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|  **CLYDE HAEMATOLOGY & BLOOD TRANSFUSION**LABORATORY HANDBOOK |

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**INTRODUCTION**

## Scope and purpose

This document describes the services provided and contact telephone numbers of the three Haematology/Blood Transfusion laboratories in Clyde;

Royal Alexandra Hospital, Corsebar Road, Paisley PA2 9PN.

Inverclyde Royal Hospital, Level C, Larkfield Road, Greenock PA16 0XN.

Vale of Leven Hospital, Main Street, Alexandria G83 0UA.

## 0.1 Responsibility

The Site Lead Clinicians are responsible for ensuring the implementation and maintenance of this procedure.

## 0.2 Applicability

This document applies to all Clyde Laboratory stakeholders.

## 0.3 References

* ISO 15189 – 2012: Medical Laboratories, Requirements for Quality & Competence.
* BCSH Blood Transfusion Task Force – Administration of blood components 6th November 2017. [www.bcshguidelines.com](http://www.bcshguidelines.com)
* BCSH Blood Transfusion Task Force – Spectrum of fresh-frozen plasma and cryoprecipitate products 12th March 2018 [www.bcshguidelines.com](http://www.bcshguidelines.com)
* BCSH Blood Transfusion Task Force – Guidelines for the use of Platelet Transfusions 23rd December 2016 [www.bcshguidelines.com](http://www.bcshguidelines.com)
* Guidelines for Compatibility Procedures in Blood Transfusion Laboratories (2012)
* Rules and Guidance for Pharmaceutical Manufacturers and Distributors (2015)
* Handbook of Transfusion Medicine. Fifth Edition 2014.

## 0.4 Location of copies

1. Electronic copy 1 - Q-Pulse
2. Intranet copy 1 – Staffnet
3. NHSGGC Website – Haematology

# general information

##  Clyde Haematology Laboratories Organizational Chart

**Quality /Training/POC Manager**

Graham Walker

**Sector Manager**

Patricia Bradley

Haematology / Blood Transfusion

**Inverclyde Royal**

Senior BMS

Biomedical Scientists

HCSWs

**Vale of Leven**

Senior BMS

Biomedical Scientists

HCSWs

**Royal Alexandra**

Senior BMS

Biomedical Scientists

HCSWs

**Clinical Consultant IRH**

Locum

**Consultants RAH**

Dr A Sefcick

Dr. F. Patrick

Dr. C. Stirling

Dr.A Yasmin

**Technical Services Manager**

Martin Wight

Haematology / Blood Transfusion

NHS GGC Clyde Sector

**Site Lead Clinician**

Dr Caroline Sweeney

Haematology/Blood Transfusion

Vale of Leven Hospital

**Sector Lab Lead Clinician**

Dr Fraser Patrick

Haematology/Blood Transfusion

Inverclyde Royal Hospital

**Sector Clinical Lead**

Dr. Alison Sefcick

Haematology/Blood Transfusion

NHS GG&C

Dr E Fitzsimmons

**Head of Service**

Haematology/Blood Transfusion

NHS GG&C

Dr. Alistair Leonard

**Clinical Director**

Laboratories, NHS GG&C

Ms Jane Gibb

**Assistant General Manager**

Blood Science & Immunology

Mr Robert Gardiner

**General Manager**

NHS GG&C Laboratory Medicine

Dr Rachel Green

**Associate Medical Director**

Diagnostics Directorate

NHS GG&C

Mr. Arwel Williams

**Director of Diagnostics**

NHS GG&C

NHS Greater Glasgow & Clyde Acute Services Division

**Chief Operating Officer**

Grant Archibald

## Quality Policy

The departments are committed to providing a service of the highest quality and shall be aware and take into consideration the needs and requirements of its users.

In order to ensure that the needs and requirements of users are met, the Departments of Haematology and Blood Transfusion will:

* Commit to providing a comprehensive diagnostic service covering Haematology, Coagulation and Blood Transfusion and implementing changes to reduce risk and improve quality as identified by the outcomes of audits and other measures and through the quality objectives
* Operate a quality management system to integrate the organisation, procedures, processes and resources.
* Set quality objectives and plans in order to implement this quality policy
* Ensure that all personnel are familiar with the Quality manual to ensure user satisfaction.
* Commit to the health, safety and welfare of all staff and compliance with relevant environmental legislation. Visitors to every department will be treated with respect and due consideration will be given to their safety while on site.
* Uphold professional values and be committed to good professional practice and conduct.

The departments will comply with standards set by UKAS (ISO 15189) and MHRA as well as all other relevant quality standards and are committed to:

* Staff recruitment, training, development and retention at all levels to provide a full and effective service to its users.
* The proper procurement and maintenance of such equipment and other resources as are needed for the provision of the service.
* The collection, transport and handling of all specimens in such a way as to ensure the correct performance of laboratory examinations.
* The use of examination procedures that will ensure the highest achievable quality of all tests performed.
* Reporting results of examinations in ways which are timely, confidential, accurate and clinically useful.
* The assessment of user satisfaction, in addition to internal audit and external quality assessment, in order to produce continual quality improvement.

## Quality Strategy

Clyde Haematology/Blood Transfusion clinical laboratories intend to maintain its good working relationships with all its stakeholders and to be an important contributor to the success of NHS Greater Glasgow & Clyde. It follows therefore that the future plans of Clyde Haematology/Blood Transfusion Clinical Laboratories' must be in line with those of NHS Greater Glasgow & Clyde in staff training, management and business planning.

Clyde Haematology/Blood Transfusion Clinical Laboratories will continue to take account of the human resource aspect of the hospital through recruiting and retaining the best staff available and developing a flexible, highly skilled and motivated workforce that can respond to change.

Currently, Clyde Haematology/Blood Transfusion Clinical Laboratories delivers a cost effective service and produces a high standard of work comparable with other laboratories of a similar nature. Under the current political and economic conditions, which prevail, we are aware that constant vigilance is required both to maintain and improve our position in relation to other laboratories.

Clyde Haematology laboratories are accredited by the United Kingdom Accreditation Service (UKAS Number 8046). Testing scope is available on the UKAS website

[**http://www.ukas.com/wp-content/uploads/schedule\_uploads/00007/8046%20Medical.pdf**](http://www.ukas.com/wp-content/uploads/schedule_uploads/00007/8046%20Medical.pdf)

##  Clyde Haematology/Blood Transfusion Laboratory Telephone Numbers

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Telephone****Number** | **Internal****Extension** | **Page No** | **E-Mail** |
| **RAH SITE** |  |  |  |  |  |
| Dr A Sefcick | Consultant Haematologist | 0141 314 6163 | 06163 | 56358 | alison.sefcick@ggc.scot.nhs.uk |
| Dr. F. Patrick | Consultant Haematologist | 0141 314 7135 | 07135 | 56360 | fraser.patrick@ggc.scot.nhs.uk |
| Locum | Consultant Haematologist | 0141 314 7422 | 07422 | 56641 |  |
| Dr C. Stirling | Consultant Haematologist | 0141 314 7059 | 07059 | 56361 | carolstirling@nhs.net |
| Dr Arshi Yasmin | Consultant Haematologist | 0141 314 6164 | 06164 | 56360 | arshi.yasmin@ggc.scot.nhs.uk |
| Haematology Consultant Secretaries | 0141 314 6712 | 06712 |  |  |
| The Duty Consultant Haematologist can be contacted “Out Of Hours” via Switchboard - 0141 887 9111 |
| Mr. Martin Wight | Technical Services Manager | 0141 314 6162 | 06162 |  | martinwight@nhs.net |
| Mrs. Patricia Bradley | Sector Manager | 0141 314 6162 | 06162 |  | patricia.bradley@ggc.scot.nhs.uk |
| Mr. Graham Walker | Quality/Training/POC Manager | 0141 314 6653 | 06653 |  | graham.walker@ggc.scot.nhs.uk |
| Ms Corrinne Duncan | Reception Supervisor | 0141 314 6650 | 06650 |  | corrinne.duncan@ggc.scot.nhs.uk |
| Laboratory Office |  | 0141 314 6157 | 06157 | General Enquires For Results |
| Haematology Laboratory |  | 0141 314 6158 | 06158 |  |  |
| Blood Transfusion Laboratory |  | 0141 314 6159 | 06159 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Telephone****Number** | **Internal****Extension** | **Page No** | **E-Mail** |
| **IRH SITE** |  | 01475 633777 |  |  |  |
| Dr. F. Patrick | Consultant Haematologist | 01475 504809 | 04809 | 56516 |  |
| Locum Consultant | Consultant Haematologist | 01475 504347 | 04347 | 51120 |  |
| Haematology Consultant Secretaries | 01475 504418 | 04418 |  |  |
| The Duty Consultant Haematologist can be contacted “Out Of Hours” via Switchboard -  |
| Mr. Martin Wight | Technical Services Manager | 01475 504181 | 04181 |  | martinwight@nhs.net |
| Mrs. Patricia Bradley | Sector Manager | 01475 504181 | 04181 |  | patricia.bradley@ggc.scot.nhs.uk |
| Mr.Mohamad Mohamad | Senior BMS | 01475 504320 | 04320 |  | mohamad.mohamad@ggc.scot.nhs.uk |
| Ms Kirsty McLean | Senior BMS | 01475 504320 | 04320 |  | kirsty.mclean@ggc.scot.nhs.uk |
| Laboratory Office |  | 01475 505494 | 05494 (04285) | General Enquires For Results |
| Haematology Laboratory |  | 01475 504324 | 04324 |  |  |
| Blood Transfusion Laboratory |  | 01475 504323 | 04323 |  |  |
| Blood Transfusion – Emergencies | 04323 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Telephone****Number** | **Internal****Extension** | **Page No** | **E-Mail** |
| **VOL SITE** |  | 01389 814121 |  |  |  |
| Dr. Caroline Sweeney | Consultant Haematologist | 01389 817507 | 87507 |  | Caroline.sweeney2@ggc.scot.nhs.uk |
| Haematology Consultant Secretaries | 01389 817598 | 87598 |  |  |
| The Duty Consultant Haematologist can be contacted “Out Of Hours” via Switchboard -  |
| Mr. Martin Wight | Technical Services Manager | 01389 817487 | 87487 |  | martinwight@nhs.net |
| Mrs. Patricia Bradley | Sector Manager | 01389 817487 | 87487 |  | patricia.bradley@ggc.scot.nhs.uk |
| Lab Reception |  | 01389 817518 | 87518 | General Enquires For Results |
| Haematology Laboratory |  | 01389 817265 | 87265 |  |  |
| Blood Transfusion Laboratory |  | 01389 817502 | 87502 |  |  |
| Blood Transfusion – Emergencies | 87502 |  |  |

For samples sent from GP’s which are regarded as very urgent and require results back before 6pm that day then contact the laboratory directly on the numbers below to warn them and give contact details.

RAH - 0141 314 6158

IRH - 01475 504324 (Dunoon and Rothesay only)

VOL - 01389 817265 (Faslane only)

##  Laboratory opening hours and Clinical Advice

|  |  |  |
| --- | --- | --- |
| **Hospital** | **Normal hours Mon - Fri** | **Out of hours shift service** |
| **IRH** | **8.30 – 17.00** | **Mon-Fri 17.00 – 8.30****Sat 08.30 – Mon 8.30** |
| **RAH** | **8.30 – 17.00** | **Mon-Fri 17.00 – 8.30****Sat 08.30. – Mon 8.30** |
| **VOL** | **8.30 – 20.00** | **From RAH** |

\*At Vale of Leven the service is Monday to Friday 08.30 to 20.00 with point of care at MAU out of hours for WBC, Hb and INR testing. All other tests must be sent by taxi to RAH for processing.

At VOL 5-8pm the lab service for Haematology covers FBC’s, Coagulation screens, Fibrinogen’s, D-Dimers and INR’s. Blood Transfusion requests should be directed to RAH.

At RAH and IRH there is no difference in the test repertoire performed during normal working hours (Mon to Fri 8.30 –17.00), weekend service and out of hours.

**Clinical Advice**

Clinical advice can be obtained 24 hours a day by contacting the duty Haematologist using the hospital switchboards on the following numbers:

Internal – Dial ‘1000’

External – Dial 0141 887 9111 (RAH)

Dial 01475 633777 (IRH)

Dial 01389 754121 (VOL)

## Collection of Blood using the Greiner Vacuette blood collection system

* The Greiner Vacuette System is used to collect, transport and process samples for testing serum, plasma or whole blood in the Laboratory.
* Select the tube or tubes appropriate for the specimen(s)
* Perform venepuncture with vacuette needle and tube holder assembly.
* Push tube into tube holder and onto the needle valve puncturing the rubber diaphragm.
* When the first tube is full and blood flow ceases gently remove it from the tube holder.
* Place succeeding tubes in the tube holder, puncturing diaphragm to begin flow. Draw tubes without additives before tubes with additives. See wall charts for recommended Order of Draw.
* GENTLY invert tubes 5-10 times immediately after blood collection to reach a proper mix of additive and blood.
* As soon as blood stops flowing in the last tube, remove needle from vein, applying pressure to puncture site with dry sterile swab until bleeding stops.
* Dispose of used needles with holder using sharps container. Do not recap needle as this increases chance of needle stick injury
* **LABEL** each tube **immediately** **following the sample collection process**. Ensure tubes and request forms are correctly completed with the patient and sample details.
* Place the tubes in the request form bag, seal and send to the laboratory (unless the samples are to be centrifuged at source).

## Specimen Labelling and Transport

**Labelling**

Please put specimens in the sealable compartment of the plastic bag. Please do **NOT** use staples or pins to secure the bags. Please ensure that request forms are not contaminated with blood or other body fluid and any leaking samples will be discarded. Please ensure that specimens are labelled with **FULL PATIENT IDENTIFICATION**. Please use labels, either found in the patients’ case notes or produced using the label printing function in SCI, Trakcare or GP order comms. For non-electronic ordering areas Haematology and Clinical Biochemistry use a combined 2 part request form. Please attach a label, bearing the patient’s name, address, CHI and bar code, on each part of the form and follow instructions on reverse of form.

Attach the small labels, containing the patient’s name and CHI, but no bar code, onto blood specimen containers.

**BLOOD TRANSFUSION** - no labels allowed on samples, details **MUST** be handwritten.

**Transport**

*Inpatients*: Samples are delivered by porter (all sites) or using the pneumatic tube system (RAH and IRH only).

*GP’s*: Samples are picked up by the GG&C van transport system and delivered on a regular basis to each site using the coloured transport bags (green – Blood Sciences, pink – emergencies).

##  Patients for Surgery

Please take specimens as soon as possible, especially for blood grouping. It is important to discover as early as possible if a patient has an antibody which may delay provision of compatible blood.

##  Danger of Infection Specimens

Clinical staff need no longer use “DANGER OF INFECTION” stickers to highlight samples containing (or suspected of containing) blood borne viruses (BBV) such as HIV and hepatitis B or C. It is not necessary to alert laboratories (other than Pathology) about potential infectivity of such samples since all laboratories observe standard precautions.

Users MUST alert relevant laboratories by phone (contact details below) for the following samples:

i) Body fluids containing group 4 hazard grade pathogens, namely from patients with confirmed or high possibility viral haemorrhagic fevers (VHF). (See ACDP Categorisation below for VHF guidance).

ii) CSF from patients with tuberculous meningitis (or high suspicion of).

(CSF spectrophotometry would not be performed on such samples).

iii) Sputum from patients with MERS (or high suspicion of) – MUST be discussed with Consultant virologist before sample sent

The above samples MUST NOT be transported via the pneumatic tube system.

##  Specimens for Other Hospitals

All specimens should be sent to the laboratory. They will then be despatched to other hospitals. They should **NOT** be posted directly from wards or through the General Office.

There must be adequate clinical details. Some laboratories will refuse to process specimens if not enough clinical information is given.

##  Names and Addresses of Referral Laboratories

|  |  |  |
| --- | --- | --- |
| **TESTS** | **HOSPITAL** | **DEPARTMENTS** |
| Thrombophilia ScreensHaemophilia screensFactors, Anti-Xa.Platelet Function tests.HIT testing | McEwen BuildingGlasgow Royal InfirmaryCastle StreetGLASGOW G4 0SF | Haemostasis Laboratory(0141 211 4461) |
| HaemoglobinopathyPlasma Viscosity | Laboratory Medicine & Facilities Management BuildingQueen Elizabeth University HospitalGovan RoadGlasgow G51 4TF | Haematology Department(0141 354 9108) |
| JAK2BCR-ABL and Cytogenetic testing | Dept.of Molecular Diagnostics Level 2 Laboratory Medicine Queen Elizabeth University Hospital 1345 Govan RoadGlasgow G51 4TF | Molecular Haematology(0141 354 9110) |
| GIT (Granulocyte Immunology testing) | NHSBT Filton500 North Bristol ParkNorthway, FiltonBristol BS54 7QH | NHSBT Filton (0117 9217325) |
| EPO (Erythropoetin) | McEwen BuildingGlasgow Royal InfirmaryCastle StreetGLASGOW G4 0SF | Biochemistry Department(0141 211 4356) |
| Malarial Parasites | Scottish Parasite Diagnostic and Reference Laboratory New Lister Building, GRI, Alexandra Parade, G31 2ER | Malaria Diagnostics Service 0141 201 8667 |
| Tissue typing (transplantation) | Tissue typing labGartnavel General Hospital21 Shelley RoadGLASGOW G12 0XB | Tissue typing lab(0141 301 7755) |
| ImmunophenotypingEMA (hereditary spherocytosis) | Haemato-oncology LabGartnavel General Hospital12 Shelley RoadGLASGOW G12 0XB | Haemato-oncology Lab(0141 301 7707) |
| Cross MatchingPlatelet SerologyReference Serology | West of ScotlandBlood Transfusion CentreGartnavel General Hospital25 Shelley RoadGLASGOW G12 0XB | Cross MatchingPlatelet SerologyReference Serology |

The accreditation status of all referral laboratories is checked annually to ensure they meet the required standards.

## Overnight Storage of Laboratory Specimens

|  |  |  |
| --- | --- | --- |
| **Specimen Type** | **Overnight Storage** | **Comments** |
| Full Blood Counts | NO |  |  |
| ESR | NO |  |  |
| Coagulation | NO |  |  |
| D-Dimers | YES | 40C | Can be performed up to 24 hours after withdrawal. |
| Blood Transfusion - Routine | YES | 40C |  |
| Ante-Natal Serology | YES | 40C |  |

##  Completion of Request Forms

All request forms **should** contain the following information: -

1. Hospital or GP Practice
2. CHI number or Patient CRN
3. Patient Surname
4. Patient Forename
5. Date of birth
6. Sex
7. Location of request - ward or GP Practice
8. Referring Consultant or GP
9. Type of specimen
10. Date and time of request
11. **Relevant** Clinical History
12. Investigations/Tests required
13. Anticoagulant or other relevant treatment

**Labels**

Labels, containing the patient’s ID may be produced using the appropriate Trakcare/GP order comms.

For non-electronic ordering areas use labels containing the patient’s name, address, CHI and bar code on both parts of the two part Biochemistry/Haematology request form. Use the small labels with just the patient’s name and CHI, but with **no** bar code, on the samples.

Trakcare – attach labels to each tube form bottom of Trakcare request form.

GP order comms – attach labels only for routine tests. More specialised tests may print a form which must accompany the tubes.

**For Blood Transfusion requests, a label can be used for the request form but the sample must be hand written.**

**Results**

If really urgent please arrange with laboratory for results to be phoned. Please restrict the use of this service as it takes technical staff away from performing the analyses.

**Reports**

Please state the location where report is to be sent, especially if different from the requesting location and if an extra copy is required and for what location.

The Haematology department is a UKAS accredited laboratory No. 8046 (no UKAS logo attached to reports) but a coded comment on the hard copy reports outline which tests are accredited for Haematology with the following words:

**‘Clyde Haematology laboratories are a UKAS accredited medical laboratory (No 8046) for all tests with the exception of GFST.’**

Please note: reports on Clinical portal do not contain the requestor’s name.

## Sample Acceptance Criteria

**Blood Transfusion**

Full patient identification is essential on both specimens and request forms. This must be handwritten and include surname and forename legibly written, Date of birth, unique identifier (e.g. CHI number), and the patient location. The date and time and a signature of the person who took the sample should also be included. Samples labelled with an addressograph label will be rejected.

**For medico-legal reasons the laboratory staff are instructed to reject all inadequately labelled specimens as per the ‘zero tolerance policy’ agreed by GG&C** **Overarching Transfusion Committee**

**Haematology**

Full patient identification is essential on both specimens and request forms. This should include surname and forename legibly written, Date of birth, unique identifier (e.g. CHI number), and the patient location.

In addition forms should include the following:

1. address
2. date and time of sample collection
3. tests required
4. treatment information / clinical details
5. type of specimen
6. doctor’s signature

The following will be considered reasons for rejection of the sample.

* Sample is unlabelled
* Patient identity details given on the sample are entirely, or almost entirely, different from those given on the request form (suggesting that the wrong patient may have been bled and possibility of an error involving transposition of 2 patients)
* One or more major criteria on the sample are incorrect or missing, regardless of the "degree" of error (e.g. transposition of letters or numbers, mis-spelling) i.e.
	+ - * Patient’s name
			* Unique identifier i.e. CHI number or Date of Birth

If patient details listed above on the sample/form do not agree with Telepath historical record then lab should phone the ward to establish if current sample details are correct. If current sample details are incorrect then requestor must be advised by phone that the sample is being rejected and given the reason for rejection.

##  Electronic Results Enquiry using SCI Store

Results can be accessed on either SCI store or using the clinical portal. It is not helpful to phone the laboratory for results as this delays other work.

If you need an access password for this complete the relevant form found on Staffnet under Applications. The lab does not issue SCI store passwords.

All staff are reminded to help prevent unauthorised access of confidential data. Do not allow unauthorised persons to see data on screens. Log off after use. Do not allow, by action or inaction, the disclosure of information to any unauthorised person.

If you are having problems with the SCI Store Results Reporting system, please contact: -

IT Helpdesk **(RAH)** - 0345 612 5000 (Short Code #650)

IT Helpdesk **(IRH)** - 0345 612 5000 (Short Code \*50 #)

IT Helpdesk **(VOL)** - 0345 612 5000 (Short Code \*50 #)

##  User Consultation and Complaints

Users of the laboratory services are consulted using questionnaires and open events. The Technical Services Manager or Clinical Consultants can also be contacted directly with any suggestions for service improvement.

Users Complaints

If any users of the laboratory service have cause to complain this should be passed on to a Departmental Consultant or the most senior member of the technical staff in the department at that time. Formal complaints will be recorded on form **QF-CGEN-004** and passed to the Technical Services Manager under procedure **MP-CGEN-006**.

Patient Complaint

If a patient or member of the public wishes to complain they should contact a member of the Complaints Team, by telephoning 0141 201 4500 or e-mail complaints@ggc.scot.nhs.uk who will be happy to help.

If they wish to make a formal complaint, they should address this in writing to:

Complaints Team

Glasgow Royal Infirmary

84, Castle Street

GLASGOW G4 0SF

## 2.0 HAEMATOLOGY

**Please note**

Advice on investigation and management can be sought from the Haematology Consultant. You may be referred to a Haematology Consultant providing on-call telephone cover from another hospital in Clyde directorate.

On statutory public holidays the laboratory has reduced staffing levels and should be used for emergency investigations only (VOL closed on public holidays)

## 2.1 Haematology Clinics

There are weekly out-patient clinics for the investigation and treatment of Haematological disorders.

|  |  |  |  |
| --- | --- | --- | --- |
| **SITE** | **TIMES** | **LOCATION** | **CONTACT DETAILS** |
| IRH | Tues PMThurs PM | Level L south (04431) | Dr. Patrick (04418)Locum (04347)Sister McDiarmid (Page 51090) |
| RAH | Mon AMWed PMThurs PM | Ward 1 outpatients | Haematology Secretary 06712 |
| VOL | Fri AM | Outpatients dept | Haematology Secretary 87598 |

## 2.2 Routine Tests available in Haematology

|  |  |  |  |
| --- | --- | --- | --- |
| **TEST** | **COLLECTION TUBES** | **ADULT NORMAL RANGE****(\* = derived from textbook)** | **COMMENTS** |
| **FBC** | 4ml Lavender |  | UKAS Accredited |
| WBC |  | 4.0-10.0 (109/L)\* | UKAS Accredited |
| Neutrophils |  | 2.0-7.0 (109/L)\* | UKAS Accredited |
| Lymphocytes |  | 1.1-5.0 (109/L0\* | UKAS Accredited |
| Monocytes |  | 0.2-1.0 (109/L)\* | UKAS Accredited |
| Eosinophils |  | 0.02 -0.5 (109/L)\* | UKAS Accredited |
| Basophils |  | 0.02-0.1 (109/L)\* | UKAS Accredited |
| RBC |  | Men 4.5-6.5 (1012/L)\*Female 3.8-5.8 (1012/L)\* | UKAS Accredited |
| Hb |  | Men 130-180 (g/L)\*Female 115-165 (g/L)\* | UKAS Accredited |
| HCT |  | Men 0.40-0.54 (L/L)\*Female 0.37-0.47 (L/L)\* | UKAS Accredited |
| MCV |  | 83 -101 (fL)\* | UKAS Accredited |
| MCH |  | 27.0-32.0 (pg)\* | UKAS Accredited |
| MCHC |  | 315 -345 (g/L)\* | UKAS Accredited |
| RETICULOCYTES |  | 50 – 100 (109/L) (0.2 -2.3%)\*  | UKAS Accredited |
| PLTS |  | 150-410 (109/L)\* | UKAS Accredited |
|  |  |  |  |
| **Coagulation** |  | **Derived from local NR** |  |
| PT | 3.5 ml Blue | 9 -13 (secs) | UKAS Accredited |
| INR | 3.5 ml Blue | 2.0 - 4.5 | UKAS Accredited |
| APTT | 3.5 ml Blue | 27 - 38 (secs) | UKAS Accredited |
| APTT Ratio | 3.5 ml Blue | 1.8 – 2.8 | UKAS Accredited |
| TCT | 3.5 ml Blue | 11 -15 (secs) | UKAS Accredited |
| D-Dimer | 3.5 ml Blue | <230 (ng/ml) | UKAS Accredited |
| Fibrinogen | 3.5 ml Blue | 1.7 - 4.0 (g/L) | UKAS Accredited |
|  |  |  |  |
| **OTHERS** |  |  |  |
| ESR –male (age in yrs) | 4ml Lavender | 17-50 = <10 | 50-61 =<12 | 61-70 = <14 | >70 = <30 | UKAS Accredited |
| ESR- female (age in years) | 4ml Lavender | 17-50 = <12 | 50-61 =<19 | 61-70 = <20 | >70  = <35 |
| Glandular Fever | 4ml Lavender | NA |  |
| Malarial Parasites | 4ml Lavender | NA | UKAS Accredited |
| Haemoglobinopathy | 4ml Lavender | NA | At QEUH |
| Sickledex | 4ml Lavender | NA | UKAS Accredited |
| Vitamin B12 | 5ml Ochre | 180 - 1000 (ng/L)\* | Biochemistry Test |
| Serum Folate | 5ml Ochre | 3.0 - 20 (μg/L)\* | Biochemistry Test |
| Serum Ferritin | 5ml Ochre | * Males 15-300μg/L (<20 iron deficiency)\*
* Females 15-200μg/L (<15 iron deficiency)\*
* 15-50 μg/L\* - intermediate result.  Consider iron deficiency in anaemic patients, older patients and those with inflammatory disease
 | Biochemistry Test |

**References:**

* + - 1. **All data with the exception of Hb, Hct, RBC Count and Lymphocyte Count - Dacie & Lewis - Practical Haematology - 12th Edition.**
			2. **Hb, Hct, RBC Count and Lymphocyte Count – Barbara J. Bain – Blood Cells a Practical Guide – 4th Edition.**

**INR**

**Please note:**

When changing from unfractionated heparin to Warfarin an INR result is meaningful provided the APTT is in the therapeutic range. If the patient is over heparinized the INR is invalid as heparin may interfere. Patients should be referred to the Anticoagulant Clinic on discharge. Please complete the Anticoagulant Clinic referral form. Patients should be given an anticoagulant record information book.

**Anti-Coagulant Control**

N.B. Low molecular weight heparin does not need control except in pregnant women and patients with renal impairment.

Warfarin control INR 2.0 - 3.0 DVT

 Pulmonary embolism

 Atrial fibrillation

 3.0 - 4.5 Recurrent DVT and PTE

 Arterial grafts

 Prosthetic heart valves

**Vitamin B12, Folate and Ferritin**

These tests are performed in Biochemistry and reported by Haematology. All queries regarding interpretation should be referred to Haematology Consultant.

**Please note**: Specimens must be taken prior to haematinic administration or Blood Transfusion.

**Malarial Parasites**: If urgent examination is required this **must** be discussed with the consultant haematologist. The specimen preferably should be taken when the patient is febrile. **Details of any recent travel or previous history should be supplied.** A 4.0ml EDTA specimen (FBC) is required.

## 2.3 Special Investigations

The following tests are more specialised investigations and should only be undertaken after discussion with the Consultant Haematologist.

**Bone Marrow Examination**

**Cell Marker Studies** (immunophenotyping investigations, flow cytometry)

**Haemoglobinopathies**

**Please note**: Haemoglobinopathy screens are performed at Queen Elizabeth University Hospital and despatched daily Monday to Friday. (Please use Family origin questionnaire (FOQ) for Ante Natal requests)

**Haemolysis screen**: Investigations may include:Direct Antiglobulin (Coombs) test, urine for Hb, haemosiderin, reticulocytes.

**Hereditary Spherocytosis Ratio (EMA):**

Please discuss with Consultant Haematologist

A 4.0ml EDTA sample is required. Please send specimen in the morning together with a sample taken at the same time, from a normal subject, to serve as a control.

**Investigation of Suspected Bleeding or Prothrombotic Disorder**

Check Thrombophilia guidelines (Staffnet) and discuss with Consultant Haematologist if necessary.

**Please note**: Thrombophilia screens are performed at Glasgow Royal Infirmary and despatched daily Monday to Friday. If Lupus inhibitor is suspected, it is important that the sample is as fresh as possible. 4 x 3.5 ml of blood in sodium citrate should be taken on the morning and despatched to laboratory together with the Thrombophilia request form.

**Reticulocytes**: Performed on 4.0ml EDTA (FBC) sample.

**PNH**: Please discuss with Consultant Haematologist.

## 2.4 Action Limits and Turnaround Times

Samples from hospital patients are analysed as they arrive in the laboratory. Urgent samples will be prioritised.

Patient results from all wards are available electronically on SCI (Scottish Communications Information) - for trouble shooting guide click on [SCI Store Trouble Shooting Guide.](http://intranet.nhsac.scot.nhs.uk/services/imt/sci_store/faq/) Laboratory results are also available on Clinical Portal and Trakcare systems. If there is difficulty in obtaining a particular result the laboratory should be contacted.

**Outpatient/GP sample results (8am to 6pm) andInpatients sample results (anytime)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Low trigger** | **High trigger** | **Comments** |
| Haemoglobin | <80g/l | - | Unless most recent result similar  |
| White cell count | - | >50 | Unless most recent result similar and taken in last month |
| Neutrophil count | <1.0 | - | Unless most recent result similar and taken within last month |
| Platelet count | <50 | >1000 | Unless most recent result similar and taken in last monthAfter checking validity of count on film |
| INR | - | >4.5 |  |

**GP Sample Results (6pm – 10pm) – Phone to GEMS**

* Any results phoned to GEMS will also be phoned to requesting GP the next working day (before 10am).
* GEMS do not wish to be phoned with abnormal results after 10pm, unless exceptional circumstances, in which case the Haematology medic should phone GEMS.

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Low trigger** | **High trigger** | **Comments** |
| Haemoglobin | <70g/l<50g/l if MCV<70fl | - | Unless most recent result similar or unless MCV <70fl thereby making IDA most likely. |
| White cell count | - | >50 | Unless most recent result similar and taken in last month |
| Neutrophil count | <0.75 | - | Unless most recent result similar and taken within last month |
| Platelet count | <30 | - | Unless most recent result similar and taken in last month |
| INR | - |  >6.0 |  |

All vitamin B12 and folate results are available within three working days.

**Turnaround times**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test** | **GP’s** | **Inpatients** | **Emergency** |  |
| **HAEMATOLOGY** |
| [Full Blood Count](#_Full_Blood_Count) | 4 Hours | 2 hours | 1 hour |  |
| [E.S.R](#_Erythrocyte_Sedimentation_Rate) | 4 Hours |  | 1 hour |  |
| **COAGULATION** |
| [Coagulation Screen](#_Coagulation_Screen) | 4 Hours | 2 hours | 1 hour |  |
| [Anticoagulant - I.N.R](#_Anticoagulant_Control_–) | 4 Hours | 2 hours | 1 hour |  |
| [Anticoagulant - Heparin](#_Anticoagulant_Control_–_1) | 4 Hours | 2 hours | 1 hour |  |
| **BLOOD TRANSFUSION** |
| Group & Save | 1 – 4 Hours | 60 Minutes |  |  |
| Crossmatch | 1 – 4 Hours | 60 Minutes | 50 Minutes | Group specific ready in 20 mins |
| Ante-Natal Serology Group | 2 – 6 Hours |  |  |  |

##

## 2.5 Time Limits for Requesting Additional Tests

Cell Markers 36 hours

Blood Film 24 hours

Reticulocytes 24 hours

Coagulation tests 4 hours

D-Dimers 24 hours after blood has been withdrawn

Glandular Fever Screen 36 hours

Malarial Parasites <2 hours after blood has been withdrawn

B12, Folate 72 hours (if Biochemistry sample available)

Sickle Screen 36 hours

## 2.6 Interfering factors

All blood samples require a clean venepuncture, the tube filled to the correct level and proper mixing of the sample before being sent to the laboratory. The following factors may cause erroneous results:

* + - * 1. A clotted sample tube
				2. An over or underfilled sample tube
				3. A lipaemic, icteric or haemolysed sample tube
				4. An activated sample for Coagulation
				5. High Bilirubin/Hb/Triglycerides for Coagulation
				6. Delayed transport time
				7. Incorrect transport temperature or storage conditions

##  BLOOD TRANSFUSION

### 3.1 General

Clyde Blood Transfusion Laboratories are regulated by the Medicines and Healthcare Regulatory Agency (MHRA) and accredited by the United Kingdom Accreditation Service (UKAS Number 8046). Blood Transfusion testing scope is available on the UKAS website

[**http://www.ukas.com/wp-content/uploads/schedule\_uploads/00007/8046%20Medical.pdf**](http://www.ukas.com/wp-content/uploads/schedule_uploads/00007/8046%20Medical.pdf)

3.2 Written Request

A request for blood grouping and/or compatibility testing must always be made on a blood transfusion department request form. The patient’s blood sample must be taken into a 6.0ml specimen tube labelled ‘EDTA K -FOR BLOOD TRANSFUSION’.

Both the request form and sample tube should have the following minimum patient ID:

* The patient’s full surname, with correct spelling.
* Forename(s).
* Date of Birth.
* CHI Number or TJ (Trakcare) number.
* Sex.
* Signature of Requestor
* Time and Date of Sample.

Full patient identification is essential on both specimens and request forms. For medico-legal reasons the laboratory staff are instructed to reject all specimens that are unlabelled, specimens with errors in labelling or specimens with missing or illegible data

A full 6ml EDTA specimen is required. In special cases further samples may be required.

In accordance with National Guidelines, addressograph labels must not be used on specimen bottles as their use could give rise to errors leading to fatalities.

Acute haemolytic transfusion reactions due to ABO incompatibility may be fatal. The majority of ABO incompatible transfusions are due to clerical, documentation or identification errors and are avoidable.

***3.3 Collection of the Patient Sample***

* + - * Whenever possible the patient should be asked to identify him/herself verbally and the information given checked against the information given on the identification bracelet.
			* The collection of blood, dispersal into containers and labelling of request form and containers must be carried out as one continuous uninterrupted event involving one patient only. Addressograph labels must NOT be used on samples.
			* Containers and forms must NOT be pre-labelled.
			* The request form and sample container should be signed. The person responsible for the request should be clearly identifiable from the information provided on the request form.

### *3.4 Antibodies*

Please check case notes for any previous blood transfusion records. The presence of previously detected antibodies should always be recorded on the transfusion request form.

### *3.5 Urgent Requests*

**Always telephone the laboratory** (or page the shift BMS out of hours) to ensure that the staff are aware of the clinical nature of the problem. In the case of a life threatening emergency a rapid group will be performed and group specific blood issued while matching is in progress. Confirmation of compatibility will be telephoned as soon as possible. Until then the responsibility of giving unmatched blood rests with the clinician.

### *3.6 Identification*

The person taking the blood sample for transfusion is responsible for patient identification and correct labelling. According to National Guidelines addressograph labels are **NOT** acceptable for labelling of Transfusion samples. (See: Requirements for ordering Red Cell Products) The responsibility for ensuring that cross matched blood is given to the correct patient lies with the person connecting the blood pack to the patient. **Always** check patient identity, including the wristband to avoid errors.

***3.6.1 Second Sample policy***

In accordance with recommendations of the BCSH and SHOT – in order to provide cross-matched blood or group specific blood products the current Blood transfusion database must have 2 ABO group samples on record. Please refer to staffnet and second sample policy leaflets for further guidance.

### *3.7 Transfusions for Elective Surgery*

There is a policy of group screen and save (GS) or matching a set number of units according to the operation. A pre-operation transfusion sample **must** betaken, clinical details and date of the procedure must be stated on the request form. The appropriate action will then be taken by the laboratory. If antibodies are detected, cross matched blood will be provided if appropriate for the operation. If no compatible blood can be provided from the hospital blood bank the ward will be informed (see: Maximum Surgical Blood Ordering System, MSBOS.)

## 3.8 Platelet Antibodies

This test can be requested after discussion with a Consultant Haematologist or SNBTS medical staff. Specimens should preferably be taken before starting steroids.

### *3.9 Kleihauer Test*

Performed on all Rh (D) Negative women who have delivered a Rh(D) Positive baby or are subject to a potential sensitising event if >20weeks gestation. The test is used to detect a feto-maternal haemorrhage and to determine the amount of Anti-D Immunoglobulin which must be given.

### *3.10 Blood Components*

Requests for blood components must come through the transfusion laboratory.

The Consultant Haematologist is available to discuss appropriate use of components.

* **Fresh Frozen Plasma (FFP)**: This is a source of clotting factors. It is available for specified patients, with a proven coagulation disorder or for patients who are bleeding. It is not issued without a coagulation screen. Dose 10 - 15 Kg/Body weight
* **Cryoprecipitate**: (contains mostly fibrinogen and FVIII) is used as a source of fibrinogen in small volume. For adult, 2 pools (equivalent to 10 donations) is a suitable dose (Volume = approx 300 mls, 4g fibrinogen approximately)

* **Platelets**: are obtained from the regional transfusion centre. The initial adult dose is provided either as a dose of pooled platelets or a dose of apheresis platelets. They are issued with a special giving set and should not be administered through any other type of set. The platelet count should be monitored. If bleeding continues a further platelet transfusion may be required.

### *3.11 Blood Products*

 Please note: Albumin preparations are currently supplied by Pharmacy.

* **Human Anti-D Immunoglobulin:** Indicated for all Rh (D) negative women who deliver a Rh (D) positive infant. It is also indicated for Rh (D) Negative women who have a termination, threatened abortion, or who have PV bleeding during pregnancy.

 The standard post-natal dose is 500 IU.

 For pre-natal exposure, under 20 weeks gestation the standard dose is 250 IU,

 After 20 weeks gestation the standard dose is 500 IU but this may be increased depending on the results of a Kleihauer examination.

 Anti D is also given to Rh Neg women prophylactically at 28-32 weeks (1500 IU)

* **Beriplex**: is a concentrate of FII, FVII, FIX & FX (Prothrombin complex) and should be used for immediate reversal of warfarin effect (limited stock kept at A/E in RAH and IRH).
* **Human Albumin Solution 4.5%:** Supplied by Pharmacy
* **Human Albumin Solution 20%:** Supplied by Pharmacy
* **Human Hepatitis B Immunoglobulin 500IU:** Supplied by Pharmacy
* **Human Anti-Tetanus Immunoglobulin 250 IU**: Supplied by Pharmacy.
* **Varicella-Zoster Immunoglobulin 250 IU:** Supplied by Pharmacy.

## 3.12 Special Requirements

Transfusion associated GVHD (Graft Versus Host Disease) is a rare complication but avoidable. Irradiated cellular blood components must be requested for: -

1. Allogenic bone marrow transplant
2. Donors of bone marrow or haemopoietic stem cells
3. Autologous bone marrow transplant: from 7 days prior to harvest and for at least 6 months post-transplant
4. Hodgkins Disease: all patients irrespective of stage or therapy
5. Purine analogues: patients receiving purine analogues (cladribine, fludaratome, 2- deoxycoformycin [Pentastatin])
6. Babies who have received intrauterine transfusions
7. Babies where there is a possibility of congenital immunodeficiency predominantly affecting cell mediated immunity. Please inform Transfusion Laboratory.

GGC Special requirements policy is available on the Blood Transfusion pages of StaffNet

### *3.13 Reaction to Blood and Blood Products*

* Febrile and allergic reactions: Stop the drip and give oral Paracetamol and if there is no improvement, intra venous anti-histamine and/or hydrocortisone.

If patient’s condition improves the transfusion can be restarted.

* Suspected incompatibility: **Stop transfusion immediately and telephone laboratory.** Retain used and partly used blood packs.
* Advice and forms for investigation of a suspected transfusion reaction are available on the transfusion pages of StaffNet

## 3.14 Routine tests available in Blood Transfusion

|  |  |  |
| --- | --- | --- |
| TEST | COLLECTION TUBES | COMMENTS |
| Blood Group & Retain | 6 ml pink | Kept for 7 days(14 days for pre-op samples) UKAS Accredited |
| Compatibility Testing (Crossmatching) | 6 ml pink | UKAS Accredited |
| Direct Coombs test | 6 ml pink | UKAS Accredited |
| Antibody identification | 6 ml pink | UKAS Accredited |
| Red Cell Phenotyping | 6 ml pink | UKAS Accredited |
| Platelet Antibodies | 6 ml pink | Performed by SNBTS |
| Kleihauer | 4ml Lavender | UKAS Accredited |

 ALL OF THIS INFORMATION IS ESSENTIAL

Care should be taken with patient identifiers. Staff within the transfusion laboratory are obliged to refuse to accept a request for compatibility testing when either the request form or the sample is inadequately identified.

THIS WASTES TIME FOR ALL CONCERNED AND CONTRIBUTES TO SERIOUS ERRORS

###

### 3.15 Maximum Surgical Blood Ordering System

**Note that the MSBOS may be revised from time to time as surgical techniques and transfusion triggers change. The cross-match of a single unit for elective procedures is NEVER indicated. Some patients may require cross-match due to pre-existing significant anaemia or known high risk of haemorrhage – modify the request accordingly and state reason on the request form.**

**LI-CBTR-021 - MSBOS – Version 3**

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