Location of Document

1. Hardcopy - Haematology General SOPs folder, Main Haematology laboratory, G0.085, Altnagelvin Hospital
2. Hardcopy - Haematology General SOPs folder, Main Haematology laboratory, PAT.B1.034, South West Acute Hospital
3. Electronic copy – WHSCT Intranet
4. Electronic copy – GP Intranet
5. Electronic Copy – Q-pulse

CHANGES IN THIS VERSION	Paper copy only active when stamped with RED "Active Document" stamp
• Include QR codes for access to UKAS Accreditation E-Certificates • Include NRBC within Test Repertoire and normal ranges • Update contact details • Removal of Human Immunoglobulin (IgG) from section 15.10 • Update of Test Repertoire and Turnaround Times	

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LOOKING FOR SPECIFIC INFORMATION?
Use 'Ctrl F' keyboard shortcut and type in the 'test name' or a 'keyword' and press enter.

1. INTRODUCTION

The Haematology/Blood Transfusion Department is an ISO15189 UKAS accredited laboratory.

8824	9766
Scan QR Barcode to Verify	Scan QR Barcode to Verify

Our accreditation is limited to those activities described on the UKAS schedule of accreditation. This schedule can be accessed from the UKAS website. Use the term 'Western' to search for accredited organisations and then choose Medical Laboratories or scan the QR barcode above.

The tests referred to in this user manual which are not explicitly covered in the scope of practice (as listed on the UKAS website) are by definition not part of the department's external accreditation. They are covered, as far as is practical, by the departments quality management system.

The Haematology/Blood Transfusion Laboratory is located on two sites within the Western Trust:-

- Altnagelvin Hospital (ALT) – Laboratory/Pharmacy building South Wing.
- South West Acute Hospital (SWAH) – Laboratory building.

The Haematology/Blood Transfusion Laboratory is directed by a Lead Consultant Haematologist and is managed by a Lead Biomedical Scientist.

The Laboratory offers a comprehensive service including a 24 hour emergency service.

2. LABORATORY HOURS

SITE	Routine Opening Hours
Altnagelvin Hospital	Monday to Friday 9.00am – 5.15 p.m.
South West Acute Hospital	Monday to Friday 9.00am – 5.00 p.m.

- All other times (including Bank Holidays) a 24 hour emergency service is available. Bleep Haematology BMS On-Call via the hospital switchboard.

Clinically urgent requests for Haematology / Blood Transfusion must always be arranged with a Biomedical Scientist. Please contact the department once the sample has been taken using the relevant contact number as listed in section 3 (Laboratory Contact Details) below or via the switchboard for samples taken outside of the normal Laboratory openings hours.

3. LABORATORY CONTACT DETAILS

Altnagelvin Hospital

Laboratory Address: Haematology/Blood Transfusion Laboratory
South Wing
Altnagelvin Area Hospital
Glenshane Road
BT47 6SB.

DEPARTMENT	TELEPHONE NUMBER
Altnagelvin Hospital Switchboard	Tel: 028 71 345 171
Haematology Results/Enquiries	Ext. 213796 / 213797 / 213798
Haematology /Transfusion Lead BMS	Ext. 213789 Tel: 028 71 611 172
Haematology Laboratory	Ext: 213827
Blood Bank Laboratory	Ext: 213830 / 213829
Haemovigilance Practitioner (1)	Ext: 213794 Bleep: 8434
Haemovigilance Practitioner (2)	Ext: 213793 Bleep: 8434
Haematology / Blood Transfusion **Emergency Out-of-Hours**	Bleep No. 8059 or via Hospital switchboard.

South West Acute Hospital

Laboratory Address: Haematology/Blood Transfusion Laboratory
South West Acute Hospital
124 Irvinestown Road
Enniskillen
BT7 6DN

DEPARTMENT	TELEPHONE NUMBER
South West Acute Hospital Switchboard	Tel: 028 6638 2000
Haematology Results/Enquiries	Ext. 252273 / 252281
Haematology /Transfusion Lead BMS	Ext. 252287
Haematology Laboratory	Ext: 252289 / 252420
Coagulation Laboratory	Ext: 252289 / 252420
Blood Bank Laboratory	Ext: 252290 / 252421
Haemovigilance Practitioner	Ext: 252286
Haematology / Blood Transfusion **Emergency Out-of-Hours**	Bleep No. 6046 or via Hospital switchboard.

For clinical advice on test selection / interpretation of results, please contact the Consultant Haematologist at the following:-

DEPARTMENT	TELEPHONE NUMBER
Altnagelvin Hospital	
Hospital Switchboard	Tel: 028 71 345 171
Consultant Haematologist (Dr McNicholl)	Ext. 214805
Consultant Haematologist (Dr Elder)	Ext. 213801
Consultant Haematologist (Dr. McConville)	Ext. 213800
South West Acute Hospital	
Hospital Switchboard	Tel: 02890329241
Contact the switchboard at Belfast City Hospital and ask for the Haematology Consultant/ Registrar on-call.	

4. AVAILABILITY OF CLINICAL ADVICE

Haematology offers a Consultant led service. Please ensure you have discussed the case / query with a senior colleague and have all relevant clinical information to hand before contacting the Consultant Haematologist for advice.

For out-of-hours advice, contact the Consultant Haematologist:

- **Altnagelvin** - via Altnagelvin Hospital switchboard.
- **South West Acute Hospital** - via Belfast City Hospital.

5. REQUEST FORM / SAMPLE - ACCEPTABLE MINIMUM IDENTIFIERS

NOTE: Please refer to Section 15.4 for Blood Transfusion Sample Acceptance Policy.

The following table lists the mandatory and desirable information required on all request forms. Any requests missing the mandatory information will not be processed

	Mandatory	Desirable
Request form	• Unique identifier (H&C number) • Forename • Surname • Date of Birth (dd/mm/yyyy) • Gender • Sample date & time- *this **MUST** be the date & time of sample taken*. • Ward / Clinic Name or code • Consultant / GP Name or code • Tests requested	• Address • Relevant Clinical Information, including Anticoagulant Therapy and Diagnosed Haematological Disorders are essential. • Signature of primary collector
Sample	• Unique identifier (H&C number) • Forename • Surname • Date of Birth (dd/mm/yyyy)	• Time / Date of Sample • Signature of primary collector

Requests that have any of the above information missing or illegible will be rejected outright without analysis.

Haematology / Blood Transfusion accept that the Health & Care (H&C) number unique identifier may not be allocated to all patients, e.g. temporary residents, cross border patients. If the H&C number is not available, this **MUST** be clearly stated on the request form or the request will not be processed. In addition, the Hospital Number or Emergency Department Number must be used as an alternative. Use of the H&C number ensures there are single patient entries on the NIECR and laboratory system. This means all patients' results are stored in the one location. Multiple entries means it will take longer to find the correct result and poses significant risks for patients requiring blood transfusions.

5.1. Clinical Details

Haematology / Blood Transfusion would like to remind users of the importance of including relevant clinical details on the request form. This helps:

- Ensure appropriate tests are being done and reduce inappropriate testing.
- Assists laboratory staff in determining reason for possible abnormality in result if present.
- Improve effectiveness of blood film reporting.
- Reduce amount of time needed to contact clinical areas to determine clinical details.
- Reduce disruption to clinical area staff.
- Improve Turnaround Times.

5.2. Common Reasons for samples not being processed

- No H&C number on sample and request form.
- Unlabelled samples.
- Sample mismatch (patient details on sample do not match those on request form).
- Samples without a test request.
- Incomplete or illegible request forms.
- Incomplete or illegible patient details on sample.
- Samples received in an incorrect container.
- Leaking samples.
- Contaminated sample or request forms.
- Insufficient sample.

6. TEST REPERTOIRE

TEST	CONTAINER	COMMENT	Storage Requirements Prior to sending to Laboratory
FBC (Full Blood Count) incl. automated WCC 5 population differential & platelets	4ml EDTA (purple top) 0.5ml EDTA (paediatric)	1ml minimum – 4ml EDTA 0.5ml minimum – 0.5ml EDTA for pediatric patients.	Room Temperature and routine dispatch to laboratory. If not same day dispatch, refrigerate until ready for dispatch.
Blood film	4ml EDTA (purple top) 0.5ml EDTA (paediatric)	Request along with FBC giving relevant clinical reason for request.	
ESR	4ml EDTA (purple top)	May be requested along with FBC. One full sample sufficient for both.	
Blood group	6ml EDTA Pink cap 0.5ml EDTA (Neonates only)		Room Temperature and routine Dispatch to Laboratory
Bone marrow		By arrangement with consultant Haematologist	Room Temperature and Immediate Dispatch to Laboratory
Cell marker studies		By arrangement with consultant Haematologist	

TEST	CONTAINER	COMMENT	Storage Requirements Prior to sending to Laboratory
Coagulation Screen to include PT, APPT, Fibrinogen	2.7ml Sodium Citrate (Blue top)	**See Section 13 Coagulation Tube, page 26 for further Information**	Room Temperature and Routine Dispatch to Laboratory
D-Dimer / XDP			
INR			
Thrombin time			
Anti-Xa assay		By prior arrangement with lab only	
Coagulation factor assays		By arrangement with consultant Haematologist	
Cold agglutinin titres	6ml EDTA Pink cap	By arrangement with Blood Bank	Room Temperature and Immediate Dispatch to Laboratory
Coombs test	6ml EDTA Pink cap	For first time patients that require a transfusion that do not have any previous blood group, a confirmation sample will be requested by the Blood Bank	
Group and Antibody Screen			
Cross matching			
Antibody Identification		Clinical area may be advised by Blood Transfusion to obtain 2 samples for referral to NIBTS	
Iron Stain		By arrangement with consultant Haematologist	Room Temperature and Immediate Dispatch to Laboratory

TEST	CONTAINER	COMMENT	Storage Requirements Prior to sending to Laboratory
Kleihauer test	4ml EDTA (Purple cap - mother) 6ml EDTA (Pink cap - cord blood)	Ensure that Cord samples are clearly labelled as Cord Blood.	Room Temperature and Immediate Dispatch to Laboratory
Lupus anticoagulant		By prior arrangement with lab only	Room Temperature and Immediate Dispatch to Laboratory
Malaria Parasites	4ml EDTA (purple top) Fresh Blood. Must arrive in lab within 2-4 hours maximum.	Request film on form with relevant clinical details. Telephone department to inform them of the sample being sent. Details of travel history & presenting symptoms are essential	Room Temperature and Immediate Dispatch to Laboratory. Must arrive in lab within 2-4 hours maximum.
NRBC	4ml EDTA (purple top) 0.5ml EDTA (paediatric)	1ml minimum – 4ml EDTA 0.5ml minimum – 0.5ml EDTA for pediatric patients.	Room Temperature and routine dispatch to laboratory. If not same day dispatch, refrigerate until ready for dispatch.
Paul-Bunnell - I.M. Screen	4ml Clotted (Yellow Top) – Preferred sample type *or* 4ml EDTA (purple top)		Room Temperature and Routine Dispatch to Laboratory
Pregnancy Test, HCG Level in urine	5 mls urine in universal container early morning sample preferable	Qualitative test only	Refrigerate (2 – 8^{o}C) and Routine Dispatch to Laboratory

TEST	CONTAINER	COMMENT	Storage Requirements Prior to sending to Laboratory
Protein C	4 ml Sodium Citrate/Blue top	Part of thrombophilia screen	Room Temperature and Immediate Dispatch to Laboratory
Protein S			
APC Resistance			
Pyruvate Kinase		Must be arranged with lab after consulting with Consultant Haematologist. Provide Relevant History	Room Temperature and Immediate Dispatch to Laboratory
Reticulocyte count	4ml EDTA(purple top)		Room Temperature and Routine Dispatch to Laboratory
Sickle Cell Test		By prior arrangement with lab only. Provide Clinical Details and relevant Family History.	Room Temperature and Immediate Dispatch to Laboratory
Thrombophilia screen	2.7ml Sodium Citrate (Blue top) x 3 4ml EDTA(purple top) x 1 6ml Red Top (Clotted) x 1		Room Temperature and Immediate Dispatch to Laboratory
Von Willebrands Screening	2 x 4 ml Sodium Citrate/Blue top	By prior arrangement with lab only	Room Temperature and Immediate Dispatch to Laboratory
Haemosiderin		By arrangement with lab	Room Temperature and Routine Dispatch to Laboratory

Please Note:

- For additional Haematology / Blood Transfusion tests, please contact the Haematology Laboratory or Blood Bank to ensure sample suitability prior to sending add-on request form.
- The Haematology and Blood Transfusion laboratories can be contacted for clarification and advice on any of the tests listed above or for any other Haematology / Blood Transfusion test not specifically listed in this user manual.

7. CLINICALLY URGENT 'OUT OF HOURS' SAMPLES

The laboratory must be contacted to arrange all clinically urgent samples before the sample is sent to the laboratory. The requesting clinician is responsible for arranging transport of clinically urgent samples to the laboratory. Only certain tests are available as urgent 'Out-Of-Hours' requests, as listed below:

TEST	COMMENT
FBC (Full Blood Count)	
ESR (Erythrocyte Sedimentation Rate)	By prior arrangement with lab only
Blood Film	Request along with FBC giving relevant clinical reason for request
Reticulocyte Count	
NRBC	
Malaria Parasites	By prior arrangement with lab only. Must arrive in lab within 2 hours. Request film on form with relevant clinical details. Details of travel history & presenting symptoms is essential
Coag (Coagulation Screen – to include PT, APTT, Fibrinogen)	
INR	
D-Dimer / XDP	
Paul Bunnell Screen	By prior arrangement with lab only
Pregnancy Test – HCG level in urine	
Crossmatch	Only Emergency Crossmatches will be performed 'Out-of-Hours'. Non-Urgent and pre-operative blood group and screens and crossmatches will be performed during routine working hours only. Pretransfusion samples received outside routine hours will **not be processed** until the next routine working day.

PLEASE NOTE:THIS SERVICE IS FOR PROCESSING EMERGENCY OUT-OF HOURS SAMPLES. IT IS NOT A RESULTS SERVICE.

8. REFERRAL LABORATORIES

Where possible, samples are only sent to accredited laboratories. Tests are either referred to other labs within Northern Ireland, or to national reference centres.

8.1 Tests referred to Laboratories within Northern Ireland

All requests will be transported to the Belfast Trust & Northern Ireland Blood Transfusion Service from the Laboratory daily at 8am. This service is Monday to Friday only.

For further details on the service provided by the Belfast Health and Social Care Trust Laboratory, including tests, sample requirements and result interpretation, please see the Belfast Health and Social Care Trust Laboratory User Manual, available from the Belfast Health and Social Care Trust website.
http://www.belfasttrust.hscni.net/Laboratory-MortuaryServices.htm

Please note: it is the responsibility of the ward to check with the referral lab if an urgent sample will be processed. The cost of sending urgent requests outside of the normal delivery service will be charged to the requesting department

TEST	REFERRAL LABORATORY	ACCREDITATION STATUS	UKAS REF. NO.
Antenatal blood group	NIBTS Belfast (Northern Ireland Blood Transfusion Service)	Approved	8198
Autoimmune neutropenia	Bristol Southmead	Approved	8067
CLL Molecular studies	Haematology BCH (Belfast City Hospital)	Approved	8952
Eosinophilia	Prof Nick Cross Salisbury	Approved	0049
Erythropoietin	Haematology RVH (Royal Victoria Hospital Belfast)	Approved	1336
Factor V Leiden	Haematology BCH	Approved	1336

TEST	REFERRAL LABORATORY	ACCREDIATION STATUS	UKAS REF. NO.
Flow cytometry	Haematology BCH	Approved	1336
G6PD	Haematology BCH	Approved	1336
Hb electrophoresis	Haematology RVH	Approved	1336
Haemachromatosis studies	Haematology BCH	Approved	1336
Hep.Induced T'cytopenia	Haematology BCH	Approved	1336
Immunophenotyping	Haematology BCH	Approved	1336
JAK2	Haematology BCH	Approved	1336
Lymph. Immunophenotyping	Haematology BCH	Approved	1336
Peripheral markers	Haematology BCH	Approved	1336
Peripheral PCR-CCRB	Haematology BCH	Approved	1336
PFA 100	Haematology BCH	Approved	1336
Platelet Aggregation	Haematology BCH	Approved	1336
Platelet antibodies	Reference Laboratory, NIBTS	Approved	8198
Platelet assoc. antigen	Haematology BCH	Approved	1336
PNH screen	Haematology BCH	Approved	1336
Prothrombin 20210	Haematology BCH	Approved	1336
T-cell studies	Haematology BCH	Approved	1336
Von Willebrand sc.	Haematology BCH	Approved	1336
Flow cytometry FMH	NIBTS	Approved	0193
Malaria Parasites	HPA Malaria Reference Laboratory London School of Hygiene & Tropical Medicine	Approved	7512

9. GUIDELINES ON ROUTINE COAGULATION SCREEN & D-DIMER TESTING

9.1 Coagulation Screen Requests

The coagulation screen is useful in the assessment of patients with suspected congenital or acquired bleeding diatheses. In the acute hospital setting the coagulation screen is most valuable in the assessment and monitoring of patients with haemorrhagic problems or with the potential to develop bleeding, such as those with liver disease needing a planned intervention.

Routine coagulation screening prior to invasive procedures/surgery has poor predictive value for post-procedure bleeding. Similarly, routine coagulation screening of acute medical admission patients has no useful predictive value for bleeding or thrombosis.

To assess bleeding risk it is most important to take a detailed history. Those patients with a personal or family history suggestive of a bleeding diathesis, patients with chronic liver and patients on anticoagulant therapy are candidates for further coagulation investigation. Obtain a quantitative description of symptoms. Patients with a strong personal or family history of bleeding and a normal routine coagulation screen result should be discussed with a Haematologist. A coagulation screen will not detect the haemostatic effect of antiplatelet drugs and renal disease and may not reveal Von Willebrand's Disease (VWD).

9.1.1 Coagulation Screen Test Parameters

- Prothrombin Time (PT).
- Activated Partial Thromboplastin Time (APTT).
- Fibrinogen Concentration.
- Thrombin Time (TT) is available on request.
  Always check the Full Blood Picture (FBC) to determine platelet count and blood film may be required to assess for red cell fragmentation.

9.1.2 Indications for Coagulation Test

- Personal history suggestive of a bleeding disorder:
  - Recurrent, spontaneous epistaxis lasting at least 30 minutes despite external compression.
  - Recurrent spontaneous bruising.
  - Unexplained menorrhagia.
  - Unexplained prolonged bleeding after dental extraction, invasive procedures, trauma, surgery or childbirth.
- Family history of a bleeding disorder.
- Acute bleeding with clinically suspected coagulopathy.

- Warfarin – coagulation screen before starting therapy and thereafter INR only.
- Rivaroxaban, Dabigatran, Fondaparinux: preparation of patient for surgery or management of bleeding. In case of dabigatran consider adding request for Thrombin Time. The coagulation screen is likely to be normal when the patient is fully anticoagulated with Apixaban.
- Liver disease
  - Acute/Chronic bleeding.
  - Requiring an invasive procedure/surgery.
  - Severe sepsis – at risk of DIC (Disseminated Intravascular Coagulation).
  - Paracetamol overdose; prognosis and monitoring.
  - Monitoring blood product therapy in liver disease, massive transfusion or DIC.

9.2 <u>Anticoagulants and the Coagulation Screen</u>

9.2.1 Coumarin (warfarin or acenocoumarol) or phenindione anticoagulant therapy - On admission of patient it is reasonable to request an INR, but there is no need to request a full coagulation screen unless the patient has acute bleeding.

9.2.2 Unfractionated heparin by intravenous infusion - After the pretreatment coagulation screen, request only the APTT to monitor the therapy. This will reduce the turnaround time for results.

9.2.3 Low Molecular Weight Heparins (LMWH) - LMWH's do not affect the coagulation screen results. Monitoring of therapeutic doses using the level of LMWH specific anti-Xa activity at 4 hours after a dose may be considered for patients with severe renal impairment, those at the extremes of weight and during pregnancy. With once daily dosing, peak anti-Xa level should be 0.6 to 1.0 units/ml. With twice daily dosing, peak anti-Xa level should be 1.0 to 2.0 units/ml.

9.2.4 Dabigatran - A direct thrombin inhibitor that has a predictable anticoagulant effect and routine monitoring to adjust dose is not needed. Testing for anticoagulant effect may be needed in the perioperative setting or in the event of bleeding and in patients with moderate or severe reduction of renal function. Always state the time of last dose and request thrombin time as well as coagulation screen and FBC.

The PT is relatively insensitive to dabigatran and can be normal with treatment doses.
Do not check INR.

The APTT is moderately sensitive and the Thrombin time (TT) is very sensitive. Occasionally fibrinogen levels can be reduced. A normal coagulation screen and TT means it is unlikely that there is any drug effect.
The time form last dose must be taken into account when interpreting results.

9.2.5 Rivaroxiban - A direct factor Xa inhibitor that has predictable anticoagulant effects and routine monitoring to adjust dose is not needed.

Rivaroxaban causes prolongation of both the PT and APTT; while these measures will indicate the presence of anticoagulant effect they cannot be used to monitor this effect.
Do not check the INR.

Testing for the presence of anticoagulant effect may be needed in the perioperative setting or in the event of bleeding. The time from last dose is must be taken into account when interpreting results.

9.2.6 Apixaban – A direct factor Xa inhibitor that has predictable haemostatic effects. Monitoring to adjust does is not required. Apixaban does not usually prolong the PT, APTT or Thrombin Time.

9.2.7 Fondaparinux – An indirect factor Xa inhibitor that has predictable anticoagulant effects and routine monitoring is not needed. The PT and APTT are prolonged.

Fondaparinux can be monitored by using the level of anti-Xa activity. The assay must be calibrated with Fondaparinux and is not routinely available; special arrangements must be made with the Haematology Lab to monitor the anti-Xa activity of Fondaparinux.

9.3 D-Dimer Requests

Thrombus formation is followed by an immediate fibrinolytic response. This generates fibrin degradation products, containing D-dimers. It follows that absence of a rise in D-dimers implies that thrombosis is not occurring. A low D-dimer value may help to exclude DVT/PE in outpatients when used with a clinical risk prediction model (Wells score). A high value is non-specific and cannot be used to make a diagnosis of DVT/PE - a specific radiological investigation is required.

Because D-dimer levels are high in a number of clinical circumstances the assay should not be used in DVT/PE assessment in the following circumstances:

- Within 4 weeks of surgery.
- In trauma cases.
- During active infection.
- Pregnancy.
- In hospitalized patients.

The use of D Dimer measurements to guide decisions regarding duration of anticoagulation in patients with unprovoked VTE is still under investigation. Only D-Dimer methods validated by clinical management studies should be used to strongly influence clinical decisions. Patients with a low D-Dimer 3 to 4 weeks after completing initial anticoagulant therapy have a lower annual risk of recurrent VTE compared to those patients with a higher D-Dimer measurement (4% vs 9%).

Disseminated Intravascular Coagulation (DIC) is associated with uncontrolled fibrin generation and secondary fibrinolysis. Usually there is prolongation of the PT and APTT with depletion of fibrinogen. In most clinical circumstances a coagulation screen alone is enough to identify DIC. However, D-dimers are generated at a rapid rate in DIC, and in the correct clinical context an elevated D-dimer result can contribute to confirmation of the presence of DIC.

9.3.1 Indications for D-Dimers

- Suspected DIC.
- Assessment of thrombolytic therapy.
- Suspected DVT or PE when used with a clinical risk prediction model.

10. THROMBOPHILIA SCREENING

Thrombophilia screens are often requested inappropriately. Standard indications for a thrombophilia screen are:

1) Recurrent venous thrombo-embolism (VTE) in individuals aged < 40 years.
2) Apparently spontaneous VTE in individuals < 40 years.
3) Recurrent VTE **and** strong family history of VTE.
4) Thrombosis at an unusual site.
5) A thrombophilia screen may occasionally be performed in other circumstances following discussion with a consultant haematologist.

A thrombophilia screen is not indicated in the following situations:

- DVT after known provoking factor such as trauma, surgery, immobility, cancer, pregnancy, oral contraceptive pill, HRT, etc.
- Routine testing in individuals > 40 years with VTE to “explain” a thrombosis.
- Arterial thrombosis (except lupus anticoagulant - may be useful in selected cases, discuss with consultant haematologist).

Timing of Investigation:

- Thrombophilia screen results are affected by acute thrombosis, pregnancy, OCP or HRT. Testing should be avoided in these circumstances, as the results are less informative.
- Thrombophilia screen should not be performed if the patient has been on warfarin in the previous 4 weeks.
- Early diagnosis of inherited thrombophilia does not influence acute management.

Samples required:

- 3x 4mls Citrate bottles (blue top).
- 1x 4mls EDTA bottle (purple top).
- 1x Clotted tube (red top).

SAMPLES WILL ONLY BE PROCESSED IF THE CLINICAL DETAILS ON THE REQUEST FORM INDICATES THAT THE PATIENT FULFILLS ONE OF THE FIVE INDICATIONS LISTED ABOVE.

11. HAEMATOLOGY REFERENCE RANGES

The Reference Ranges supplied are provided for guidance only, but should be used rather than those quoted in textbooks since methods, instrumentation, and units of measurement may vary from hospital to hospital. The reference ranges given are applicable to most healthy adults and children.

Ranges have been derived from both Practical Haematology; 11th edition Dacie & Lewis 2012 and various manufacturers. Detailed information and advice on interpretation is available by contacting the Haematology Laboratory.

11.1 Haematology reference ranges for adults

Full Blood Count

	MALES	FEMALES	ALL
Haemoglobin g/L **HB**	130-180	115-165	
White cell count $x10^9$/l **WCC**			4.0-11.0
Red cell count $x10^{12}$/l **RCC**	4.5—6.5	3.8-5.8	
Haematocrit **HCT**	0.400 - 0.540	.370- .470	
Mean Cell Volume fl **MCV**			76-100
Mean Cell Haemoglobin pg **MCH**			27-32
Mean Cell Haemoglobin conc. g/L **MCHC**			300-350
Red cell distribution widthband **RDW**			9.5-15.5
Platelets $x10^9$/l **PLAT**			150-450
Reticulocytes $x10^9$/l (0.2-2.25%) **RET**			50-100
Nucleated Red Blood Cells **NRBC**			0 NRBCs/100WBCs

Differential WCC x10^9/l

	MALES	FEMALES	ALL
Neutrophils			1.5-8.0
Lymphocytes			1.0-4.8
Monocytes			0-0.8
Eosinophils			0-0.7
Basophils			0-0.2
ESR mm/hr			
Up to 50 yrs	1-10		
Up to 70 yrs	1-20	1-20	
> 70 yrs	1-30	1-35	

Coagulation

	MALES	FEMALES	ALL
Prothrombin time secs **(PT)**			9.5-12.5
Activated partial thromboplastin time (**APTT)**			22-32
Fibrinogen g/l (**FIB)**			1.5-4.5
D-Dimer mg/L (**XDP)**			<0.5
Thrombin time secs			15 - 22
Anti-thrombin III %			75-125
Protein C %			70-140
Protein S Free Antigen	67.5 – 139%	60.1 – 113.6%	
Activated protein C resistance Ratio **(APC-R)**			0.69-1.56
Factor II %			70 – 120
Factor V %			60 – 150
Factor VII %			70 – 120
Factor VIII %			70 – 150
Factor IX %			70 – 150
Factor X %			70 – 120
Factor XI %			70 – 120
Factor XII %			70 - 150
Anti-Xa (LMWH) (units of Heparin/mL)	Therapeutic Range		0.6 – 1.0

11.2 Haematology reference ranges for infants and children

Haemoglobin g/L (HB)

1day	149-237
7 days	149-196
1 month	135-195
2 months	94-130
1 year	113-143
6 years	115-135
7-12 years	115-155

White Cell Count x 10^9/l (WCC)

1 day	10.0-26.0
2 months	6.0-18.0
12 years	4.5-14.5

Red Cell Count x 10^{12}/l (RCC)

1 day	3.7-6.5
2 months	3.1-4.3
12 years	3.8-5.2

Haematocrit (HCT)

1 month	.440- .640
12 years	.320-.440

Mean Cell Volume fl (MCV)

1 day	100-135
2 months	84-105
6 years	75-87

Mean Cell Haemoglobin pg (MCH)

1 month	27-33.6

Mean cell haemoglobin conc.g/L (MCHC)

	300-350

Platelets x10^9/l (PLT)

	150- 450

12. TURNAROUND TIMES (TAT)

Turnaround Time (TAT) = Time of receipt in laboratory until the maximum time the results may be available on laboratory host computer.

HAEMATOLOGY

Test/Profile	TAT (Routine)	TAT (In-Patient)	TAT (CLINICALLY URGENT)
FBC	< 24 Hrs	< 4 Hrs	< 1 Hr
Paul-Bunnell(Infectious Mononucleosis)			
Reticulocytes			
Nucleated Red Blood Cells (NRBC)			
Coagulation Screen *			
INR *			
APTT *			
Thrombin Time			
D-Dimer/XDP *			
Sickle Cell Test			
Pregnancy Test			
Lupus Anticoagulant	< 4 weeks		
Coagulation Factor Assays			
Thrombophilia Screen	6-8 weeks		
Bone Marrow Aspirate	14 Days Routine Working Days		
Bone Marrow Trephine			
Bone Marrow Iron Stain			
Iron Stain / Haemosiderin			
Anti-Xa Assay	< 24 Hrs	< 6 Hrs	< 3 Hr
Erythrocyte Sedimentation Rate (ESR)	< 24 Hrs	< 4 Hrs	< 90 minutes
Malaria Screen	< 24 Hrs	< 24 Hrs	< 4 Hrs
Blood Film	< 24 Hrs	< 15Hrs	< 2 Hr
Blood Films Referred To Haematology Consultants	< 5 days	< 5 days	< 24 Hrs

***Additional Coagulation Tests**

For any additional Coagulation test deemed necessary by the Haematology Laboratory, the turnaround time will increase by a further 1 hour.
Laboratory staff will contact the clinical area to discuss additional testing requirements and additional one hour to turnaround time.

Please note:
Laboratory staff must be notified in advance for all clinically urgent samples that are to be processed within the laboratory under 'Under Status'.

BLOOD TRANSFUSION

Test/Profile	TAT (Routine)	TAT (In-Patient)	TAT (CLINICALLY URGENT)
Group & Screen *	< 24 Hrs	< 24 Hrs	< 1 Hr
Antibody Identification	<24Hrs	<24 Hrs	<24 Hrs
Group & Coombs *	< 24 Hrs	< 24 Hrs	< 1 Hr
Direct Coombs (DAT) *	< 24 Hrs	< 24 Hrs	< 1 Hr
Crossmatch *	< 24 Hrs	< 4 Hrs ***	< 1 Hr ***
Fresh Frozen Plasma and Cryo		30 mins.	30 mins.
Platelets **		< 4 Hr	< 4 Hr
FMH Flow Cytometry	17 days		
Anti-D Immunoglobulin	< 72 Hrs	< 72 Hrs	< 1Hr
Kleihauer	<24Hrs	<24 Hrs	<24 Hrs
Cold Agglutinin Titres	<24Hrs	<24 Hrs	<24 Hrs
Blood Products	Depending on product availability and whether or not it has to be ordered from NIBTS Belfast		

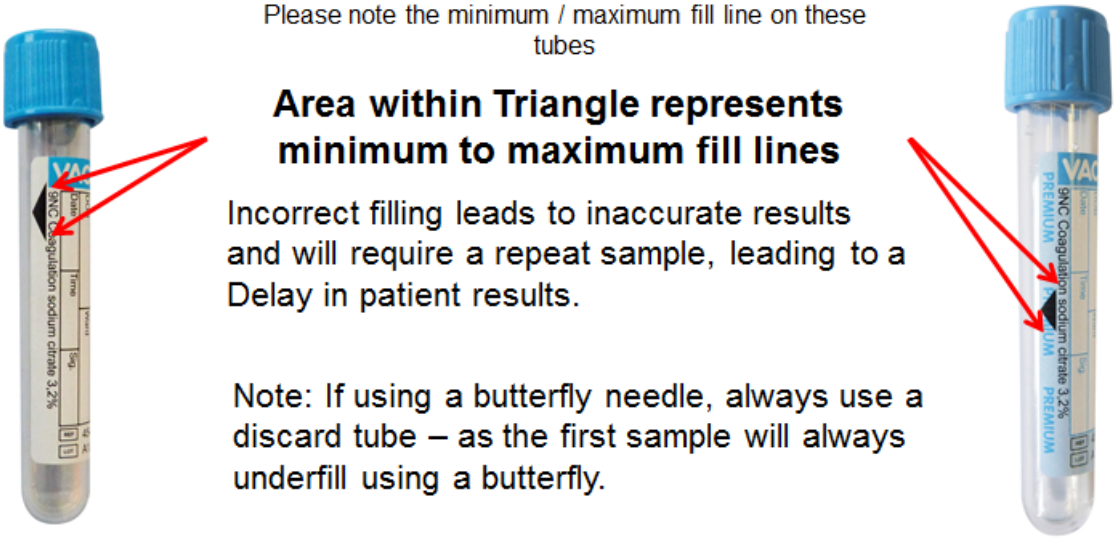
* Only Emergency Crossmatches will be performed 'Out-of-Hours'. Non-Urgent and pre-operative blood group and screens and crossmatches will be performed during routine working hours only.
Pretransfusion samples received outside routine hours will **not be processed** until the next routine working day.

** Depends on availability from Northern Ireland Blood Transfusion Service.
Factors effecting performance and TAT include but not limited to:

- Labelling errors (request form or sample);
  - Illegibility.
  - Incorrect or insufficient demographic information.
- Poor sample quality;
  - Clotted sample.
  - Under filled/Overfilled coagulation and ESR samples.
  - Insufficient sample.
  - Haemolysis.
  - Lipaemia.
  - Incorrect sample bottle.

*** Crossmatch Turnaround time for In-Patient samples with clinically significant antibodies may increase as blood component availability is dependent on supply from the Northern Ireland Blood Transfusion Service.

13. COAGULATION TUBE



14. TUBE GUIDE & RECOMMENDED ORDER OF DRAW

VACUETTE® SELECTION CHART

Western Health and Social Care Trust Version 1.0. Last updated 16.02.2018

Samples to be collected in the following order unless specified below:

	PPC code	GBO code	Draw Vol.	Cap Colour	Tube Type	Haematology Tests	Biochemistry Tests	Microbiology Tests	
1	KBC000161 +A2:A10 C000161 +A2:A10	454334	3ml	Blue	Sodium Citrate	Coagulation Screen, INR, D-Dimer/ XDP, Thrombophilia Screen, Lupus Anticoagulant, Factor assays.			Invert 3 - 4 times
2	KBC000139	454204		Red	Serum	Cold Agglutinin.	Androgen Profile, Androstenedione, 17-Hydroxyprogesterone.		Invert 5 - 10 times
3	KBC000141	454228	3.5ml	Gold	Serum Gel	Paul-Bunnell.	Routine Biochemistry Profiles: Electrolyte, Liver, Bone, Lipid, Thyroid, Iron. Miscellaneous biochemistry tests: Amylase, CRP, CK, Magnesium, Urate, LDH, Troponin, NT-proBNP, PSA, hCG, Ferritin, Hydroxybutyrate, Therapeutic Drugs, Gentamicin, Ethanol, B12, Folate, Paracetamol, Salicylate, Osmolality, Conjugated Bilirubin.	Syphilis Screen, Rheumatoid Factor, ASOT, Bloods for Virus Reference Lab, Antibody Screen for Reference Lab.	Invert 5 - 10 times
4	KBC000141	454228	3.5ml	Gold	Serum Gel		**NON ROUTINE / REFERRALS [Separate Request form and tubes needed – do not include with ROUTINE BIOCHEMISTRY]** Hormone Profile, Cortisol, Total Bile Acids, Vancomycin, Serum Protein Electrophoresis, Complement, Immunoglobulins, Vit D, Immunology Testing, Tumour Markers, C-Peptide, DHEAS (DHAS), Growth Hormone, Insulin.		Invert 5 - 10 times
5	KBC000144	454029	4ml	Green	Lithium Heparin		Chromosome Analysis.		Invert 8 - 10 times
6	KBC000149	454021	4ml	Lavender	K3 EDTA	Full Blood Count, Retics, ESR, Maternal sample for Kleihauers.	HbA1c, PTH, TPMT, TPMT Metabolites, Ammonia (on Ice), Tacrolimus, Sirolimus, Genetic DNA Testing, Aldosterone/Renin, Lead.	Meningococcal PCR Bloods and PCR bloods for reference labs. [For Paediatric PCR bloods smaller volume pink top EDTA tubes are acceptable]	Invert 8 - 10 times
7	KBC000152		6ml	Pink	Cross-match	Group and Screen, Crossmatch, Direct Coombs, Cord sample for Kleihauers.			Invert 8 - 10 times
8	KBC000147	454221	2ml	Grey	Fluoride Oxalate		Glucose, Lactate.		Invert 8 - 10 times
9	KBC000154	456080	6ml	Dark Blue	Trace Elements		Trace Metals (tube available via Clinical Biochemistry Lab) Aluminium, Chromium, Cobalt, Copper, Selenium, Zinc.		Invert 8 - 10 times

VAWH01

Greiner Bio-One Ltd.
Tel: 01453 825255.
sales@uk.gbo.com

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- Disposal of all clinical material used in the procedure of sample collection must be disposed in accordance with local departmental Health & Safety Policy.
- In the event of spillages or breakages during sample collection procedure, please ensure spillages and breakages are dealt with in accordance with local departmental Health & Safety Policy.
- Staff responsible for obtaining a venous sample for testing must be trained in the correct venepuncture technique.

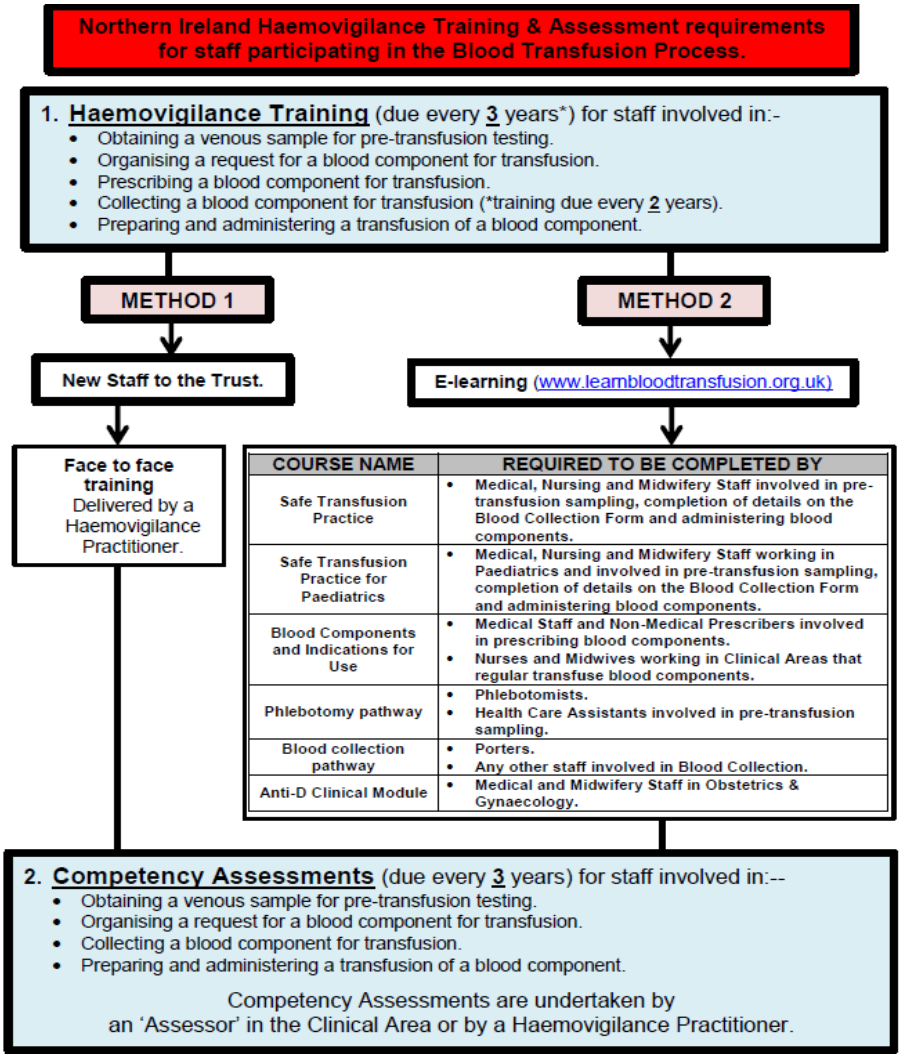
15. BLOOD TRANSFUSION

The Western Trust Policy for Blood Component Transfusion can be found on the Trust Intranet.

All patients being transfused must be positively and correctly identified and must be wearing a patient identification band.

All staff involved in the Blood Transfusion process must be trained and competency assessed (DHSSPS 2009).

15.1 Right Patient / Right Blood – Training and Assessment requirements for staff participating in the Blood Transfusion process



15.2 Serious Adverse Reactions and Events

Clinical incidents associated with Blood Transfusion **must** be reported via the Trust incident Reporting system (DATIX).

15.2.1 Serious Adverse Reaction (SAR):

'an unintended response in a donor or in a patient that is associated with the collection, or transfusion of blood or blood components that is fatal, life-threatening, disabling or incapacitating, or which results in or prolongs hospitalisation or morbidity' (Blood Safety and Quality Regulations).

It is a legal requirement for the Blood Transfusion Service to fully investigate all adverse reactions associated with the transfusion of blood components and blood products and to report them to the Medicines and Healthcare products Regulatory Agency (MHRA).

15.2.2 Serious Adverse Event (SAE):

'Any untoward occurrence associated with the collection, testing, processing, storage and distribution, of blood or blood components that might lead to death or life-threatening, disabling or incapacitating conditions for patients or which results in, or prolongs, hospitalisation or morbidity.' (Blood Safety and Quality Regulations).

It is a legal requirement for the Blood Transfusion Service to fully investigate all adverse events associated with the transfusion of blood components and blood products to report them to the Medicines and Healthcare Regulatory Agency (MHRA).

ALL NON COMPLIANCES ARE INVESTIGATED AND REPORTED VIA THE TRUST RISK MANAGEMENT REPORTING SYSTEM

NON-COMPLIANCES RESULTING IN SERIOUS ADVERSE EVENTS WILL BE REPORTED TO THE HOSPITAL TRANSFUSION TEAM AND TO THE MHRA

15.3 Written authorisation / instruction for a blood component

Written authorisation / instruction for blood components is the responsibility of a medical officer or non-medical prescriber (who is an appropriately trained, competent locally authorised registered practitioner).

All Blood Components must be written on the WHSCT Blood Component Transfusion Record.

- **Consent:**
  Although gaining written consent for transfusion of blood components is not a legal requirement in the United Kingdom, there is a responsibility to ensure that the patient or parent/guardian receives adequate information regarding the transfusion. In planned circumstances patients or parent/guardian should be provided with advance information and opportunity to ask questions about the risks and benefits of transfusion and be informed about any suitable alternatives.

15.4 Blood Transfusion Sample Acceptance

	Mandatory	Desirable
Request form	• Unique identifier (H&C* number) • Patient's first name • Surname • Date of Birth (dd/mm/yyyy) • Gender • Destination / Ward • Sample date & time- *this **MUST** be the date & time of sample taken*. • For female patients previous obstetric history • MUST be signed by the person taking the sample, as evidence that they have clearly and unequivocally identified the patient.	• Consultant • Previous transfusion history (including presence of antibodies) • Reason for Test request
Sample	• Unique identifier (H&C* number) • Patient's First name. • Surname • Date of Birth (dd/mm/yyyy) • Gender • Sample date & time- *this **MUST** be the date & time of sample taken*. • Destination/Ward • Signature of staff member taking sample.	

*Exceptions to use of the Health & Care number (please communicate directly with Blood Bank when there is an exception):

- Non residents in Northern Ireland will not have a H&C number, the hospital number is permitted.
- Emergency situation in A&E where patient requires emergency transfusion and no H&C/Hospital number available or patient details are unknown the hospital number or AE number of the current admission is permitted.

Care must be taken when labelling infant samples.

- If the newborn is not named the official first name must be '**Infant**'
- If the newborn is not named and from multiple births the first name must be, in order of birth, '**InfantA**' '**InfantB**' etc.

Samples & request forms which are not labelled correctly, have labelling discrepancies, illegible, Haemolysed or insufficient will be rejected.

A REPEAT REQUEST OF BOTH REQUEST FORM AND SAMPLE WILL BE REQUIRED, which may CAUSE DELAY in provision of compatible Blood Components.

15.5 Sample Requirements

All details on the sample bottle must be handwritten.

ADULT AND CHILD > 4 MTHS	EDTA - Pink bottle with black circle 6 mls
Children <4 months	Paediatric EDTA sample.

If a patient has been previously transfused, a new blood sample is required as indicated in the following table:

Patient Transfused	Timing of Blood Sample
Within last three months	Within 72hrs of anticipated transfusion
More than three months ago	Within 7 days of anticipated transfusion
Never had a transfusion	Within 7 days of anticipated transfusion *(a confirmation sample may be requested if there is no previous transfusion history on the patient)*

15.6 Confirmation Group

For any patient that requires a crossmatch who has no previous transfusion history on the WHSCT Laboratory System, the clinical area will be contacted by Blood Bank and asked to send a confirmation group sample.

The confirmation sample is completely independent from the original sample taken
i.e. two separate venepunctures, two separate positive identification of the patient.

It is only required if the clinical area are contacted by the Blood Bank.

15.7 Maximum Surgical Blood Ordering Schedule (MSBOS)

Use of a MSBOS has the potential to contribute to a more efficient use of available blood, reduction of overstocking, reduction of variability and inconsistency in ordering and the minimising of wastage.

The intention of a blood ordering schedule is to relate the ordering of the blood to the likelihood that a transfusion will be required. It aims to correlate as closely as possible the amount of blood cross-matched to the amount of blood transfused.

Each procedure has been agreed locally by clinicians based on retrospective analysis of the blood loss associated with the procedure.

Please refer to Trust Intranet for further information: MSBOS

15.8 Emergency Stock O Negative

ALTNAGELVIN	Six units of Emergency 'O' Rh negative red cells are available from the Satellite Blood Fridge in Theatre Recovery area
SWAH	Four units of Emergency 'O' Rh negative red cells are available in the Blood Issue Fridge in the Blood Collection Room.
OH&PCC	Six units of Emergency 'O' Rh negative red cells are available in the Blood Issue Fridge in Cardiac Assessment Unit.

Removal of any Emergency 'O' Rh Negative Red Cells should be reported to the relevant Blood Bank immediately.

15.9 Blood Components Supplied by the Blood Bank

15.9.1 Red Cells – Refer to the Trust Blood Transfusion Policy for information on use. 4ml/kg (equivalent to 1 unit per 70kg adult) typically raises the Hb concentration by about 10g/L.

15.9.2 Fresh Frozen Plasma – Refer to the Trust Blood Transfusion Policy for information on use. Issued to patients who are bleeding and who have abnormal coagulation screen. Any other reason for ordering must be authorised by the Consultant Haematologist. FFP should **NOT** be used for the reversal of warfarin overdose. FFP dose: 12-15 ml/kg body weight.

15.9.3 Cryoprecipitate (Cryo) – Refer to the Trust Blood Transfusion Policy for information on use. Used to replace Fibrinogen if FFP is not sufficient and the Fibrinogen level is <1 g/L. **Contact Consultant Haematologist for advice on use and dosage.**

15.9.4 Platelets – Refer to the Trust Blood Transfusion Policy for information on use. Platelets are required if patient is bleeding and the platelet count is $<50 \times 10^9$/l or in case of head injury or multiple trauma the platelet count is $<100 \times 10^9$/l. **Contact Consultant Haematologist for advice on use and dosage.**

15.10 Blood Products Supplied by the Blood Bank

15.10.1 Octaplex – Prothrombin Complex Concentrate used for the reversal of warfarin overdose.

15.10.2 Anti-D Immunoglobulin – Anti-D Immunoglobulin for prophylactic use in the prevention of Anti-D formation in Rh(D) Negative mothers during the antenatal and Post-natal periods.

15.10.3 Human Albumin Solution – 4.5% and 20 % Human Albumin Solution.

15.11 Investigation of a suspected transfusion reaction

Blood Component Transfusion Reactions can be:

- Acute (occur within 24 hours of the transfusion).
- Delayed (occur up to 14 days post transfusion).

Where a transfusion reaction is suspected the blood component transfusion, where applicable, should be stopped immediately and Medical staff informed.

If your patient becomes unwell during the transfusion refer to the flow chart on the back of the WHSCT Blood Component Transfusion Record.

If you think that your patient may have signs and symptoms in keeping with a transfusion reaction, you MUST:-

- Inform Blood Bank

Complete 'Investigation of a Suspected Transfusion Reaction Form' (available via the Trust Intranet) and undertake standard tests and investigations as indicated on the Form.

PLEASE ENSURE THAT BLOOD BANK IS NOTIFIED OF ANY SUSPECTED TRANSFUSION REACTION

CONSIDER a blood transfusion reaction if your patient has received a blood component transfusion within the previous 14 days and presents with any of the following signs or symptoms:

- A high temperature – feeling feverish, hot and clammy
- Shivering or 'cold chills'
- Breathing problems
- Extreme tiredness
- Passing blood in urine
- Passing much less, or very dark, urine
- Itchy skin rash
- Pain in the lower back (loin pain)
- Unexpected or unexplained bruising
- Jaundice (yellow colour in whites of eyes or skin)

16. SAMPLE DELIVERY

The Pathology Department provides a comprehensive Laboratory service to hospital and community users within the entire Western Health and Social Care Trust Area.
Samples are regularly transported by the Transport department within the Western Trust area and to Laboratories within South West Acute Hospital and Altnagelvin Hospital.

Proper handling and timely transport of samples to the laboratory are important for maintaining sample integrity and the quality of test results.

16.1. Altnagelvin & South West Acute Hospital Transport of Samples via Vacuum Transfer System (VTS)

Note: Emergency Group and Crossmatch samples (e.g. activation of the Major Haemorrhage Protocol) must be hand delivered to the relevant Blood Bank.

16.1.1. Samples suitable for transport include urines, whole blood serum and plasma.

- **DO NOT SEND Hazard Group 3** samples to any laboratory departments via Vacuum Transfer System (VTS).

16.1.2. Samples must be placed in the plastic transport bag attached to the request form and the bag sealed.

16.1.3. Place the sample into the canister, then into the transfer system and select the destination code (Table below). The canister will automatically be transferred to its destination in the next available slot.

Location	Vacuum Transfer System Station No.
Altnagelvin Hospital	
Blood Bank	870
Haematology	880
Sample Reception	860 & 880
South West Acute Hospital	
Blood Bank	18
Haematology	16
Sample Reception	15

16.1.4. Upon receipt of a canister, the sample will be removed and the canister will be returned to the sender and wrapping material will be recycled.

16.1.5. If a spillage leaks outside the canister, the portering service should be contacted immediately. They will arrange for shutdown of the system, and contact the Infection Control Nurse and Estate Service Department.

16.1.6. In the event of any spillages a Datix form must be completed. A copy should be made for laboratory records and stored in Pathology Manager's office. A copy must also be completed signed and forwarded to Site Management.

It is the responsibility of the sender to ensure samples are forwarded to the correct address. Using a different address number will result in delay in the sample going to the Haematology / Blood Transfusion Laboratory.

16.2. Transport of Laboratory Samples to Laboratory by Van

16.2.1. Samples must always be carried in the sample transport box provided. Samples should always be placed in these boxes by the Health Centre or GP Surgery staff. Drivers should not handle samples which are not in these boxes or in other boxes provided by the laboratory.

16.2.2. These boxes are checked regularly by the MLA supervisor and will be cleaned and disinfected when necessary by the laboratory staff.

16.2.3. A disinfection kit/spillage kit must be carried in the van. This kit must contain gloves and materials for absorbing and disinfecting.

16.2.4. Drivers must be trained in the use of these kits. This should be carried out by the Transport Manager or a senior member of the laboratory staff.

16.2.5. If a sample leaks or spills out in the van the driver must put on the gloves provided and pour the disinfectant granules over the spill. It should not be mopped up. The driver should contact the laboratory and ask for help or advice from a senior member of the laboratory staff.

16.2.6. Drivers must report all accidents and incidents to a senior member of the laboratory staff on returning to the laboratory. All incidents must be recorded and reported to General Manager Pathology.

16.2.7. If the van breaks down or there is a road traffic accident the driver must not let anyone touch the samples unless they are authorised hospital personnel. The driver must get in touch with his base or the laboratory as soon as possible.

16.2.8. Pickup and delivery times are detailed in (Specrec/47 'Transport Collection Times). This policy is available on request. Please contact the department to request a copy of this policy.

16.3 Omagh Hospital & Primary Care Complex

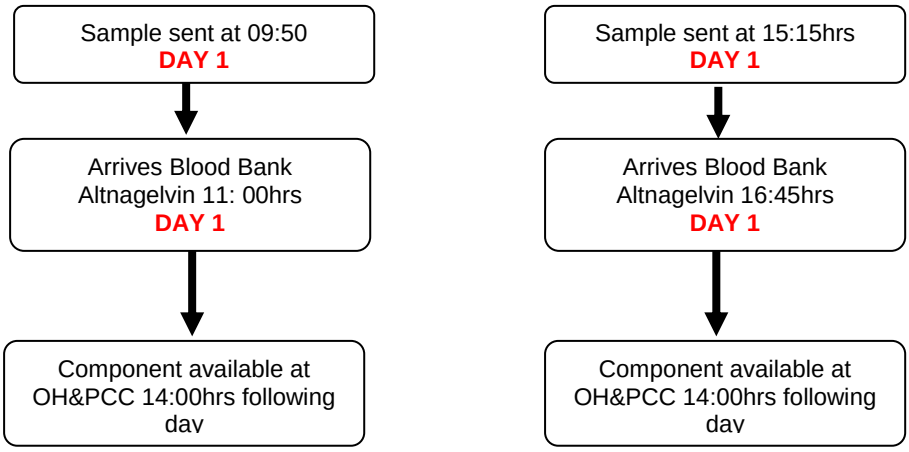
Transport for pre-transfusion samples to other sites from OH&PCC is as follows:

- South West Acute: Monday – Friday 13:50 & 15:30
- Altnagelvin: Monday – Friday 09:50 & 15:15

If blood is required within 24 hours contact must be made with the relevant Blood Bank to ensure that they are aware of the sample.

Any patients that have a known antibody, or patients who may have developed an antibody from their last transfusion, will require additional testing which may delay the time that compatible blood is available.

Blood component requests from OH&PCC for Altnagelvin

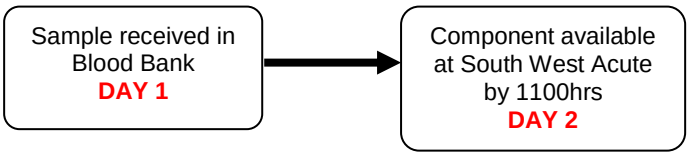


For Transfusion episodes outside these times please contact the Blood Bank at Altnagelvin

Blood component requests from OHPCC for South West Acute Hospital

All Blood Transfusion samples and Requests for Components/Products must be delivered to the Laboratory at South West Acute Monday-Friday 0900-1700hrs.

Any patients that have a known antibody, or patients who may have developed an antibody from their last transfusion, will require additional testing which may delay the time that compatible blood is available.



If there are any queries regarding sample requirements please contact the Blood Bank.

17. REPORTING OF RESULTS

Authorised laboratory reports are released in two formats:

- Electronic Report.
- Hardcopy Report.

Electronic reports are immediately available on the BSO Laboratory Information System (LABS) and Web Recall System to all WHSCT users who use the Pathology system and have user logins and passwords to access the system. Enquiries on laboratory results should be made through the 'Patient Results Recall' function of these systems and by entering in the required patient details when prompted.

Authorised laboratory reports (excluding Blood Transfusion) are also uploaded to the Northern Ireland Electronic Care Record (NIECR) and can be accessed from any trust PC within Northern Ireland that has access to NIECR. User login and password is required to gain access to this system.

Authorised reports for GP samples are electronically released on a regular basis onto the GP Link system allowing GP practices to access their patient reports.

Hard copy reports are printed to relevant areas at regular intervals within the laboratory and are distributed on a daily basis.

Note:
The Haematology / Blood Transfusion laboratories can be contacted for any patient report that does not appear on any of the systems listed above.

17.1. Electronic and Telephoned Report

Haematology / Blood Transfusion endeavours to report results electronically as soon as the completed results are available. In order to facilitate the department in producing prompt reports, it is requested that phone calls made to the department are for urgent results only. Please check for the result on the labs system prior to any phone call.

Please note:
If you require a result urgently, it is important to contact the laboratory prior to sending the sample. Contact the lab if you require a result to be phoned back on a sample.

17.2. Critical Values

A critical Value is defined as one which is such at variance with normal (expected values) as to be life threatening unless something is done promptly and for which some corrective action could be taken.

Abnormal results are not considered critical values. Most laboratory tests have established reference ranges (section 11 & 12) which are the results that are typically seen in a group of healthy individuals. While results outside these ranges may be considered abnormal, they may not be critical.

For any result that exceeds the critical values, the Haematology laboratory staff will telephone the result to the requestor as soon as possible.

Critical values include but are not limited to:

	Less than	Greater than
Hb	80 g/L	
WBC		25 $x10^9$/L
Neutrophils	0.7 $x10^9$/L (Exceptions: Known Haematology / Cancer Patients)	25 $x10^9$/L
PLT	50 $x10^9$/L (Exceptions: Known Haematology / Cancer Patients)	800 $x10^9$/L
INR		5.0
XDP		0.5
FIB	1.0	
APTT		45

18. PROTECTION OF PERSONAL INFORMATION

Haematology / Blood Transfusion follows the Western Health & Social Care Trust Data Protection and Confidentiality Policy (Reference Number Corp 11/003), which is available on the Trust Intranet.

19. LABORATORY COMPLAINT PROCEDURE

Haematology / Blood Transfusion follows the Western Health & Social Care Trust Policy for Management of Complaints (Reference Number Med 11/009), which is available on the Trust Intranet.

Service users are encouraged to provide feedback to the laboratory. If you have a compliment or complaint, please contact a member of the laboratory team who will attempt to rectify the issue

20. MEASUREMENT OF UNCERTAINTY

Haematology / Blood Transfusion employ the use of Measurement of Uncertainty as a statistical tool to ensure accuracy of results are within defined acceptable limits.

All pathology assays carry an inevitable degree of uncertainty; the level of uncertainty is a combination of three factors; pre-analytical influences, analytical variation and biological variation. The uncertainty is associated with the fact that when a measurement is repeated for any particular laboratory test, it will generally provide a result that will not be exactly the same.

Although some of the uncertainty can be controlled by the laboratory it is important to recognise the effect of pre-analytical and biological variation when interpreting laboratory test results and to understand the changes in values that must occur before they can be regarded as significant.

Haematology / Blood Transfusion has calculated the Measurement of Uncertainty for some results and procedures and are available to users on request. A formal request must be made to the Lead Biomedical Scientist who will supply a copy of the current Measurement of Uncertainty calculations if available.