details for "Heparin assay"		

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EPO	(Send Away)	Serum	SST – 5mL Yellow	Sample must be received in the laboratory less than 8 hours after venesection	1 week	<8 hours
ESR	Haematology (All Sites)	Whole blood	EDTA - 4mL Purple	Sample must be near full for adult and half full for Paediatrics. (6mL sample tubes will be rejected).	90 minutes (urgent), 24 hours (routine)	<24 hours
Factor II	Special Haemostasis (Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate	Urgent assays can be performed following agreement with a Haematology Consultant. Contact the laboratory for paediatric sample volume requirements Urgent assays can be performed following agreement with a Haematology Consultant. Contact the laboratory for paediatric sample volume requirements	One week, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Factor IX	Special Haemostasis (Royal London and Lewisham)	Plasma	3.0mL citrate / 1.8 mL citrate		One week, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Factor V	Special Haemostasis (Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate		One week, Same day if urgent	4h if not frozen, 6 months if plasma frozen

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Factor VII	Special Haemostasis (Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate	Urgent assays can be performed following agreement with a Haematology Consultant. Contact the laboratory for paediatric sample volume requirements	One week, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Factor VIII (one stage)	Special Haemostasis (Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate		One working day, 4h if urgent	4h if not frozen, 6 months if plasma frozen
Factor VIII Binding assay	Send Away	Plasma	3.0mL citrate / 1.8 mL citrate		6 weeks	4 hours if not frozen, 3 months if plasma frozen
Factor VIII (chromogenic)	Special Haemostasis (Royal London and Lewisham)	Plasma	3.0mL citrate / 1.8 mL citrate		One working day, 2h if urgent	4h if not frozen, 6 months if plasma frozen
Factor X	Special Haemostasis (Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate		One week, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen

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Factor XI	Special Haemostasis (Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate	Urgent assays can be performed following agreement with a Haematology Consultant. Contact the laboratory for paediatric sample volume requirements	One week, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Factor XII	Special Haemostasis (Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate		One week, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Factor XIII Assay	Special Haemostasis (Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate	Urgent assays can be performed following agreement with a Haematology Consultant. Contact the laboratory for paediatric sample volume requirements	One week, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Fibrinogen	Haemostasis(All Sites)	Plasma	3.0mL citrate / 1.8 mL citrate		1h (urgent), 4h (routine)	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Fibrinogen Antigen	Special Haemostasis(Royal London)	Plasma	3.0mL citrate / 1.8 mL citrate	Urgent assays can be performed following agreement with a Haematology Consultant. Contact the laboratory for paediatric sample volume requirements	2 weeks	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Flow Cytometry for FMH	Send Away	Whole blood	EDTA - 6mL pink		5 working days	
Fluid Cytospin	Haematology (RLH)	Fluid	PLAIN - Universal	Minimum 1mL sample required	6 hours	

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Fondaparinux assay	Special Haemostasis(Royal London)	Plasma	3.0mL citrate / 1.8mL citrate	Urgent assays can be performed following agreement with a Haematology Consultant	One week, Same day if urgent	4 hours if not frozen, 6 months if plasma frozen
Fragmin assay	All sites	Plasma	3.0mL citrate / 1.8mL citrate	Refer to details for "Heparin assay"		
Full blood count (FBC)	Haematology (all sites)	Whole blood	EDTA - 4mL Purple	Sample must be near full	1 hour (urgent), 4 hours (inpatients), 24 hours (routine)	<24 hours
FVL (Factor V Leiden)	Molecular			Please refer to: SIHMDS.POLICY.002 Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) User Guide	10 working days	7 days
G6PD Assay	Send Away			Assay referred to Synnovis King's College Hospital Bessemer Wing Denmark Hill London SE5 9RS		
G6PD Screen	Red Cell Lab (RLH)		EDTA - 4mL Purple	Screen: In house testing performed	72 hours	<7 days (at 4°C)
Genotype	Send Away				12 weeks	2 days
			EDTA - 6mL Pink			

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Test Name	Section	Sample Type	Container Type	Special Instructions	Turn-Around Time	Time limit for add-on request
Heparin assay	Haemostasis (All sites)	Plasma	3.0mL citrate / 1.8mL citrate	Samples must be received within one hour of sample collection	1h (urgent) 4h (routine)	4 hours if not frozen, 6 months if plasma frozen
HbH bodies	Red Cell Lab (RLH, QEH, UHL)	Whole blood	EDTA - 4mL Purple		72 hours	<24 hours
HBO Screen				Complete ethnic origin on request form or submit FOQ questionnaire with the sample	72 hours	<7 days (at 2-8°C)
HIT Screen	Special Haemostasis (Royal London/QEH)	Serum	Clotted sample - 6mL Red	<p>Discuss with Haematology Registrar before requesting. A "4T score" is needed before analysis.</p> <p>Test from RLH sent to Queen Elizabeth Hospital: 1 aliquot must be sent via ad hoc courier to: Haematology Department, Pathology, Queen Elizabeth Hospital, Stadium Road, Woolwich, SE18 4QH. 1 aliquot must remain stored at RLH site (in case of HIT ELISA test needs to be performed). Werfen Acustar (chemiluminescent method) will be tested on all requests. ELISA performed only if Werfen Acustar positive HIT is a clinic-pathological diagnosis</p> <p>Urgent assays can be performed following agreement with a Haematology Consultant</p>	2 working days, Werfen Acustar same day if urgent	7 days if not frozen, 6 months if serum frozen
HLA B27	Send Away	Whole blood	EDTA - 6mL Purple	Sent to NHSBT		

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Q Pulse ID	EHA.QSOP.5	Sites	HH, NUH, RLH, SBH, WXH, QEH, UHL
Version	1	Author	Minal Dave, Juswal Dadhra, Julia Lancut
Date of Issue	April 2024	Approver	Karl Jewell, Davinia Burgon
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HMW Kininogen	Special Haemostasis(Royal London)	Plasma	3.0mL citrate / 1.8mL citrate		2 weeks	48h if not frozen, 6 months if plasma frozen
Homocysteine	Send Away	Plasma	EDTA 4mL purple	<p>Sample must be sent to laboratory on ice within 8 hours of sample collection Samples sent on ice cannot be used for other haematology assays</p> <p>Samples referred to Nutristasis Laboratory (Viapath plc, St Thomas' Hospital) via laboratory at Royal London Hospital</p>	4 weeks	[Not applicable]
IGH Rearrangement	Molecular	Whole blood	EDTA - 6mL Purple	Please refer to: SIHMDS.POLICY.002 Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) User Guide	see SIHMDS user guide	
IM Screen	Haematology			Screen only available at HH, QEH, UHL, WXH, NUH & RLH. Samples taken at SBH will be sent to RLH.	24 hours	<24 hours
Immunopheno-typing	Immunopheno typing		EDTA - 4mL Purple	Please refer to: SIHMDS.POLICY.002 Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) User Guide	see SIHMDS user guide	

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Inhibitor Assay	Special Haemostasis(Royal London)	Plasma	3.0mL citrate / 1.8mL citrate	Urgent assays can be performed following agreement with a Haematology Consultant	One week, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Inhibitor Screen					One week, Same day if urgent	
INR	Haemostasis (All sites)	Plasma	3.0mL citrate / 1.8mL citrate		1 hour (urgent), 4 hours (inpatients), 24 hours (routine)	
Iron Stain	Haematology (All sites)	Bone Marrow Aspirate	EDTA - 4mL Purple	Discuss with haematology registrar prior to test	1 week	24 hours
JAK2	Molecular	Whole blood	EDTA - 6mL Purple	Please refer to: SIHMDS.POLICY.002 Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) User Guide		
Kleihauer	Transfusion	Whole blood	EDTA – 6mL pink from mother and EDTA - 4mL purple cord blood	Maternal and cord blood must be received together, Samples processed at HH, QEH, UHL, NUH, RLH & WXH.	72 hours	

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Test Name	Section	Sample Type	Container Type	Special Instructions	Turn-Around Time	Time limit for add-on request
Lupus Screen	Special Haemostasis(Royal London)	Plasma	3.0mL Citrate or 4 x 1.8 mL citrate	At least 3x citrate samples are required for a full screen.	One week	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Malaria Screen	Haematology	Whole blood	EDTA - 4mL Purple	Please provide travel history and detail of any prophylaxis taken. Samples processed at HH, QEH, UHL, WXH, NUH & RLH. Samples at SBH will be sent to RLH.	2 hours (inpatient) 6 hours (GP)	<6 hours
Methotrexate	Send Away	Serum	EDTA- 4 mL purple	Samples must be received on the day before 14:00hrs. Requests received from non-haematology patients / clinicians that haven't been authorised by the haematology registrar will be rejected. Clotted EDTA samples are not suitable.	3 working days	Same day
NBS Referral	Send Away to NHSBT	Whole blood	EDTA- 2x6mL pink	(complex antibody investigations may require more extensive testing)	5 working days	2 days
Neonatal screen HBO	Red Cell Laboratory (RLH)	Whole blood	EDTA Micro-container	Only performed via liaison with Haematology consultant. This screen normally performed via national screening laboratory using the neonatal blood spot card	72 hours	<7 days
Neutrophil Antibodies	Send Away	Whole blood	Clotted sample - 6mL Red	Contact laboratory	5 working days	
Organ assay	Special Haemostasis(Royal London)	Plasma	3.0mL citrate / 1.8mL citrate	Urgent assays can be performed following agreement with a Haematology Consultant	One week, Same day if urgent	4 hours if not frozen, 6 months if plasma frozen
P5N	Send Away	Whole blood	EDTA - 4mL Purple	Contact laboratory	4 weeks	

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PIVKA proteins	Special Haemostasis (Royal London)	Plasma	3.0mL Citrate	Samples referred to Nutristasis Laboratory (Viapath plc, St Thomas' Hospital) via laboratory at Royal London Hospital	6 weeks	4h if not frozen, 6 months if plasma frozen
PK Assay &/or Screen	Send away	Whole blood	EDTA - 4mL Purple	Contact laboratory	2 weeks	4 days (at 4°C)
Plasma Viscosity	Send Away	Plasma	EDTA - 4mL Purple	Do not refrigerate; sample must be received in laboratory within 12 hours of venesection	3 working days	Same day
Platelet Function Tests	Special Haemostasis (RLH)	Plasma	4x3.0mL Citrate or 5x1.8mL citrate	Can only be performed by prior arrangement with laboratory through RLH Haematology Day Unit	Same day	[Not applicable]
Platelet Immunology	Send Away	Whole blood	EDTA-6mL pink SST-6mL Red	Please contact laboratory for specific sample requirements. Samples must reach the referral laboratory within 3 days of venesection	5 working days	2 days
Platelet Nucleotides Send Away	Special Haemostasis (RLH)		2x 3.0mL Citrate or 3x1.8mL citrate	Samples referred to Katherine Dormandy Haemostasis and Thrombosis Centre (Royal Free Hospital) via laboratory at Royal London Hospital	6 weeks	[Not applicable]
Prekallikrein Assay			3.0mL Citrate or 1.8mL citrate		2 weeks	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Protein C Activity			4x Citrate & 1x EDTA-4mL purple	Normally requested as part of Thrombophilia Screen. Urgent assays can be performed following agreement with a Haematology Consultant	One week. Same day if urgent	

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Protein S Antigen (Total) Send away		Plasma	3.0mL Citrate or 1.8mL citrate	Not requestable in Millennium. Will be ordered by laboratory in patients with persistently reduced free protein S antigen after discussion at Thrombosis MDT. Samples referred to Katherine Dormandy Haemostasis and Thrombosis Centre (Royal Free Hospital) via laboratory at Royal London Hospital	6 weeks	
Protein S Free		Plasma	3.0mL Citrate or 1.8mL citrate	Normally requested as part of Thrombophilia Screen. Urgent assays can be performed following agreement with a Haematology Consultant	One week. Same day if urgent	
Prothrombin Time		Haemostasis(All Sites)		3.0mL Citrate or 1.8mL citrate		
Prothrombin Variant/Prothrombin Gene Mutation	Molecular	Whole blood	EDTA - 4mL Purple	Please refer to: SIHMDS.POLICY.002 Specialist Integrated Haematological Malignancy Diagnostic Services (SIHMDS) User Guide	10 working days	7 days
PT 50/50, mixing studies	Haemostasis (All Sites)	Plasma	3.0mL Citrate or 1.8mL citrate		1h (urgent), 4h (routine)	24h if not frozen, 6 months if plasma frozen

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Test Name	Section	Sample Type	Container Type	Special Instructions	Turn-Around Time	Time limit for add-on request
Red Cell Folate	Send Away	Whole blood	EDTA - 4mL Purple EDTA - 4mL Purple	The sample should be protected from light and Haematocrit must be provided. Maximum sample age is 48 hrs A minimum sample volume of 500µl is required for analysis.	5 days	
Reticulocytes	Haematology (All Sites)			Minimum 2mLs sample required	1 hour (urgent), 2 hours (routine)	<24 hours
Rh Phenotype	Transfusion (All Sites)		EDTA - 6mL Pink		24 hours	2 days
Ristocetin Sensitivity	Special Haemostasis (Royal London)	Plasma	4 x 3.0mL Citrate or 5 x 1.8mL Citrate	Can only be performed by prior arrangement with laboratory through Haematology Day Unit	Same day	[Not applicable]
Rivaroxaban assay	Haemostasis	Plasma	3.0mL Citrate or 1.8mL citrate	Assay only available at RLH, NUH, WCUH, Samples from SBH sent to RLH	1h (urgent), 4h (routine), 24h (SBH)	24h if not frozen, 6 months if plasma frozen
Sickle Cell screen	Haematology (QEH, UHL, HH, RLH)	Whole blood	EDTA - 4mL purple	Please check EPR to determine if sickle status is already known. Send sample 3 days in advance of planned surgery. Provide details of when surgery will take place.	1 hour (urgent), 72 hours (routine)	<7 days
T Cell Receptor B	Molecular	Whole blood	EDTA - 6mL Purple	See SIHMDS user guide	see SIHMDS user guide	

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Test Name	Section	Sample Type	Container Type	Special Instructions	Turn-Around Time	Time limit for add-on request
Thrombin generation	Special Haemostasis (Royal London)	Plasma	3.0mL Citrate or 1.8mL citrate		6 weeks	4h if not frozen, 6 months if plasma frozen
Thrombin Time	Haemostasis (All Sites)				1 hour (urgent), 4 hours (Routine)	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Thrombophilia Screen	Special Haemostasis (Royal London)	Plasma and whole blood	4/5 citrate & 1x EDTA-4mL purple	At least 4x citrate samples and 1x EDTA required for full thrombophilia screen	2 weeks	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Tinzaparin assay				Refer to details for "Heparin assay"		
Taipan Venom Time	Special Haemostasis (Royal London)	Plasma	3.0mL Citrate or 1.8mL citrate	Performed as part of lupus screen on anticoagulated patients	2 weeks	48h if not frozen, [7d if sample available], 6 months if plasma frozen
Urinary Haemosiderin	Haematology (RLH)	Urine	PLAIN - Universal	Contact the Haematology SpR	1 week	[Not applicable]
Vitamin K epoxide	Special Haemostasis (Royal London)			Samples referred to Nutristasis Laboratory (Viapath plc, St Thomas' Hospital) via laboratory at Royal London Hospital	6 weeks	4h if not frozen, 6 months if plasma frozen

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Test Name	Section	Sample Type	Container Type	Special Instructions	Turn-Around Time	Time limit for add-on request
VWF Activity (CBA) Send Away	Special Haemostasis(Royal London)	Plasma	3.0mL Citrate or 1.8mL citrate	Samples referred to Katherine Dormandy Haemostasis and Thrombosis Centre (Royal Free Hospital) via laboratory at Royal London Hospital		48h if not frozen, [7d if sample available], 6 months if plasma frozen
VWF Activity, (GpIbM)				Urgent assays can be performed following agreement with a Haematology Registrar	One working day, 2h if urgent	4h if not frozen, 6 months if plasma frozen
VWF Activity (RCo)					2 weeks	
VWF Antigen				Urgent assays can be performed following agreement with a Haematology Consultant	2 weeks, Same day if urgent	48h if not frozen, [7d if sample available], 6 months if plasma frozen
VWF Multimers Send Away				Samples referred to Katherine Dormandy Haemostasis and Thrombosis Centre (Royal Free Hospital) via laboratory at Royal London Hospital	6 weeks	
VWF VIII Binding assay Send Away				Samples referred to Katherine Dormandy Haemostasis and Thrombosis Centre (Royal Free Hospital) via laboratory at Royal London Hospital		
Warfarin Concentration Send Away				Samples referred to Nutristasis Laboratory (Viapath plc, St Thomas' Hospital) via laboratory at Royal London Hospital		

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Other tests at LGT for sendaway: (see BQ-QP-005 for table)

Erythropoietin
 Cytogenetics /
 MTHFR
 CD4 /CD8
 HFE/HCTG
 Factor 8 inhibitors
 P50
 Lymphocyte subsets
 PML-RARA
 Warfarin Levels
 Warfarin Sensitivity / Resistance

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13.1 Test Combinations

Test Name	Section	Sample Type	Container Type	Special Instructions
Any combination of the following: FBC Reticulocytes ESR IM screen HBO screen Malaria parasites Blood film G6PD Screen	Haematology	Whole blood	1x EDTA 4ml - purple	
Any combination of the following: Coagulation Screen (PT, INR, APTT, APTT ratio) INR Fibrinogen D-Dimer Thrombin Time Rivaroxaban Apixaban Edoxaban Heparin Dabigatran Argatroban	Haemostasis	Plasma	1 x 3.0mL Citrate/ 1 x 1.8 ml citrate	

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Test Name	Section	Sample Type	Container Type	Special Instructions
<u>Lupus Anticoagulant screen</u> Test includes PT, INR, APTT, APTT ratio, TT, TT ratio DRVVT (and correction tests) Dilute APTT (and correction tests) Anticoagulant assay (if indicated) TSVT/ECT (if indicated)	Haemostasis. Samples sent to Royal London for analysis	Plasma	3 x 3.0mL Citrate/ 4x1.8ml citrate	
<u>Thrombophilia Screen</u> Test includes PT, INR, APTT, APTT ratio, TT, TT ratio, fibrinogen DRVVT (and correction tests if indicated) Dilute APTT (and correction tests if indicated) Anticoagulant assay (if indicated) TSVT/ECT (if indicated) Antithrombin activity Protein C activity Free Protein S antigen Factor V Leiden mutation analysis Prothrombin gene mutation analysis Antithrombin antigen (if indicated) Total Protein S antigen (if indicated) Thrombin generation (if indicated)	Haemostasis. Samples sent to Royal London for analysis	Plasma and whole blood	4 x 3.0mL Citrate / 4 x 1.8 ml citrate and 1 x 4ml EDTA	

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Test Name	Section	Sample Type	Container Type	Special Instructions
<u>Von Willebrand Screen</u> Test includes PT, INR, APTT, APTT ratio, TT, TT ratio, fibrinogen Factor VIII assay (chromogenic) VWF activity assay (vW:GplbM) VWF antigen assay (if indicated) VWF activity assay (vW:RCO) (if indicated) VWF activity assay (vW:CB) (if indicated) VWF VIII-binding assay (if indicated) VWF multimers (if indicated)	Haemostasis (all sites) Samples sent to Royal London for analysis	Plasma	3 x 3.0mL Citrate/ 4x1.8 ml citrate	
Platelet Function	Haemostasis (Royal London)	Plasma	4x3.0 ml citrate/ 5x1.8 ml citrate	Can only be performed on samples collected at Royal London Hospital by prior arrangement with laboratory through Haematology Day Unit
Platelet Nucleotides	Haemostasis (Royal London)	Plasma	2x3.0 ml citrate/ 3x1.8 ml citrate N.B – no additional samples required if Platelet Function is already requested.	Can only be performed on samples collected at Royal London Hospital, unless

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14 Haematology Reference ranges

14.1 Full Blood Count Parameters and Cell Counts

Routine tests * reference ranges taken from Practical Haematology, Dacie and Lewis, 11th Edition (2012)

Full Name	Age	Lower Limit	Upper Limit	Reporting Units
White blood cell count*	Birth	10	26.0	$\times 10^9/\text{L}$
	Day 3	7.0	23.0	$\times 10^9/\text{L}$
	Day 7	6.0	22.0	$\times 10^9/\text{L}$
	Day 14	6.0	22.0	$\times 10^9/\text{L}$
	1 month	5.0	19.0	$\times 10^9/\text{L}$
	2 months	5.0	15.0	$\times 10^9/\text{L}$
	3-6 months	6.0	18.0	$\times 10^9/\text{L}$
	1 year	6.0	18.0	$\times 10^9/\text{L}$
	2-6 years	5.0	15.0	$\times 10^9/\text{L}$
	6-12 years	5.0	13.0	$\times 10^9/\text{L}$
	>12 years	4.0	10.0	$\times 10^9/\text{L}$
Red blood cell count*	Birth	5.00	7.00	$\times 10^{12}/\text{L}$
	Day 3	4.00	6.60	$\times 10^{12}/\text{L}$
	Day 7	3.90	6.30	$\times 10^{12}/\text{L}$
	Day 14	3.60	6.20	$\times 10^{12}/\text{L}$
	1 month	3.00	5.40	$\times 10^{12}/\text{L}$
	2 months	3.10	4.30	$\times 10^{12}/\text{L}$
	3-6 months	4.10	5.30	$\times 10^{12}/\text{L}$
	1 year	3.90	5.10	$\times 10^{12}/\text{L}$
	2-6 years	4.00	5.20	$\times 10^{12}/\text{L}$

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Full Name	Age	Lower Limit	Upper Limit	Reporting Units
	6-12 years	4.00	5.20	$\times 10^{12}/L$
	>12	4.50	5.50	$\times 10^{12}/L$
	>12	3.80	4.80	$\times 10^{12}/L$
Haemoglobin level*	Birth	140	220	g/L
	Day 3	150	210	g/L
	Day 7	171	179	g/L
	Day 14	161	169	g/L
	1 month	115	165	g/L
	2 months	94	130	g/L
	3-6 months	111	141	g/L
	1 year	111	141	g/L
	2-6 years	110	140	g/L
	6-12 years	115	155	g/L
	>12	130	170	g/L
	>12	120	150	g/L
Haematocrit*	Birth	0.45	0.75	I/L
	Day 3	0.45	0.67	I/L
	Day 7	0.42	0.66	I/L
	Day 14	0.31	0.71	I/L
	1 month	0.33	0.53	I/L
	2 months	0.28	0.42	I/L
	3-6 months	0.30	0.40	I/L
	1 year	0.30	0.38	I/L
	2-6 years	0.34	0.40	I/L
	6-12 years	0.35	0.45	I/L
	>12	0.40	0.50	I/L
	>12	0.36	0.46	I/L
Mean cell volume*	Birth	100.0	120.0	fL
	Day 3	92.0	118.0	fL
	Day 7	88.0	126.0	fL
	Day 14	86.0	124.0	fL
	1 month	92.0	116.0	fL

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Full Name	Age	Lower Limit	Upper Limit	Reporting Units
	2 months	87.0	103.0	fL
	3-6 months	68.0	84.0	fL
	1 year	72.0	84.0	fL
	2-6 years	75.0	87.0	fL
	6-12 years	77.0	95.0	fL
	>12 years	83.0	101.0	fL
Mean cell haemoglobin*	Birth	31.0	37.0	pg
	Day 3	31.0	37.0	pg
	Day 7	31.0	37.0	pg
	Day 14	31.0	37.0	pg
	1 month	30.0	36.0	pg
	2 months	27.0	33.0	pg
	3-6 months	24.0	30.0	pg
	1 year	25.0	29.0	pg
	2-6 years	24.0	30.0	pg
	6-12 years	25.0	33.0	pg
	>12 years	27.0	32.0	pg
Mean cell haemoglobin concentration*	Birth	300	360	g/L
	Day 3	290	370	g/L
	Day 7	280	380	g/L
	Day 14	280	380	g/L
	1 month	290	370	g/L
	2 months	285	355	g/L
	3-6 months	300	360	g/L
	1 year	320	360	g/L
	2-6 years	310	370	g/L
	6-12 years	310	370	g/L
	>12 years	315	345	g/L
Red cell distribution width*	>12 years	11.6	14.0	%
Platelet count*	Birth	100	450	$\times 10^9/L$
	Day 3	210	500	$\times 10^9/L$
	Day 7	160	500	$\times 10^9/L$




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Full Name	Age	Lower Limit	Upper Limit	Reporting Units
	Day 14	170	500	$\times 10^9/L$
	1 month	200	500	$\times 10^9/L$
	2 months	210	650	$\times 10^9/L$
	3-6 months	200	550	$\times 10^9/L$
	1 year	200	550	$\times 10^9/L$
	2-6 years	200	490	$\times 10^9/L$
	6-12 years	170	450	$\times 10^9/L$
	>12 years	150	410	$\times 10^9/L$
Neutrophil count*	Birth	4.0	14.0	$\times 10^9/L$
	Day 3	3.0	5.0	$\times 10^9/L$
	Day 7	3.0	6.0	$\times 10^9/L$
	Day 14	3.0	7.0	$\times 10^9/L$
	1 month	3.0	9.0	$\times 10^9/L$
	2 months	1.0	5.0	$\times 10^9/L$
	3-6 months	1.0	6.0	$\times 10^9/L$
	1 year	1.0	7.0	$\times 10^9/L$
	2-6 years	1.5	8.0	$\times 10^9/L$
	6-12 years	2.0	8.0	$\times 10^9/L$
	>12 years	2.0	7.0	$\times 10^9/L$
Lymphocyte count*	Birth	3.0	8.0	$\times 10^9/L$
	Day 3	2.0	8.0	$\times 10^9/L$
	Day 7	3.0	9.0	$\times 10^9/L$
	Day 14	3.0	9.0	$\times 10^9/L$
	1 month	3.0	16.0	$\times 10^9/L$
	2 months	4.0	10.0	$\times 10^9/L$
	3-6 months	4.0	12.0	$\times 10^9/L$
	1 year	3.5	11	$\times 10^9/L$
	2-6 years	6.0	9.0	$\times 10^9/L$
	6-12 years	1.0	5.0	$\times 10^9/L$
	>12 years	1.0	3.0	$\times 10^9/L$
Monocyte count*	Birth	0.5	2.0	$\times 10^9/L$
	Day 3	0.5	1.0	$\times 10^9/L$

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Full Name	Age	Lower Limit	Upper Limit	Reporting Units
	Day 7	0.1	1.7	$\times 10^9/L$
	Day 14	0.1	1.7	$\times 10^9/L$
	1 month	0.3	1.0	$\times 10^9/L$
	2 months	0.4	1.2	$\times 10^9/L$
	3-6 months	0.2	1.2	$\times 10^9/L$
	1 year	0.2	1.0	$\times 10^9/L$
	2-6 years	0.2	1.0	$\times 10^9/L$
	6-12 years	0.2	1.0	$\times 10^9/L$
	>12 years	0.2	1.0	$\times 10^9/L$
Eosinophil count*	Birth	0.1	1.0	$\times 10^9/L$
	Day 3	0.1	2.0	$\times 10^9/L$
	Day 7	0.1	0.8	$\times 10^9/L$
	Day 14	0.1	0.9	$\times 10^9/L$
	1 month	0.2	1.0	$\times 10^9/L$
	2 months	0.1	1.0	$\times 10^9/L$
	3-6 months	0.1	1.0	$\times 10^9/L$
	1 year	0.1	1.0	$\times 10^9/L$
	2-6 years	0.1	1.0	$\times 10^9/L$
	6-12 years	0.1	1.0	$\times 10^9/L$
	>12 years	0.02	0.5	$\times 10^9/L$
Basophil count*	>12 years	0.02	0.1	$\times 10^9/L$
Nucleated red blood cell count	All	0	0.2	$\times 10^9/L$
Blasts	All	0	0	%
Promyleocytes	All	0	0	%
Metamyelocytes	All	0	0	%
Myelocytes	All	0	0	%
Erythrocyte sedimentation rate*	17-50 Years 	≤ 10		mm/hr
	50-61 Years 	≤ 12		mm/hr
	61-70 Years 	≤ 14		mm/hr
	>70 Years 	≤ 30		mm/hr
	17-50 Years 	≤ 12		mm/hr

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Full Name	Age	Lower Limit	Upper Limit	Reporting Units
	50-61 Years 	≤ 19		mm/hr
	61-70 Years 	≤ 20		mm/hr
	>70 Years 	≤ 35		mm/hr
Reticulocytes*	Birth	120.0	400.0	$\times 10^9/L$
	Day 3	50.0	350.0	$\times 10^9/L$
	Day 7	50.0	100.0	$\times 10^9/L$
	Day 14	50.0	100.0	$\times 10^9/L$
	1 month	20.0	60.0	$\times 10^9/L$
	2 months	30.0	50.0	$\times 10^9/L$
	3-6 months	40.0	100.0	$\times 10^9/L$
	1 year	30.0	100.0	$\times 10^9/L$
	2-6 years	30.0	100.0	$\times 10^9/L$
	6-12 years	30.0	100.0	$\times 10^9/L$
	>12 years	50.0	100.0	$\times 10^9/L$
	Birth	0.5	2.5	%
CSF Red Cell Count	All	0	0	$\times 10^6/L$
CSF White Cell Count	All	0	0	$\times 10^6/L$
Fluid Red Cell Count	All	0	0	$\times 10^9/L$
Fluid White Cell Count	All	0	0	$\times 10^9/L$
Plasma Viscosity	All	1.5	1.72	mPA s ⁻¹

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15 Haemostasis Reference Ranges

Routine Haemostasis				
Reference range for tests marked * may change with each batch of reagent Paediatric reference ranges are taken from "Development of the human coagulation system in the full-term infant." M Andrew et al. Blood (1987); 70: 165-172. Reference ranges for >6m locally derived.				
Full Name	Age	Lower Limit	Upper Limit	Units
PT*	<1d	8.8	11.7	Seconds
	<5d	7.9	12.7	Seconds
	<1m	8.1	12.5	Seconds
	<3m	8.4	12.4	Seconds
	<6m	9.3	12.1	Seconds
	>6m	8.8	11.7	Seconds
INR	<1d	0.8	1.3	-
	<5d	0.8	1.2	-
	<1m	0.8	1.2	-
	<3m	0.8	1.1	-
	<6m	0.9	1.1	-
	>6m	0.9	1.1	-
PT 50/50*	<1d	8.8	13.8	Seconds
	<5d	8.3	13.3	Seconds
	<1m	8.1	12.5	Seconds
	<3m	8.4	12.4	Seconds
	<6m	9.3	12.1	Seconds
	>6m	9.4	12.2	Seconds
APTT*	<1d	24	42	Seconds
	<5d	20	46	Seconds
	<1m	20	43	Seconds
	<3m	19	39	Seconds
	<6m	22	33	Seconds

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Routine Haemostasis				
Reference range for tests marked * may change with each batch of reagent Paediatric reference ranges are taken from “Development of the human coagulation system in the full-term infant.” M Andrew et al. Blood (1987); 70: 165-172. Reference ranges for >6m locally derived.				
Full Name	Age	Lower Limit	Upper Limit	Units
	>6m	21	29	Seconds
APTT ratio	<1d	0.9	1.6	-
	<5d	0.8	1.8	-
	<1m	0.8	1.7	-
	<3m	0.7	1.5	-
	<6m	0.8	1.3	-
	>6m	0.9	1.1	-
APTT 50/50*	<1d	24	42	Seconds
	<5d	20	46	Seconds
	<1m	20	43	Seconds
	<3m	19	39	Seconds
	<6m	22	33	Seconds
	>6m	21	29	Seconds

Routine Haemostasis				
Reference range for tests marked * may change with each batch of reagent Paediatric reference ranges are taken from “Development of the human coagulation system in the full-term infant.” M Andrew et al. Blood (1987); 70: 165-172. Reference ranges for >6m locally derived.				
Full Name	Age	Lower Limit	Upper Limit	Units
TT*	<1d	11	16	Seconds
	<5d	10	17	Seconds
	<1m	11	17	Seconds

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Routine Haemostasis

Reference range for tests marked * may change with each batch of reagent

Paediatric reference ranges are taken from "Development of the human coagulation system in the full-term infant." M Andrew et al. Blood (1987); 70: 165-172. Reference ranges for >6m locally derived.

	<3m	12	17	Seconds
	<6m	11	18	Seconds
	>6m	16	20	Seconds
TT ratio	<1d	0.7	1.1	-
	<5d	0.7	1.2	-
	<1m	0.8	1.2	-
	<3m	0.8	1.2	-
	<6m	0.8	1.2	-
	>6m	0.8	1.2	-
Clauss fibrinogen	<1d	1.67	3.99	g/L
	<5d	1.62	4.62	g/L
	<1m	1.62	3.78	g/L
	<3m	1.07	3.79	g/L
	<6m	1.15	3.87	g/L
	>6m	1.56	4.00	g/L
Fibrinogen antigen	All	1.50	4.50	g/L
D-dimer	All	0	0.44	mg/L FEU

Lupus anticoagulant tests

Full Name	Age	Lower Limit	Upper Limit	Units
DRVVT	All	0.74	1.10	Ratio
DRVVT + PNP	All	0.85	1.06	Ratio
DRVVT + PNP correction	All	0	10	%
DRVVT 50/50	All	0.82	1.06	Ratio
DRVVT 50/50 + PNP	All	0.82	1.02	Ratio
DRVVT EVM + PNP correction	All	0	10	%
Dilute APTT	All	0.83	1.15	Ratio
Dilute APTT + PNP	All	0.84	1.06	Ratio

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Lupus anticoagulant tests				
Full Name	Age	Lower Limit	Upper Limit	Units
Dilute APTT + PNP correction	All	0	10	%
Dilute APTT EVM	All	0.89	1.10	Ratio
Dilute APTT EVM + PNP	All	0.91	1.05	Ratio
Dilute APTT EVM + PNP correction	All	0	10	%
Lupus interpretation summarises findings of above tests, as required by ISTH and BCSH guidelines				



Thrombophilia tests				
Paediatric reference ranges are taken from "Development of the human coagulation system in the full-term infant." M Andrew <i>et al.</i> Blood (1987); 70 : 165-172. Reference ranges for >16y locally derived.				
Thrombophilia opinion summarises interpretation of test results by Chief Biomedical Scientist or Haematology Clinicians				
Full Name	Age	Lower Limit	Upper Limit	Units
Antithrombin activity	<1d	39	87	iu/dL
	<5d	41	93	iu/dL
	<1m	48	108	iu/dL
	<3m	73	121	iu/dL
	<1	76	130	iu/dL
	<6	82	139	iu/dL
	<10	90	131	iu/dL
	<17	77	132	iu/dL
	>16	81	119	iu/dL
Antithrombin antigen	All	83	124	iu/dL
Protein C activity	<1d	17	53	iu/dL
	<5d	20	64	iu/dL
	<1m	21	65	iu/dL
	<3m	28	80	iu/dL
	<6m	37	81	iu/dL
	<5	40	92	iu/dL
	<10	45	93	iu/dL
	≤16	55	111	iu/dL

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Thrombophilia tests

Paediatric reference ranges are taken from "Development of the human coagulation system in the full-term infant." M Andrew *et al.* Blood (1987); **70**: 165-172. Reference ranges for >16y locally derived.

Thrombophilia opinion summarises interpretation of test results by Chief Biomedical Scientist or Haematology Clinicians

Full Name	Age	Lower Limit	Upper Limit	Units
	>16	72	162	iu/dL
Protein C antigen	All	65	108	iu/dL
Free Protein S antigen	<1d	12	60	iu/dL
	<5d	22	78	iu/dL
	<1m	33	93	iu/dL
	<3m	54	118	iu/dL
	<6m	54	119	iu/dL
	<5y	54	118	iu/dL
	<10y	41	114	iu/dL
	≤16y	52	92	iu/dL
	>16y 	68	139	iu/dL
	>16y 	60	114	iu/dL
Total Protein S antigen	All	67	140	iu/dL
Anti-Xa	All	-	-	IU/mL
Plasminogen	<1d	42	89	iu/dL
	<5d	47	99	iu/dL
	<1m	42	91	iu/dL
	<3m	59	108	iu/dL
	<6m	74	128	iu/dL
	>6m	83	143	iu/dL
Homocysteine	All	0.00	15.00	mmol/L

Haemophilia tests

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HAEMATOLOGY AND BLOOD TRANSFUSION

Partnership Wide



East and South East London

Pathology Partnership

Full Name	Age	Lower Limit	Upper Limit	Units
Factor VIII	<1d	50.0	178.0	iu/dL
	<5d	50.0	154.0	
	<1m	50.0	157.0	
	<3m	50.0	125.0	
	<6m	50.0	109.0	
	>6m	52.0	153.0	
Factor VIII (chromogenic)	<1d	50.0	178.0	iu/dL
	<5d	50.0	154.0	
	<1m	50.0	157.0	
	<3m	50.0	125.0	
	<6m	50.0	109.0	
	>6m	51.0	160.0	
Factor IX	<1d	15.0	91.0	iu/dL
	<5d	15.0	91.0	
	<1m	21.0	81.0	
	<3m	21.0	113.0	
	<6m	36.0	136.0	
	>6m	58.0	138.0	
Full Name	Age	Lower Limit	Upper Limit	Units
Factor XI	<1d	10.0	66.0	iu/dL
	<5d	23.0	87.0	
	<1m	27.0	79.0	
	<3m	41.0	97.0	
	<6m	38.0	134.0	
	>6m	58.0	148.0	
Factor XII	<1d	13.0	93.0	iu/dL
	<5d	11.0	83.0	
	<1m	17.0	81.0	
	<3m	25.0	109.0	
	<6m	39.0	115.0	
	>6m	52.0	164.0	

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Haemophilia tests

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Full Name	Age	Lower Limit	Upper Limit	Units
Factor II	<1d	26.0	70.0	iu/dL
	<5d	33.0	93.0	
	<1m	34.0	102.0	
	<3m	45.0	105.0	
	<6m	60.0	116.0	
	>6m	70.0	146.0	
Factor V	<1d	36.0	108.0	iu/dL
	<5d	45.0	145.0	
	<1m	62.0	134.0	
	<3m	48.0	132.0	
	<6m	55.0	127.0	
	>6m	62.0	150.0	
Factor VII	<1d	28.0	104.0	iu/dL
	<5d	35.0	143.0	
	<1m	42.0	138.0	
	<3m	39.0	143.0	
	<6m	47.0	127.0	
	>6m	67.0	143.0	
Factor X	<1d	12.0	68.0	iu/dL
	<5d	19.0	79.0	
	<1m	31.0	87.0	
	<3m	35.0	107.0	
	<6m	38.0	118.0	
	>6m	60.0	152.0	
Factor XIII	<1d	27.0	131.0	iu/dL
	<5d	44.0	144.0	
	<1m	39.0	147.0	
	<3m	36.0	172.0	

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Haemophilia tests

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Full Name	Age	Lower Limit	Upper Limit	Units
	<6m	46.0	162.0	
	>6m	55.0	155.0	
vW:Ag	<1d	50.0	287.0	iu/dL
	<5d	50.0	254.0	
	<1m	50.0	246.0	
	<3m	50.0	206.0	
	<6m	50.0	197.0	
	>6m	50.0	156.0	
vW:RCo	All	41.0	161.0	iu/dL
vW:CBA	All	50	150	iu/dL
High Molecular Weight Kininogen	<1d	6.0	102.0	u/dL
	<5d	18.0	130.0	
	<1m	33.0	121.0	
	<3m	18.0	146.0	
	<6m	36.0	128.0	
	>6m	48.0	136.0	
Prekallikrein	<1d	5.0	69.0	u/dL
	<5d	20.0	76.0	
	<1m	23.0	91.0	
	<3m	41.0	105.0	
	<6m	56.0	116.0	
α 2-antiplasmin	>6m	62.0	162.0	iu/dL
	<1d	55.0	115.0	
	<5d	70.0	130.0	
	<1m	76.0	124.0	
	<3m	76.0	140.0	
	<6m	83.0	139.0	
Inhibitor activity	All	0	0.6	NBu/mL

Haemophilia opinion summarises interpretation of test results by Haematology Clinicians

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Platelet function tests				
Full Name	Age	Lower Limit	Upper Limit	Units
ADP 5µM	All	43	98	%
ADP 3µM	All	27	89	%
ADP 1µM	All	5	30	%
Arachidonic acid	All	75	96	%
Adrenaline	All	29	95	%
Collagen	All	80	95	%
Ristocetin	All	83	95	%
Platelet nucleotides	All	0.60	1.39	åmol/plt
Nucleotide ATP	All	0.30	0.88	åmol/plt
Nucleotide ADP	All	0.22	0.59	åmol/plt
ATP:ADP ratio	All	0.86	2.26	-
Haemophilia opinion summarises interpretation of test results by Haematology Clinicians				

16 Red Cell Laboratory Reference Ranges

Full Name	Age	Lower Limit	Upper Limit	Reporting Units
Vitamin B12	All	191	900	ng/L
Serum Folate	All	3.8	20	µg/L
Red Cell Folate	All	140	836	µg/L
Haemoglobin A2	All	1.8	3.3	%
Haemoglobin F	All	0	1	%
Haemoglobin A	All	80	100	%
Haemoglobin S	All	0	0	%
Haemoglobin E	All	0	0	%
Haemoglobin C	All	0	0	%
Haemoglobin D	All	0	0	%
Other haemoglobins	All	0	0	%
Glucose-6-phosphate dehydrogenase	All	4.6	13.5	u/g (Hb)

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Full Name	Age	Lower Limit	Upper Limit	Reporting Units
Pyruvate Kinase	All	11	21	u/g (Hb)
Erythropoietin	All	5	25	iu/mL

Interpretation and reporting of antenatal screening results - GOV.UK (www.gov.uk) and Significant haemoglobinopathies: A guideline for screening and diagnosis
<https://onlinelibrary.wiley.com/doi/full/10.1111/bjh.18794>

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17 Haematology and Blood Transfusion Critical Results

Samples whose results exceed the following critical limits described in the table below will be telephoned, unless the immediately preceding sample gave similar results. An exception to this rule is if the second sample has been sent in order to confirm an unexpectedly abnormal result obtained on the first. Where necessary, a repeat sample may also be requested.

Parameter / Test	Critical Level
HAEMATOLOGY	
WBC	$>50.0 \times 10^9/L$
Neutrophils	$\leq 0.5 \times 10^9/L$
Hb	$\leq 70 \text{ g/L}$
	$\leq 50 \text{ g/L}$ - patients with low MCV/MCH
	$> 190 \text{ g/L}$
Platelets	$\leq 30 \times 10^9/L$
Leukaemia	Results of blood films and full blood counts for patients with newly presented acute leukaemia will be telephoned to the Haematology Lab SpR on extension 45856 (RLH) or Lab Consultant (60375), or through the switchboard for other sites. The lab will also contact the SpR through the switchboard if results require communication outside their normal working hours
Malaria	Newly presented/diagnosed malaria infection of any species, along with the parasitaemia if <i>P. falciparum</i> infection is found.
HAEMOSTASIS	
INR	>5.0 - All patients (Not required If clinical details say patient known to have high INR on POCT)
APTT_r	>4.4 - All patients
Fibrinogen	$<1.00 \text{ g/L}$ - All patients
Acquired Inhibitors	All New Diagnoses
Severe Factor Deficiencies	All New Diagnoses (with or without inhibitors)
RED CELL LABORATORY	

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Parameter / Test	Critical Level
Haemoglobinopathy Testing	All urgent haemoglobin-S percentages. Any neonatal screen where no HbA has been detected. These results will be bleeped to the Paediatric Haematology Registrar on 1239 (RLH).
BLOOD TRANSFUSION	
<p>The following results will be telephoned:</p> <ul style="list-style-type: none"> • Positive Kleihauers with estimated FMH of >2ml • Any requirement for additional maternal samples or additional Anti-D based upon FMH quantitation by flow cytometry. • Antenatal antibodies with a titre >32 or any significant rise in antibody levels in pregnancy especially for patients with anti-D, anti-c and anti-K • Neonatal DAT results > 2 	

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