

# Haematology & Blood Transfusion User Handbook University Hospitals Bristol



\*Please note this User guide is intended for Hospital and all other users. Links contained within may only function within the Trust intranet, if unavailable and copies are required, please contact the Laboratory\*

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## General Information

### Location

The Haematology and Blood Transfusion laboratory is located at Level 8 Queens Building Marlborough Street, Bristol BS2 8HW. Samples are sent from the main hospital to specimen reception via the 'Pod' system or via porters lodge. Further information for sample transport is available on the Trust webpage [Transport of Specimens](#).

**MAIN SWITCHBOARD: 0117 923 0000**

### Contact Numbers and Working Hours

| Key Contacts  |                                   |   |
|---|-----------------------------------|---|
| <b>Clinical Lead</b>  | Dr Andrew Stewart                 | <a href="mailto:Andrew.Stewart@nhs.net">Andrew.Stewart@nhs.net</a>  |
| <b>Head of Service</b>  | Elizabeth Worsam                  | <a href="mailto:Elizabeth.Worsam@UH Bristol.nhs.uk">Elizabeth.Worsam@UH Bristol.nhs.uk</a><br>0117 342 2575 Mon-Fri 09:00-17:30 |
| <b>Lead Blood Sciences Automation</b>                               | Mark Nicholas                     | <a href="mailto:Mark.Nicholas@UH Bristol.nhs.uk">Mark.Nicholas@UH Bristol.nhs.uk</a><br>0117 342 2595                           |
| <b>Training Officer</b>   | Donna Connolly                    | Donna.Connolly@UH Bristol.nhs.uk  |
| <b>Quality Manager</b>  | Mark Nicholas                     | Mark.Nicholas@UH Bristol.nhs.uk   |
| Routine Haematology & Coagulation                                   |                                   |   |
| <b>Reception/helpdesk</b>   | 0117 342 3080                     | Monday-Friday 09:00-17:30   |
| <b>Haematology Routine</b>  | 0117 342 2708                     | Monday-Friday 08:00-20:00   |
| <b>Coagulation Routine</b>  | 0117 342 2598                     | Monday-Friday 08:00-20:00   |
| <b>Haematology Lead</b>   | Mark Nicholas                     | 0117 342 2708   |
| <b>Coagulation Lead<br/>(Specialised Coagulation)</b>               | Chris Reilly-Stitt                | 0117 342 2598   |
| Blood Transfusion   |                                   |   |
| <b>Blood Transfusion Laboratory</b>                                 | 0117 342 2579 or<br>0117 342 2529 | Monday-Friday 08:00-20:00   |
| <b>Blood Transfusion Lead</b>                                       | Adele Wardle                      | 0117 342 2579   |
| <b>Blood Transfusion Practitioner</b>                               | Soo Cooke                         | 0117 342 7709 Bleep 3572  |
| <b>Blood Bank Consultant</b>  | Dr Tom Latham                     | Contact via switchboard   |
| Specialist Registrars (09:00-17:00 Monday-Friday)                   |                                   |   |
| <b>Haematology Laboratory SpR</b>                                   | Bleep 2445                        |   |
| <b>Haemostasis Laboratory SpR</b>                                   | Bleep 2677                        |   |
| <b>On-call Haematology Registrar<br/>(Outside of routine hours)</b> | Contact via switchboard           |   |

## Out-of-Hours Service (after hours Monday-Friday, Saturday/Sunday & Bank holidays)

The Haematology Laboratory provides a 7 day/24hr restricted service outside of routine hours. A Biomedical scientist can be contacted via the relevant Routine Haematology, Routine Coagulation and Blood Transfusion Laboratory extension number until 20:00 Mon-Friday (see above). Outside of these times (20:00-08:00 Mon-Fri, all day Saturday/Sunday) the BMS must be contacted via the extension 0117 342 2579 or 22579 if within the hospital.

The following services are available out of routine working hours:

- Full Blood Count (FBC), Erythrocyte Sedimentation Rate (ESR), urgent Blood film examination, including malaria screen.
- Clotting screen (PT/APTT), Fibrinogen, D-Dimers, Anti-Xa levels, Thrombin clotting times. Factor assays and Antithrombin 3 are available but require authorisation from as a minimum, Haematology SpR.
- Group and Antibody Screen (Urgent) and Crossmatch.
- Urgent Pre-op sickle screening.

Contact the laboratory on ext 22579 to discuss any urgent requests for any services that are not usually available outside of routine working hours.

### Clinical advice

During routine working hours (Monday-Friday 09:00-17:00), please contact the relevant Specialist registrar via the bleep system. For clinical advice outside of these hours contact the Haematology Registrar via switchboard.

## **MAJOR HAEMORRHAGE PROCEDURE**

The major haemorrhage procedure is designed to provide blood products in the minimum time to the site of a major haemorrhage.

Major haemorrhage is considered as any situation where immediate delivery of blood is required for a patient with rapid blood loss. All clinical and laboratory staff can activate the procedure if immediate emergency delivery of blood is deemed necessary.

The procedure is activated with one phone call. Calls will be recorded as routine.

1. Call 2222 "I would like to trigger the major haemorrhage procedure in location x extension xxxx".
2. Switchboard will ask you to put the phone down then call you back immediately and connect you to blood bank. STAY ON THE LINE UNTIL CONNECTED. Provide patient identification details, age and weight (if child) and products required.

For further information refer to the Trust Major Haemorrhage Procedure, link underneath.

<http://nww.avon.nhs.uk/dms/download.aspx?did=13398>

## Completion of the Request form

Please use the appropriate request form for the tests required.

### Form and sample labelling criteria

#### Unlabelled or Inadequately labelled Request Forms

Where an unlabelled or inadequately labelled request form is received with a labelled specimen, the patient information may be taken from the specimen and written on the request form. The location of the patient should be identified and contacted in order to ascertain the test(s) required and any additional information necessary for completion.

#### Unlabelled or Inadequately Labelled Specimens

### **LABORATORY STAFF MUST NOT ALTER OR COMPLETE SPECIMEN LABELLING**

These specimens will be booked in as per the accompanying request form. The unlabelled or inadequately labelled specimen **MUST** be rejected. The rejected specimen cannot be returned to the person who took the specimen under any circumstances.

#### Request Form and Specimen Labelling Incompatibility

Where the request form and specimen are labelled differently the requesting clinician or ward will be informed and a repeat specimen requested. The specimen and request form **MUST** be discarded.

Specimen and form labelling criteria for Haematology and Clinical Biochemistry (except Blood Transfusion specimens and requests see below). For [examples of request forms](#), click on the link

| <b>Essential information for specimen</b>  | <b>Desirable information for specimen</b>  |
|--|--|
| Surname  |  |
| First name or Initial  | Signature of the person labelling the tube |
| Date of birth or patient Identification (hospital, NHS, accident and emergency or major incident number) | Specimen collection date                   |



| <b>Essential specimen information from unconscious patient</b>   | <b>Desirable specimen information from unconscious patient</b> |
|--|--|
| Identified as unconscious (name unknown)   | Signature of the person labelling the tube                     |
| Gender   | Specimen collection date                                       |
| Unique hospital registration number  |  |
| <b>Essential information for request form</b>  | <b>Desirable information for request form</b>                  |
| Surname  |  |
| First name   |  |
| Date of birth or Patient Identification (hospital, NHS, accident and emergency or major incident number) | Clinical information including relevant medication             |
| Gender   | Patient's address including postcode.                          |
| Patient's location and destination for report  |  |
| Patient's consultant, GP or name of requesting practitioner  | Practitioner's contact number (extension or bleep number)      |
| Investigation(s) required  |  |
| Date and time specimen collected   |  |

### Completion of the Request Form (Blood Transfusion)

Confirmation of ABO blood group with a previous sample is required before issue of group-specific red cells. A second sample will therefore be required for first time patients with no historical blood group on the transfusion laboratory information system.

If red cells are requested for a patient who has no historical transfusion record, the requester will be asked to send a second sample to check ABO blood group. The report on ICE will state "This is the first grouping record for this patient. Group O red cells will be available in an emergency situation".

#### **Group O red cells will be provided until a second sample has been received.**

(a) Venepuncture:

- (i) Positive identification of the patient must be made prior to venepuncture.
- (ii) Samples should be taken and labelled from one patient at a time to minimise the risk of mislabelling.

(b) Sample Labelling:

- (i) After taking the sample, the tube must be labelled immediately by the person who has taken the sample, next to the patient.
- (ii) Sample tubes must not be pre-labelled.
- (iii) Patient demographic labels must not be used for sample labelling as these are more likely to result in inadequate patient identification.
- (iv) The label of sample tubes must be hand-written with the following minimum patient identification:

- (A) Surname.
- (B) First name.
- (C) Date of birth.
- (D) Patient identification number – Hospital or NHS number.
- (E) Signature of person taking the sample.

(v) In addition the tube label should also include:

- (A) Date & time the sample was collected.

(vi) Samples from unconscious patients must be identified as such and the following details must be written on the tube:

- (A) Gender.
- (B) Patient registration number - Hospital or NHS number.
- (C) Signature of the person taking the sample.

(vii) In addition the tube label should also include:

- (A) Date & time the sample was collected.

(c) If inadequately completed request forms, inadequately labelled samples and discrepancies between the information provided on the request form and sample are received:

(i) The hospital blood transfusion laboratory will contact the person who has taken the sample and explain the nature of the discrepancy or inadequacy. The laboratory staff will not process samples or requests that do not comply with Trust policy.

(ii) If one or more of the patient identifiers are not provided on the sample in a life-threatening situation, group O blood will be issued until a correctly labelled sample is provided. If the patient is a female under 51 years of age, O RhD & K negative blood should be issued.

(d) Blood Transfusion Laboratory patient records:

(i) Duplicate patient records must be avoided in the hospital blood transfusion laboratory otherwise essential transfusion requirements may be overlooked.

(ii) The hospital blood transfusion laboratory must verify the patient's ABO and RhD group against previous records for the patient and any discrepancy should be resolved before blood or blood components are issued.

For full guidance see the Blood and Blood Component Transfusion Policy, link below.

<http://www.avon.nhs.uk/dms/download.aspx?did=23321>

## **Making a complaint to the Laboratory**

While we endeavour to provide a quality service we may not always meet your expectations. If you have any concerns please contact the relevant section leads for the individual departments, clinical lead for laboratory medicine or head of service. If your concerns cannot be resolved, issues can be escalated via the patients' complaints and support team on 0117 342 3604 or email [pals@UH Bristol.nhs.uk](mailto:pals@UH Bristol.nhs.uk). Alternatively DATIX incidents can be instigated on the Trust intranet.

## **Protection of Personal Information**

Laboratory medicine conforms to the current trust information governance standards. Our computer systems are appropriately managed to secure data and our paper records are secure and disposed of appropriately. If you would like any further information please contact the head of service Liz Worsam.

## **Sample Transport to the Laboratory**

Refer to the Policy located on the Trust website/intranet "[Transport of Specimens to the Laboratory Policy](#)".




## **Special Handling Requirements**



Please see 'Notes' section in the tests tables below or contact the laboratory for information regarding special handling requirements.



## Vacutainer™ & Specimen Container Guide

\*For all Immunology or SIHMDS (Flow cytometry/Molecular Biology) see respective user guides\*

| Becton Dickinson Vacutainer™ or specimen container  | Ordering Information   | Tests/Screens   |
|---|--|---|
|   | EDTA<br>4ml adult<br>1.3ml paed<br>500µl neonate                                 | FBC, ESR, Reticulocyte count, Blood film, Malaria screen, G6PD assay, PK assay, Plasma viscosity, Haemoglobinopathy screen, Haemoglobin A1c, rapid sickle screen, Zinc protoporphyrin, Heinz bodies, Haemoglobin H preparation, Kleihauer, DAT, Prothrombin gene mutation & Factor V Leiden.  |
|    | EDTA<br>BLOOD<br>TRANSFUSION<br>ONLY<br>6ml adult<br>1.3ml paed<br>500µl neonate | <p><b>Blood Transfusion</b><br/>Group &amp; save (including antibody screen*, Crossmatch*, Kleihauer, DAT.</p> <p>*Sample identification for Group &amp; save or crossmatch MUST be handwritten and have the correct 4 points of ID plus the signature of the person taking the sample.</p>   |
| <p>Note underfilled samples are unsuitable for testing</p>  | SODIUM<br>CITRATE<br>4.5ml adult<br>1.3ml paed<br>650µl neonate                  | <p>Clotting screen (PT/APTT), Fibrinogen, D-Dimers, Low molecular weight heparins (LMW/Xa).</p> <p>These tubes MUST be filled to the correct 4.5ml (adult), 1.3ml (paed), 650µl* (neonate) mark on the side of the tube: underfilled or overfilled samples are unsuitable for testing.</p> <p>Citrated Platelet Count – notify Haematology laboratory staff that the sample is en route: it must not be centrifuged.</p> <p><b>Specialist Haemostasis tests must be authorised by a Haematology/Haemostasis SpR/Consultant</b><br/>See the Haemostasis section below for the samples required for specialist Haemostasis tests.</p> <p>*650µl neonate tubes are issued from the Coagulation laboratory. Contact ext22708 if required.</p> |

|   |  |   |
|---|--|---|
|   | <p>SST<br/>3.5ml adult<br/>600µl<br/>neonate/paed</p>    | <p>Anticardiolipin antibodies (antiphospholipid antibodies)</p> <p>All Immunology* screening (AIP,HEP2, ENA, DNA, CCP, IFA, ANCA, SHA)</p> <p>*See Immunology user guide</p>  |
|  | <p>PLAIN<br/>UNIVERSAL<br/>CONTAINER<br/>20ml bottle</p> | <p>Fluid cell counts (Pleural/Peritoneal ONLY) – CAN also be performed on 4ml EDTA of fluid.</p> <p>CSF – Cerebro Spinal Fluid cell counts. This test is ONLY performed for Haematology/Oncology patients.</p> <p>CSF samples must be sent to the haematology laboratory immediately after collection as ideally need to be processed within 2 hours.</p> <p>Haemosiderin – Fresh urine required in 20ml container.</p> |

**Haematology – Test information**

Level 8 Queens Building, Marlborough Street, Bristol Royal Infirmary, Bristol BS2 8HW  
0117 342 2708 Haematology ext 22579 (out of hours).

\*Please note that time limit for additional tests are dependent on sample availability as general retention time for haematology EDTA samples is 48-72hrs\*

Please contact the laboratory for any reference ranges if not listed below, all relevant ranges can be found on patient reports and/or ICE system.

**Haematology – Test information:** Section Lead: Mark Nicholas

Haematology Tel: 0117 342 2708

| Test  | Specimen type                                    | Reference Ranges            | Key factors affecting tests  | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample        |
|---|--|-----------------------------|--|--|--|--|--|
| Blood Film  | EDTA<br>(can be performed on same sample as FBC) | Not applicable              | Delay in receiving sample<br><br>Sample not kept at room temperature | Send sample ASAP to the laboratory as prolonged storage affects cell morphology.<br><br>Please give clinical details/reason for the request.   | Service for clinically urgent requests | Within 24hrs   | 24hrs  |
| Citrated Platelet Count (performed for platelet clumping in EDTA) | Sodium Citrate                                   | 150-400 x10 <sup>9</sup> /l | Clot in sample<br><br>Platelet aggregation in citrate                | Please indicate clearly on the request form that the sample is for a citrated platelet count. Notify Haematology ex22708 that sample is en route: sample must not be centrifuged.<br><br>Sample must be filled to correct filling line | Service for clinically urgent requests | Within 24hrs   | 24hrs  |
| CSF Cell Count (Cerebrospinal Fluid)                              | CSF in 20ml sterile container                    | Not applicable              | Sample not delivered as soon as they have been taken.                | 500µl minimum volume required for CSF cell count & cytospin.<br><br>Only performed on Haematology/Oncology patients. Telephone Haematology if required on other patient groups   | Service for clinically urgent requests | 4hours   | 24hrs (further TAT if flow cytometry required) |

| Test                                       | Specimen type                                       | Reference Ranges  | Key factors affecting tests  | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|--|---|---|--|--|--|--|---|
| Cytospin (Cerebrospinal Fluid)             | CSF in 20ml sterile container                       | Not applicable  | Sample not delivered as soon as they have been taken.                      | 500µl minimum volume required for CSF cell count & cytospin.<br><br>Only performed on Haematology/Oncology patients. Telephone Haematology if required on other patient groups   | Service for clinically urgent requests | 4hours   | 24hrs                                   |
| ESR Erythrocyte Sedimentation Rate         | EDTA (can be performed on same sample as FBC)       | M:<br>17-50<10mm/hr<br>51-60<12mm/hr<br>61-70<14mm/hr<br>>70 <30mm/hr<br>F:<br>17-50<12mm/hr<br>51-60<19mm/hr<br>61-70<20mm/hr<br>>70<35mm/hr | Clot in sample<br><br>Insufficient sample<br><br>Delay in receiving sample | >1ml of EDTA blood is required to perform ESR  | Service for clinically urgent requests | Within 24hrs   | 24hrs                                   |
| Fluid Cell Count (e.g Pleural, Peritoneal) | Fluid taken into 20ml sterile container or 4ml EDTA | Not applicable  | Delay in receiving sample.   | ONLY Pleural, peritoneal (ascetic) and peritoneal dialysis specimens can be processed.<br><br>ONLY total nucleated and red cell count are available. Any other counts need to be discussed with Microbiology (contact via switchboard) | Service for clinically urgent requests | 4hours   | 24hrs                                   |

| Test   | Specimen type                                 | Reference Ranges  | Key factors affecting tests   | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|--|---|---|---|--|--|--|---|
| Full Blood Count                               | EDTA  | Adult WBC: 4-11 x10 <sup>9</sup> /l<br>Neutrophils: 1.5-8 x10 <sup>9</sup> /l<br>Haemoglobin: 120-150g/l (F)<br>130-170 g/l (M)<br>MCV: 83-100 fl<br>Platelets: 150-400 x10 <sup>9</sup> /l<br>Full ranges on POD | Clotted sample.<br>Insufficient sample.<br><br>Lipaemic, icteric, haemolysed samples.<br><br>Delayed sample receipt.  | Adult samples >1ml of blood required.<br>Paediatric/neonate >500µl of blood required.  | Service for clinically urgent requests | Within 24hrs   | 24hrs                                   |
| G6PD (Glucose-6-Phosphate Dehydrogenase Assay) | EDTA (can be performed on same sample as FBC) | 4.6-13.5 U/gHb<br><br>Values for new-borns maybe somewhat higher (up to 150%)   | Copper & sulphate ions decrease G6PD activity.<br>Certain drugs interfere with circulating levels.<br>Clotted sample. | Reticulocytes have increased G6PDH levels than mature red cells. NOT recommended that assays be performed after severe haemolytic crisis due to falsely elevated levels.                     | Not available                          | 6 days (if stored at 4°C)                            | 3 working days                          |
| Haemoglobin A1c (HbA1c)                        | EDTA (can be performed on same sample as FBC) | 20-42 mmol/mol  | Unstable haemoglobins e.g. Hb Raleigh.<br>Reduced red cell lifespan – e.g. HbSS, HbCC, HbSC.                          | Retrospective indicator of mean plasma glucose concentration during the last 6-8 weeks. Does not detect hypoglycaemic episodes and falsely low results may be found with haemolytic disease. | Not available                          | 7 days   | 3 working days                          |

| Test                     | Specimen type                                 | Reference Ranges   | Key factors affecting tests   | Notes   | Out of hours service | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|--------------------------|---|--|---|---|----------------------|--|---|
| Haemoglobin H Stain      | EDTA(can be performed on same sample as FBC)  | Not applicable   | Age of sample.  | Fresh EDTA required – test cannot be performed on samples over 24hrs.<br>Test performed as part of haemoglobinopathy screen.  | Not available        | Within 24hrs   | 3 working days                          |
| Haemoglobinopathy screen | EDTA (can be performed on same sample as FBC) | Normal:<br>HbA <sub>2</sub> <4%<br>HbF <1%<br>Normal red cell indices<br>MCH≥27pg<br>Hb ≥80g/L | Severe iron deficiency can reduce HbA <sub>2</sub> levels.<br><br>Clotted sample. | Laboratory will process all requests but note that with patients under 1 year of age – unable to exclude α/β thalassaemia, repeat suggested after 1 year of age.<br>Results may be misleading if patient transfused within the last 4 months. | Not available        | 7 days (if stored at 4°C)                            | 3 working days                          |
| Hemosiderin (Urinary)    | Urine (fresh) in 20 ml sterile container      | Not applicable   | Age of sample.  | Fresh early morning urine required.   | Not available        | 12hrs  | 24hrs                                   |
| Heinz Bodies Stain       | EDTA(can be performed on same sample as FBC)  | Not applicable   | Age of sample.  | Fresh EDTA required – test cannot be performed on samples over 24hrs  | Not available        | Within 24hrs   | 24hrs                                   |



| Test                  | Specimen type                                 | Reference Ranges | Key factors affecting tests     | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample        |
|-----------------------|---|------------------|---------------------------------|--|--|--|--|
| Plasma Viscosity (PV) | EDTA (can be performed on same sample as FBC) | 1.5-1.72 mPa/s   | None known                      | *Send away test – Performed at RUH Bath <sup>1</sup>   | Not available                          | 7 days (if stored at room temp)                      | 3 weeks for report (SEND-AWAY)                 |
| Pyruvate Kinase Assay | EDTA (can be performed on same sample as FBC) | 11-19 IU/g Hb    | Age of sample<br>Clotted sample | *Send away test – Performed at King’s College Hospital, London <sup>2</sup>  | Not available                          | 72hrs (if stored at RT)                              | 3 weeks for report (SEND-AWAY)                 |
| Malaria Screen        | EDTA (can be performed on same sample as FBC) | Not applicable   | Age of sample                   | URGENT REQUESTS: Contact Haematology where rapid test can be used alongside priority thick & thin blood film analysis.<br><br>Please fill all clinical information when prompted when submitting ICE request.<br><br>All positives are sent to London School of Hygiene & Tropical medicine <sup>3</sup> for confirmation. | Service for clinically urgent requests | Within 24hrs   | 24hrs (note all POSITIVE’s confirmed at LSHTM) |

| Test                       | Specimen type                                 | Reference Ranges  | Key factors affecting tests   | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection       | Turn-around time from receipt of sample |
|----------------------------|---|---|---|--|--|--|---|
| Rapid Sickle Screen        | EDTA (can be performed on same sample as FBC) | Not applicable  | Erythrocytosis, hyperglobunaemia, leucocytosis, lipaemia – can give false positives. Children <6 months can give false negatives. Recent blood transfusion can give false positive/negatives. | If Pre-op and URGENTLY required, contact the laboratory. Sickle screen performed alongside full haemoglobinopathy screen for all requests. | Service for clinically urgent requests | 7 days (if stored at 4°C)                                  | 72hrs                                   |
| Reticulocyte Count (Retic) | EDTA (can be performed on same sample as FBC) | >18 years 50-100 x10 <sup>9</sup> L   | Clotted sample.<br>Insufficient sample.<br><br>Lipaemic, icteric, haemolysed samples.<br><br>Delayed sample receipt.  | Adult samples >1ml of blood required.<br>Paediatric/neonate >500µl of blood required.<br><br>Reticulocyte count performed alongside FBC.   | Service for clinically urgent requests | Within 24hrs   | 24hrs                                   |
| Zinc Protoporphyrin (ZPP)  | EDTA (can be performed on same sample as FBC) | Borderline 70 -90 µmol/mol haem<br><br>Iron Deficient 90 -120 µmol/mol haem<br><br>Severe Iron Def >120 µmol/mol haem | Haemolysed samples.<br><br>Abnormally elevated bilirubin will create positive interference due to its spectral qualities.   |  | Not available                          | Within 48hrs at RT<br><br>Within 7 days (if stored at 4°C) | 24hrs                                   |

Haematology Referral Hospitals

|   |  |  |
|---|--|--|
| <p>1.Royal United Hospitals Bath<br/>                 NHS Foundation Trust<br/>                 Combe Park<br/>                 Bath BA1 3NG<br/>                 Main switchboard: 01225 428331<br/>                 Haematology: 01225 824240</p> | <p>2. Red Cell Centre - Protein Laboratory<br/>                 020 3299 2455<br/>                 kch-tr.redcelllab@nhs.net<br/>                 c/o Central Specimen Reception<br/>                 Blood Sciences Laboratory<br/>                 Ground Floor Bessemer Wing<br/>                 King's College Hospital<br/>                 Denmark Hill<br/>                 London SE5 9RS</p> | <p>3.PHE Malaria Reference Laboratory<br/>                 Faculty of Infectious &amp; Tropical Diseases<br/>                 London School of Hygiene &amp; Tropical Medicine<br/>                 Keppel Street<br/>                 London WC1E 7HT<br/>                 Laboratory:020 7927 2427</p> |
|---|--|--|

**Haemostasis Routine Test Information** Section Lead: Chris Reilly-Stitt

Coagulation Tel: 0117 342 2708

- Citrated samples must be adequately filled to the correct marked line (4.5ml adult/1.3ml paed/650µl neonate). Tests cannot be performed on under filled, overfilled, or clotted samples.
- Grossly lipaemic samples may require manual testing and a delay in results.
- Neonatal blood tubes are available upon request, primarily for St.Michaels NICU. Telephone the laboratory on ext22708 during routine hours if required. Please note due to the nature of the sample volume, clotting tests may be limited or unavailable if plasma levels are too low.
- Include clinical details on the request form/ICE order e.g. 'patient on ..... anticoagulation (warfarin/heparin etc.)' or 'post-op sample'; to facilitate appropriate testing and interpretation of results.
- Send request form (if used) and sample to the laboratory as quickly as possible. Any critically urgent requests telephone the laboratory on ext22708 routine hours and ext225279 out of hours.
- Abnormal results that require further laboratory testing may result in delayed reporting.
- Antithrombin 3 is available to be performed as a routine test providing it has been approved by the Clinical Haemostasis team – this is a Haemostasis registrar bleep 2677 during routine hours (Mon-Fri 09:00-17:00). Out of hours requires minimum Haematology SpR agreement with Haemostasis on call Consultant, contact Haematology registrar via switchboard.
- The laboratory provides the testing for the UHBristol Pharmacy dosed Warfarin patients. For enquiries about doses for these patients contact the Pharmacy helpline on 0117 342 3874 during routine hours (Mon-Fri 09:00-17:00).

| Test   | Specimen type  | Reference Ranges   | Key factors affecting tests | Notes  | Out of hours service                    | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|--|----------------|--|-----------------------------|--|---|--|---|
| Antithrombin 3 (AT3)   | Sodium citrate | 0.8-1.26 IU/ml   | Delayed receipt of sample   | *Available outside of thrombophilia screening on agreement with minimum Haematology SpR but may require Haemostasis Consultant on call approval – both contactable via switchboard | Service for clinically urgent requests* | Within 24hrs   | 2 weeks (unless clinically agreed)      |
| Anti-Xa assay For the monitoring of Low Molecular Weight Heparin (LMW) | Sodium citrate | Once daily regime: 0.8-1.6 IU/ml<br>Twice daily regime:0.5-1.1 IU/ml | Delayed receipt of sample   | Please state the anticoagulation of the patient.<br><br>Common LMW's – Clexane, Enoxaparin   | Service for clinically urgent requests  | Within 24hrs   | 12hrs                                   |
| Anti-Xa used in the monitoring of Unfractionated Heparin (UFH)         | Sodium citrate | 0.35-0.7 IU/ml   | Delayed receipt of sample   | Please state the anticoagulation of the patient.   | Service for clinically urgent requests  | Within 24hrs   | 12hrs                                   |

| Test  | Specimen type   | Reference Ranges                        | Key factors affecting tests  | Notes   | Out of hours service                   | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|---|---|---|--|---|--|--|---|
| Clotting Screen (PT/APTT – Prothrombin Time, Activated Partial Thromboplastin Time) | Sodium citrate  | PT: 9.5-12.0secs<br>APTT: 23.0-32.0secs | Anticoagulation<br><br>Delayed receipt of sample<br><br>Grossly lipaemic samples | <b>Heparin &amp; Warfarin therapy affects results and determines appropriate testing</b> please state that the patient is on Heparin and/or Warfarin on the request form. | Service for clinically urgent requests | Within 24hrs   | 6 hrs                                   |
| D-Dimers (DDV)  | Sodium citrate (can be added to Clotting screen sample) | Normal cut off <500ng/ml (FEU)          |  |   | Service for clinically urgent requests | Within 24hrs   | 6hrs                                    |
| Fibrinogen - Clauss (FIB)   | Sodium citrate (can be added to Clotting screen sample) | Normal: 1.5-4.0g/L                      | Grossly lipaemic samples   |   | Service for clinically urgent requests | Within 24hrs   | 6hrs                                    |
| Heparin (unfractionated) Monitoring (HEP, APTTR)                                    | Sodium citrate  | Therapeutic range: 2.0-3.0 (APTT ratio) | Grossly lipaemic samples<br><br>Other anticoagulation                            |   | Service for clinically urgent requests | Within 24hrs   | 1hr                                     |



| Test                         | Specimen type  | Reference Ranges  | Key factors affecting tests | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|------------------------------|----------------|---|-----------------------------|--|--|--|---|
| Thrombin Clotting Time (TCT) | Sodium citrate | Normal: 15.4-17.5 secs  | Delayed receipt of sample   | Test is used in combination with protamine to check for the presence of heparin within a sample. | Service for clinically urgent requests | Within 24hrs   | 6 hrs                                   |
| Warfarin Monitoring (INR)    | Sodium citrate | Ranges – are determined on an individual basis as decided by clinical decision. Contact the Laboratory for further information. | Delayed receipt of sample   | Please inform of anticoagulation on request form.  | Service for clinically urgent requests | Within 24hrs   | 6 hrs                                   |

**Specialist Haemostasis Tests** Section Lead: Chris Reilly-Stitt

Coagulation Tel: 0117 342 2708

All the further specialist Haemostasis tests are vetted and approved by Haemostasis Consultants – if urgent tests/screens are required during routine hours, 09:00-17:00 Mon-Fri, these will need approval from the clinical Haemostasis Team (Haemostasis SpR bleep 2677) or Haem registrar with on call Consultant consent for any urgent out of hours requests (contact via switchboard).

Haemophilia and thrombophilia screens involve multiple tests and so as a minimum for adults' 2x 4.5ml citrate samples are required (ideally 4x 4.5ml bottles). Thrombophilia screens also require a 4ml EDTA to perform molecular testing, Factor V Leiden and Prothrombin gene mutation. Please discuss with the Coagulation laboratory (ext22708) staff if necessary, to ensure adequate samples are collected, especially in paediatric cases.

Individual factor assays are available during routine if agreed by the haemostasis team (bleep 2677 haemostasis SpR) and can be arranged out of hours in a clinical emergency by contacting the haematology registrar who will liaise with the on call Haemostasis Consultant.

- Citrated samples must be adequately filled to respective mark lines (4.5ml/1.3ml/650µl).
- Tests cannot be performed on under filled, overfilled or clotted samples.
- For any specialist tests it is critical to include the relevant clinical information on the request as this is required for Consultant approval.
- Send the completed request form and sample to the laboratory as quickly as possible for processing.
- For urgent requests, contact the Laboratory on ext 22708 (routine hours) ext 22579 (out of hours).

Some of the individual Factor/screen tests are available with discussion with the laboratory e.g. Protein C/S and Antithrombin 3. Any queries about specialist Coagulation tests please contact the laboratory.

| Test   | Specimen type               | Reference Ranges   | Key factors affecting tests  | Notes  | Out of hours service                    | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|--|-----------------------------|--|--|--|---|--|---|
| ADAMST-13  | Sodium citrate              | Normal 40-130%   | Delay in receipt of sample   | Consultant approval unless known patient.  | Not available                           | Within 24hrs   | 2 weeks                                 |
| Apixaban   | Sodium citrate              | Not established, contact Haemostasis consultant for advice                   | Delay in receipt of sample   |  | Not available                           | Within 24hrs   | 72hrs                                   |
| Bethesda Assay (F8C Inhibitor) (F9C Inhibitor)                 | Sodium citrate<br>2 x 4.5ml | Not applicable, contact Haemostasis consultant for advice                    | Delay in receipt of sample   |  | Not available                           | Within 24hrs   | 2 weeks                                 |
| Dabigatran   | Sodium citrate              | Not established, contact Haemostasis consultant for advice                   | Delay in receipt of sample   |  | Not available                           | Within 24hrs   | 72hrs                                   |
| Edoxaban   | Sodium citrate              | Not established, contact Haemostasis consultant for advice                   | Delay in receipt of sample   |  | Not available                           | Within 24hrs   | 72hrs                                   |
| <b>Factor Assays</b><br>F2, F5, F7, F8, F9, F10, F11, F12, F13 | Sodium citrate<br>2 x 4.5ml | All factors except F11<br>Normal: 0.5-2.0 IU/ml<br>F11 Normal: 0.7-2.0 IU/ml | Anticoagulation:<br>Warfarin/Heparin<br><br>Delay in receipt of sample | *Urgent tests require Haemostasis Consultant approval.<br>For Pre/Post factor samples please keep in separate bags and mark on sample tubes which are the Pre/Post | Service for clinically urgent requests* | Contact the Laboratory                               | 2 weeks                                 |

| Test  | Specimen type                                   | Reference Ranges  | Key factors affecting tests  | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|---|---|---|--|--|--|--|---|
| Factor 8/9 specialist tests:<br>F8 Bovine<br>F8/9 Chromogenic<br>F8 Refacto | Sodium citrate<br>2 x 4.5ml                     | Normal: 50-200%<br>0.5-2.0 IU/ml  | Delay in receipt of sample<br><br>Anticoagulants especially Heparin    | All require Consultant approval<br><br>Sticker required for Refacto testing  | Not available                          | Contact the Laboratory                               | 2 weeks                                 |
| Lupus Anticoagulant/ Screen (Antiphospholipid antibodies)                   | Sodium citrate<br>2 x 4.5ml<br>SST<br>1 x 3.5ml | Contact the Laboratory  | Anticoagulant therapy  | If screen for antiphospholipid/lupus<br>Then send SST sample also for Anticardiolipin antibody testing.  | Not available                          | Within 24 hours                                      | 2 weeks                                 |
| Platelet Aggregation Studies  | Sodium citrate<br>6 x 4.5ml                     | Contact the Laboratory  | Aspirin affects platelet aggregation<br><br>Delayed receipt of samples | Test is only organised with Haemostasis Consultants as requires specific planning.<br><br>Samples must be kept at room temperature and taken immediately to the Laboratory | Not available                          | Not applicable                                       | 2 weeks                                 |
| Rabbit Brain Thromboplastin   | Sodium citrate                                  | Ranges – are determined on an individual basis as decided by clinical decision. Contact the Laboratory for further information. | Delayed receipt of sample  |  | Service for clinically urgent requests | Within 24hrs   | 72hrs                                   |

|   | Specimen type  | Reference Ranges   | Key factors affecting tests  | Notes   | Out of hours service                    | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|---|--|--|--|---|---|--|---|
| Rivaroxaban   | Sodium citrate   | Not established, contact Haemostasis consultant for advice             | Delay in receipt of sample   |   | Not available                           | Within 24hrs   | 72hrs                                   |
| Reptilase   | Sodium citrate   | Normal: 16-22secs  | Delay in receipt of sample   |   | Not available                           | Within 24hrs   | 72hrs                                   |
| <b>Thrombophilia Screen</b><br>Antithrombin 3<br>Protein C activity,<br>Free Protein S,<br>Lupus Anticoagulant,<br>Cardiolipin<br>Antibodies,<br>Factor V Leiden,<br>Prothrombin Gene<br>Mutation | Sodium citrate<br>4 x 4.5ml<br>EDTA<br>1 x 4ml<br>SST<br>1 x 3.5ml | Contact the laboratory   | Delay in receipt of sample<br><br>Warfarin & Heparin (Anticoagulant therapy) | Note the tests can be requested individually if specific measuring is required.<br><br>All screens are vetted by the Haemostasis Consultants, contact prior to venesection to ensure test completion.<br><br>*Protein C/S can be arranged if Urgent clinical need, with Haemostasis Consultant approval | Service for clinically urgent requests* | Not applicable                                       | 2 weeks                                 |
| <b>Von Willebrands Screen</b><br>VW Antigen<br>VW Antibody (Ricof)<br>F8  | Sodium citrate<br>2 x 4.5ml  | Normal: 0.5-2.0 IU/ml<br>Normal: 0.5-2.0 IU/ml<br>Normal: 0.5-2.0IU/ml | Delay in receipt of sample<br><br>Heparin therapy (F8)                       | Can be performed individually or as part of a Haemophilia screen.   | Service for clinically urgent requests  | Within 24hrs   | 2 weeks                                 |

Specialist Haemostasis Send away Tests:

| Test  | Specimen type               | Reference Ranges  | Key factors affecting tests | Notes  | Out of hours service | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample |
|---|-----------------------------|---|-----------------------------|--|----------------------|--|---|
| Heparin Induced Thrombocytopenia (HIT) Screen | SST<br>6ml clotted blood    | Score... Associated with<br>Score 6-8 High probability HIT<br>Score 4-5 Intermediate<br>Score 0-3 Low probability HIT | Delay in sample receipt     | Send away test to NHSBT Filton <sup>4</sup><br>Routine transports to NHSBT daily, test ONLY performed daily Mon-Fri. | Not available        | Not applicable                                       | 3 working days                          |
| Lupus Anticoagulant Extended Screen           | Sodium citrate<br>2 x 4.5ml | Contact Laboratory  | Delay in sample receipt     | Send away test to UCLH <sup>5</sup>  | Not available        | Not applicable                                       | 2                                       |

Referral Hospitals

|  |   |
|--|---|
| <p>4.H&amp;I Diagnostic Specimens<br/>NHSBT Filton<br/>500 North Bristol Park<br/>Northway<br/>Bristol BS34 7QH Tel: 0117 921 7372</p> | <p>5.Haemostasis Laboratory UCLH<br/>2<sup>nd</sup> Floor 60 Whitfield Street<br/>London W1T 4EU<br/>Tel: 0203 447 8545</p> |
|--|---|



**Blood Transfusion Test Information:** Section Lead: Adele Wardle Blood Bank Tel: 0117 342 2579

**\*MAJOR HAEMORRHAGE procedure see page 4 of this guide\***

- Samples and form MUST contain full and correct patient identification i.e. handwritten forename, surname, date of birth and hospital number – requests without these details will not be accepted. Fill out special product requirement e.g. Irradiated/CMV and state the reason.
- The sample MUST be signed by the taker of the blood.
- Please provide Requestor, Ward location and bleep (extension) number for enquiries.
- Please refer to the Blood Component Transfusion Policy for full details see link below

<http://nww.avon.nhs.uk/dms/download.aspx?did=23321>

| Test        | Specimen type   | Key factors affecting tests  | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection  | Turn-around time from receipt of sample   |
|-------------|---|--|--|--|---|---|
| Cross match | EDTA<br>6ml (Pink top)<br>1.3ml Paed<br>500µl Neonate | Incorrectly labelled, insufficient, unsigned, clotted samples will be rejected | Primary samples from previously ungrouped patients can only receive Group O Blood until confirmatory sample received.<br><br>Blood product orders can be requested on the Blood Transfusion form or by telephoning Blood Bank ext 22579.<br>*For patients with antibodies, provision time may be significantly longer. | Service for clinically urgent requests | Up to 7 days dependent upon sample validity.<br><br>Not transfused patient sample valid 7 days<br>If transfused within 90 days or pregnant, sample validity 72hrs | Routine Crossmatch 2hrs*<br>Telephone the laboratory if Blood urgently required |

| Test                           | Specimen type   | Key factors affecting tests  | Notes  | Out of hours service                   | Time limit for add on tests from time of venesection  | Turn-around time from receipt of sample |
|--------------------------------|---|--|--|--|---|---|
| Direct Antiglobulin Test (DAT) | EDTA<br>(can be performed on FBC sample)<br>6ml (Pink top)<br>1.3ml Paed<br>500µl Neonate |  | Can be added on to existing Group & Save or Haematology FBC sample                                   | Service for clinically urgent requests | 7 days  | 24hrs                                   |
| Group & Save                   |   | Incorrectly labelled, insufficient, unsigned, clotted samples will be rejected | To add a blood product request, telephone blood bank on ext 22579 (see Blood Product ordering below) | Service for clinically urgent requests | Up to 7 days dependent upon sample validity.<br><br>Not transfused patient sample valid 7 days<br>If transfused within 90 days or pregnant, sample validity 72hrs | 24hrs                                   |
| Kleihauer                      | EDTA  | Delay in receipt of sample   | Samples should be taken minimum 30-45mins POST sensitising/delivery event                            | Service for clinically urgent requests | Dependent on indication – telephone the laboratory  | 72hrs                                   |

Blood Transfusion Referrals

| Test  | Specimen type                               | Key factors affecting tests | Notes   | Out of hours service                   | Time limit for add on tests from time of venesection | Turn-around time from receipt of sample         |
|---|---|-----------------------------|---|--|--|---|
| <b>Reference serology</b><br>Antibody Quantification (AntiD/c),<br>AlloAb investigation<br>Compatibility testing<br>Quantification of FMH<br>Extended RBC Phenotype | EDTA<br>6ml (Pink top) more may be required |                             | Send away referral to RCI NHSBT Filton <sup>6</sup><br><br>Further samples may be required depending on tests to be undertaken – Laboratory will phone if needed. | Service for clinically urgent requests | Blood Transfusion Laboratory referral                | Dependent on tests required<br>5-7 working days |
| <b>HLA Testing</b><br>HLA Typing &<br>HLA Antibody testing  | 6ml EDTA +<br>6ml SST (clotted)             |                             | Send away referral to H&I NHSBT Filton <sup>7</sup>   | Not available                          | Not applicable – fresh samples required              | 5-7 working days                                |

|   |  |
|---|--|
| 6.RCI NHSBT Filton<br>500 North Bristol Park<br>Northway<br>Bristol BS34 7QH Tel: 0117 921 7380 | 7. H&I Diagnostic Specimens<br>NHSBT Filton<br>500 North Bristol Park<br>Northway<br>Bristol BS34 7QH Tel: 0117 921 7372 |
|---|--|