Blood Transfusion Policy

This procedural document supersedes: PAT/T 2 v.4 – Blood Transfusion Policy

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<thead>
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<tbody>
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<td>Target Audience:</td>
<td>Trust wide; all personnel involved in the transfusion process</td>
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**Summary of changes to the Blood Transfusion Policy:**

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Brief Summary of Changes</th>
<th>Author</th>
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| Version 5 | May 2014 | Major changes throughout policy, including:  
- Reference updates  
- Hyperlinked contents  
- Change to wording of golden rules including **new rule 8** concerning **Massive Haemorrhage recognition**.  
- Addition of a point on Massive Haemorrhage recognition to the summary.  
- Policy 3 addition of a small section on requesting HLA matched products for renal transplant patients.  
- Policy 4 please read this section due to the extent of the changes, which include the addition of a section on the **2 sample rule and changes to sample expiry**.  
- Policy 7 now refers to use of Teletrack system.  
- Policy 10 Clarified Methylene Blue treated (MBT) FF and Cryoprecipitate should be given to neonates, children and **young adults born after 1 January 1996**. Previous guidance was under 16 years only.  
- Policy 10 change to disposal of blood product bags  
- **Policy 12 please read this section due to the extent of the changes**  
- Policy 15 title change from Kleihauer to FMH testing much more detail to this entire policy. Added a section on **intra-operative cell salvage at delivery**. Addition of a section on management of **transfusion of D positive blood components to D negative girls or women of childbearing potential**.  
- Replacement of **appendices 2 & 3** with new updated versions related to **acute transfusion reactions**.  
- Change to **appendix 5 MHP regarding recognition and activation** | Gill Bell & Youssef Sorour                     |
| Version 4 | January 2012 | Major changes throughout policy, including:  
- Reference updates  
- Addition of “Golden Rules” section  
- Addition of section on consent (policy 1)  
- Addition of section on good blood management (policy 2)  
- Collection of samples now renamed venepuncture (policy 6)  
- Addition of section on requesting blood products (policy 4)  
- Policy 7 (Collection of blood products) amended to include collection from a BARS controlled fridge.  
- Massive haemorrhage (was policy 15) now appendix 5 major changes; rewritten.  
- Addition of 3 new appendices, appendix 2 Administration of blood components – key action points, appendix 3 Transfusion Reaction flow chart, appendix 4 FFP dosage poster. | Gill Bell & Youssef Sorour                     |
<table>
<thead>
<tr>
<th>Version 3</th>
<th>August 2009</th>
<th>• Review date extended to March 2010 to accommodate the implementation of the BARS project.</th>
<th>Gill Bell</th>
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</table>
| Version 3 | January 2008 | • Reiterated in the **Introduction** the Trusts commitment to the competency assessment of all staff involved in the transfusion process.  
• Reiterated in **Policy 6 - The administration of blood products** that only the blood product pack and the patient's identity band are to be used as part of the final bedside check, not the compatibility form. | Gill Bell |
| Version 3 | Oct 2007 | • Reviewed and formatted in line with the policy "Development and Management of Approved Procedural Documents (APDs) within the Trust"  
• Minor changes/amendments made throughout for better clarity.  
• Addition of an introduction.  
• Addition of a paragraph on how we will monitor compliance and effectiveness.  
• Expansion of the section "The Kleihauer and use of anti-D immunoglobulin" for greater clarity – no procedural changes.  
• Reference now made to Prothrombin Complex Concentrate (PCC) and recombinant activated factor VII in the section technical aspects of blood transfusion – products already authorised for use within the Trust.  
• Section on abdominal aortic aneurysms and the section on massive obstetric haemorrhage now combined to produce the section on massive bleeds – as agreed by the Hospital Transfusion Committee (September 2007).  
• Addition of a section on patient transfers with blood products to try and ensure greater compliance in this problematic area and provide a point of reference for the policy PAT PA 24 Transfer of Patients and their Records. | Gill Bell |
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REFERENCES

This policy is written in accordance with the following guidelines and policies:

**BCSH Guidelines**

- BCSH guideline for the use of anti-D immunoglobulin for the prevention of haemolytic disease of the fetus and newborn 2014
- Red cells in critical care 2012
- Guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories 2012
- Guideline on the investigation and management of Acute Transfusion Reactions 2012
- Guidelines on the use of irradiated blood components 2010
- The administration of blood components 2009
- Guidelines for the estimation of fetomaternal haemorrhage 2009
- Transfusion guidelines for neonates and older children 2004 (amended 2007)
- Guidelines for the use of fresh frozen plasma, cryoprecipitate and cryosupernatant 2004 (amended 2007)
- Guidelines for the use of platelet transfusions 2003

**Trust Policies**

- **PAT/T 8** Policy for Specimen and Request Form Labelling
- **PAT/PS 7** Patient Identification Policy
- **PAT/PA 2** Policy for Consent to Examination or Treatment
- **PAT/PA 19** Mental Capacity Act 2005 Policy and Guidance
- **PAT/PA 24** Policy for the Transfer of Patients and their Records

**NPSA Safer Practice Notice**

Right Patient, Right Blood SPN14 (9 November 2006)
INTRODUCTION

Errors in the requesting, supply and administration of blood lead to significant risks to patients. Errors either in the collection or labelling of the sample for blood grouping and compatibility testing, or in the laboratory, or to failure of the final pretransfusion checks account for a number of patient deaths in the UK each year. The incidence of `wrong blood in tube' episodes has changed little over several decades. This contrasts with the dramatic reductions in other hazards of transfusion such as viral transmission. The introduction nationally of the requirement for 2 separate samples prior to transfusion should help to address this.

Variation in the practice of the administration of blood is remains increasingly evident from audit, both local and national and from the annual Serious Hazards of Transfusion (SHOT) reports. Consequently the Trust is committed to the use of competency assessment of all staff involved in the transfusion process and is committed to the targets set by the NPSA Safety notice 14 (Right patient, right blood).

This policy is based on recognised guidelines and provides the Trust with local procedures for the ordering and administration of blood products and the management of transfused patients.

MONITORING COMPLIANCE AND EFFECTIVENESS

- The Hospital Transfusion Team will ensure that systematic audit and review of the transfusion process is undertaken and will report outcomes to the Hospital Transfusion Committee.

- This will include participation in the programme for national comparative audit of blood transfusion as well as local and regional audits.

- The Hospital Transfusion Committee will review all serious adverse transfusion events / reactions which must be notified direct to blood bank staff in addition to the Trust’s incident reporting system; DatixWeb.

CONTACTS

- Blood Bank
  - DRI Ext 3779
  - BDGH Ext 2452

The Hospital Transfusion Team:

- Blood Bank Manager
  - DRI Ext 6187

- Transfusion Practitioner
  - DRI Ext 6115

- Consultant Haematologist
  - Contact via Switchboard
GOLDEN RULES OF THIS POLICY

1. All staff involved in the transfusion process must be aware of this policy.

2. All staff involved in the transfusion process should understand their role and responsibilities.

3. Role specific training requirements must be met; the competencies are mandatory.

4. Ensure transfusion is appropriate and alternatives have been explored.

5. All transfusion documentation must be completed.

6. Recognise and manage transfusion reactions.

7. Always report untoward transfusion events / reactions to the Blood Bank and Datix Web.

8. Recognition of Massive Haemorrhage; if you need emergency uncrossmatched (historically O RhD Negatives) you need to activate the Massive Haemorrhage protocol.
SUMMARY

1. All samples must be handwritten and labelled to include surname, forenames, date of birth, district number / NHS number, (identification numbers from other hospitals are not acceptable), date and ward. 6 ml of blood is required for grouping and crossmatching (pink top EDTA). Addressographs may be used on request forms, do not use Addressograph Labels on Samples. Both the sample and request form must be signed by the person taking the sample.

2. Urgent requests must also be telephoned to the Blood Bank. Do not write "ASAP" for time required. The sample and request form must be brought directly to Blood Bank and presented to a member of blood bank staff.

3. Blood products must be prescribed on blood prescription sheet WPR26561.

4. When a unit of blood is transfused to a patient the sticker from the blood tag must be signed by two nursing or medical staff one with responsibility for the actual administration of the blood. The start and finish time must be recorded and the sticker attached to the prescription sheet. The tear off tag must have the “patient identity confirmed by:” box filled in and then this tag must be returned to Blood Bank immediately.

5. It is extremely important that the units of blood are transfused in expiry date order. Some units of blood will have a shorter expiry time and must be used before other units; some of the requested units may indeed not be needed and can then be returned and used for other patients. Blood products must not be removed from the Blood Bank until you are ready to start the transfusion, the pre-transfusion checks must have been performed and ensure that the patient has adequate venous access.

6. If after the blood is collected a problem arises which prevents immediate transfusion, the unit must be returned to the Blood Bank within 30 minutes of collection and Blood Bank staff informed. There have been instances of blood being left on the ward for hours and having to be discarded. Such wastage of this valuable resource must be avoided.

7. Each unit of blood should be used within four hours of removal from the blood fridge or validated blood transit box. It is essential that medical / nursing staff check that the drip is running satisfactorily; and if it isn’t, that this is rectified in order that the unit of blood may be given within the required time. Transfusion of Platelets, FFP and Cryoprecipitate should be commenced within 30 minutes of removal from the blood fridge or validated blood transit box and transfused over 20 to 30 minutes.

8. Recognise trigger and activate pathway for management of massive haemorrhage.; if you need emergency uncrossmatched (historically O RhD Negatives) you need to activate the Massive Haemorrhage protocol. Communication with the Blood Bank is essential to ensure blood products are made available as quickly as possible.
POLICY 1 - CONSENT

Patients have the right to know about the treatment being offered and the available alternatives. This should be done in a timely and understandable manner. It is essential to follow the Trust policies on consent (PAT/PA 2. Policy for Consent to Examination or Treatment) and the provisions of the mental capacity act (PAT/PA 19. Mental Capacity Act 2005 Policy and Guidance).

- Patients must be given information regarding the risks/benefits and alternatives, including the option of no transfusion. This is the responsibility of a doctor; however, signed consent is not required.

- It is helpful to provide patients with an information sheet outlining the risks and benefits of blood transfusion. For example, NHS Blood & Transplant produce a number of patient information leaflets; these are available from the Transfusion Practitioner.

- If a patient refuses a transfusion the Doctor in charge of the patient should be informed and any blood product on the ward immediately returned to the Blood Bank.

It is recommended that the following information is documented in the case notes using blood prescription sheet WPR26561:

- The discussion with the patient. (Details of the information provided to the patient)
- Reason for transfusion (clinical and laboratory data)
- The administration of the transfusion and any complications
- The clinical outcome
- Consent to proceed
- If unable to obtain consent prior to transfusion, document retrospective notification

Wherever consent is not possible i.e. in an emergency or for an unconscious patient, the decision to treat must be documented in the patient’s medical notes detailing why the transfusion is judged to be in the best interests of the patient. Any known advance directives, DNAR decisions and consultations regarding the patient’s rights under the mental capacity legislation must be taken into account and included in the entry in the notes.

In addition, if a patient is unable to give consent prior to transfusion they should be provided with information retrospectively to comply with SABTO recommendations (Oct 2011).

Post Transfusion; complete patient discharge list and inform GP, transfusion episodes should be recorded in the discharge summary.
POLICY 2 – GOOD BLOOD MANAGEMENT

Good blood management is defined as management of the patient at risk of transfusion so as to minimise the need for allogeneic transfusion.

Blood products should only be prescribed when the clinician is satisfied that the risk of not transfusing is likely to be greater than the risk of transfusing.

Questions to think about before prescribing a transfusion:

Have you acted on an up to date result?
Have you reviewed the clinical condition of your patient?
Is intervention required?
Is transfusion the only appropriate intervention?
Are the blood products prescribed on blood prescription sheet WPR26560?
Have you documented in the medical notes why you made the decision to transfuse?
Does the patient have the mental capacity required to be able to make an informed decision regarding the transfusion?
Have you discussed the need for transfusion with the patient, and advised them of all known risks and obtained informed verbal consent?
 POLICY 3 – PRESCRIBING BLOOD PRODUCTS

- Blood can only be **prescribed** by a doctor or advanced nurse practitioner (who has completed a recognised Hospital Transfusion Team approved nurse authorisation course specific to blood products). Both groups of have staff must also complete the organisational NPSA competency based package for prescribing blood and blood products. Competencies are recorded on Oracle Learning Management (OLM).

- All staff prescribing must be aware of the risks / benefits of transfusion.

- **Training** – all staff prescribing blood products must have the appropriate training / competencies completed as identified by the NPSA and follow both local and national guidelines; failure to do so may result in requests being rejected. In addition advanced nurse practitioners must complete a recognised Hospital Transfusion Team approved nurse authorisation course specific to blood products.

- The prescription for blood and blood products **must** be signed and dated by the prescriber on the appropriate blood prescription sheet (**WPR26561**).

- It is essential that the prescription sheet contains the patient identification details surname, first name, date of birth, patient identification number.

- It is essential that all documentation provides a unique identification of the patient (See **policy 5**).

The prescription must document the following:

- Consent obtained
- Retrospective notification of transfusion if consent not obtained.
- What components are to be transfused
- Date of transfusion
- The volume/number of units to be transfused
- The rate of transfusion for red cells is usually 1.5 - 2 hours. Transfusion must be completed within 4 hours of removal from the Blood Fridge or authorised sealed blood product transit box.
- The rate of transfusion is 20 - 30 minutes for an adult therapeutic dose of platelets / bag of fresh frozen plasma (FFP) or Cryoprecipitate.
- Any other special instructions or requirements e.g. Irradiate, HLA matched or CMV negative products required and the reason. Blood Bank must be made aware of any special requirements prior to transfusion.
- Requirement for any concomitant drugs.
Requesting HLA Matched Products for Renal Transplant Patients

Only patients with confirmed live donors require HLA matched products. This is required to maintain the match between the live donor and the recipient. The provision of HLA matched products can take 3-5 working days and will require timely planning with the Blood Bank.
POLICY 4 - REQUESTING BLOOD PRODUCTS

- Blood can only be requested by a Doctor or authorised non-medical staff e.g. midwife or nurse with the appropriate training / competencies completed.

- All telephone requests must be followed by a written request form, failure to do so will result in a delay in blood product provision.

Timing and viability of Blood Bank samples

Transfusion or pregnancy may stimulate the production of unexpected antibodies against red cell antigens through either a primary or secondary immune response. The timing of samples selected for crossmatching or antibody screening should take account of this, as it is not possible to predict when or whether such antibodies will appear. It is also important to note that all cellular blood components contain residual red cells and may elicit an immune response.

When performing transfusion serology the age of the stored sample and how it is stored is important, as increase in age of refrigerated sample correlates with decrease in complement activity and potency of RBC antibodies. Previously transfused and pregnant patients pose a special problem as they may be in the process of mounting an immune response to a foreign RBC antigen and hence an antibody may be developing in vivo that is not present in the pre-transfusion sample.

To ensure that the specimen used for compatibility testing is representative of a patient’s current immune status, serological studies should be performed using blood collected no more than 3 days in advance of the actual transfusion when the patient has been transfused or pregnant within the preceding 3 months, or when such information is uncertain or unavailable.

The 3 days includes the dereservation period, e.g. if the sample was 1 day old when crossmatched, the blood would have to be transfused within 2 days. Where there has been no transfusion or pregnancy within the preceding 3 months, the sample is valid for up to 7 days. See Table 1 for summary of sample validity.

Key Recommendations: Serological studies should be performed using blood collected no more than 3 days in advance of the actual transfusion when the patient has been transfused or pregnant within the preceding 3 months

Table 1. Working limits for use of stored whole blood for pre-transfusion testing

<table>
<thead>
<tr>
<th>Patient Type</th>
<th>Sample Storage Temperature EDTA whole Blood</th>
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<tbody>
<tr>
<td>Patient transfused or pregnant in last 3 months</td>
<td>4°C Up to 3 days</td>
</tr>
<tr>
<td>Patient not transfused and not pregnant in last 3 months</td>
<td>Up to 7 days</td>
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The 2 sample prior to Transfusion Rule

General principles
This national recommendation is based on the evidence from –

- The BEST studies as referenced in BCSH Guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories.
- National data from the IBCT and the Near Miss chapters in recent SHOT reports (SHOT, 1996 to 2010) – 386 cases of “wrong blood in tube” (WBIT) were reported as near misses in 2010.
- Local data confirms an unacceptable number of WBIT cases among patients where it can be detected due to having a historical group on record.

Those taking samples for transfusion need to understand that the second sample is required due to the possibility of inadequate patient identification and labelling errors which lead to an unacceptable risk of WBIT.

Whenever possible a second sample should be obtained and tested before issue of red cells. The urgency of the situation should always be considered, as delays in provision of blood could compromise patient outcome.

Concerns have been expressed that the two samples may be taken at the same time and one “saved” to send to the transfusion laboratory at a later time. The process detailed below will assure that the two samples have been taken independently of one another.

Key Recommendation
A second sample should be requested for confirmation of the ABO group of a first time patient prior to transfusion, where this does not impede the delivery of urgent red cells or other components

Urgent Situations
In an urgent situation when it is not possible to obtain a second sample, group-specific red cells should not be issued without a second ABO check on the first sample.

Action Required:

First Sample
Can be historical i.e. >7 days old or taken on the same day as the 2nd sample.

Second Sample
Must be a separate venepuncture event with new patient ID checks performed. Must be sent to the laboratory site which will perform the blood issue. Ideally this would be performed by a different member of staff but this is not mandatory.
POLICY 5 - POSITIVE IDENTIFICATION OF PATIENTS

Positive identification of the patient is essential and is based on:

- Direct questioning of the patient - by asking them to state their surname, first name and date of birth. This must always be done where the patient is judged capable of giving an accurate, reliable response. Staff should never lead the patient, the answer yes is not sufficient to establish correct identification.

- Checking the details on the patient’s identification wristband, match those on the request form. All in-patients and all patients undergoing a transfusion must have an ID band complying with the current Patient Identification Policy (PAT/PS 7).

- All patients including unconscious and unknown patients must have a patient identification number and an ID wristband with this number. When additional details become available the Blood Bank must be informed but details must not be changed mid incident.

- No wristband – no transfusion

Positive identification of the patient must occur prior to

- Venepuncture

- Transfusion of blood and blood products
POLICY 6 - VENEPUNCTURE

Samples to be taken by a Doctor or a member of staff with a valid competency in venepuncture.

All patients being sampled must be positively identified.

Sample tubes should not be pre labelled.

The collection of the blood sample from the patient into the sample tubes and the sample labelling should be performed as one continuous uninterrupted event, involving one patient and one trained and competent healthcare worker only, samples to be labelled at the bedside using information taken from the patient’s ID wristband.

The Request Form

The request form must be completed in full (Addressograph labels may be used) and include:

- Full name – surname and forename.

- District number and/or NHS number may be used. Hospital numbers from other hospitals are not acceptable as they do not uniquely identify the patient on PAS. The NHS number must be available for the issue of blood products using BARS.

- Date of birth.

- Patients location

- Consultant

- Number and type of blood products required.

- Date and time required.

- Patient’s diagnosis / clinical details (include pregnancy status).

- Reason for the request (clinical indication) including most recent haemoglobin and or platelet count if applicable, include date tested.

- Any special requirements (e.g. Irradiated, HLA matched, CMV negative).

- Date and time bled.
• Gender.

• Requestors name and signature.

• The request form should be signed by the person drawing the sample.

• Date of last transfusion.

• Any known antibodies

• If pregnant within the last 6 months and Rh D negative please state the dates and doses of any prophylactic Anti-D immunoglobulin administered during this pregnancy.

The Sample

• **Addressograph labels must not be used.**

• The patient **must** be positively identified at the time a sample is taken (Policy 5)

• The sample tube must be labelled **immediately after** the blood has been taken (at the patients bedside), sample tubes **must not** be pre-labelled.

• Never copy details from the request form onto sample tubes.

The sample tube must be labelled with the following details taken from the ID band:

• Full name - surname and forename.

• District number, NHS number, Hospital numbers from other hospitals are not acceptable.

• Date of Birth.

• Gender.

• Signature of person taking the blood sample.

• Ward or Clinical area.

• Date sample taken.

• Time sample taken.
The Unconscious and or Unknown Patient including Major Incident Patients.

- The minimum identification for an unconscious unknown patient is the district number and the gender of the patient. Follow the Trust protocol for the identification of unconscious patients. This level of identification is essential even for use of the emergency group O blood packs.

- Avoid changing the details of the unknown patient mid incident / acute treatment; this would result in samples with the new details being required to obtain further blood products. The original wristband must be left in place until all merges are complete, this will mean two wristbands may be in place for a short time.

- Wristbands must not be removed if you intend to continue transfusing blood products labelled with the original details. Either complete their infusion with the original wristband in place and use this for all checks or return unused products to Blood Bank.

Incorrectly labelled samples or request forms

- The Blood Bank will not accept any sample where the request form or sample are inadequately or incorrectly labelled.

- A substantial number of requests arrive with labelling or request form errors. This can contribute to serious errors and delays in blood product provision. In clinical emergency situations group O blood will be available for the patient while the sampling and labelling process is repeated correctly.

Samples and forms cannot be amended, even in a clinical emergency a new sample and form must be provided
POLICY 7 - COLLECTION OF BLOOD PRODUCTS

Good documentation of the blood audit trail is mandatory and a legal requirement

Before collection, ensure the patient is ready to start the transfusion, baseline observations taken and has patent venous access.

Key Points

When collecting the blood component from the laboratory or blood refrigerator

• Ensure person collecting components has been trained and has a valid competency

• Take authorised documentation containing the patient's core identifiers and bar coded NHS number e.g. an addressograph label. This must still be done even if Teletrack is used to organise collection.

• Check core patient identifiers with the label on the blood component.

• Core patient identifiers, date and time of collection and staff identification details must whenever possible be recorded using the BARS system. If BARS fails or room temperature products are collected, staff must sign the register for each unit removed with the date and time.

• The component should be delivered to the clinical area and given directly to the staff responsible for transfusion without delay.

Staff authorised to collect Blood Products

• Only staff that have been fully trained and competency assessed in the collection of blood products can collect products from the Blood Bank / Blood fridges.

• Blood collection training to be arranged through the Trust’s Transfusion Practitioner using NPSA competency based packages. Re-assessment is required 3 yearly. Departmental/CSU managers to contact the Transfusion Practitioner to arrange collection training for staff. Collection training must be recorded on OLM.

Collection of Blood Products from a BARS controlled Blood Fridge

• Collection can be arranged using the Teletrack system however, the staff member removing the blood from the Blood Bank must have documentation containing a barcoded addressograph label. The label includes the patient’s identification details including full name, date of birth, district number and a barcoded NHS number.
• Blood product collection slips are available from the Transfusion Practitioner.

• At the BARS Box; **Blood Removal (No cold box)**
  
  o Scan "Blood Removal"
  o Scan "Staff ID"
  o Scan "No Cold Box"
  o Scan "Patient ID" on patient’s addressograph label brought from clinical area (NHS number available as a barcode on the load list if necessary).
  o Fridge unlocks if units are available.
  o Remove selected unit from fridge.
  o Scan donation number on the **blood pack not the tag** or any accompanying paperwork, (Patient / unit information is displayed)
  o For multiple patient removals: enter next patient’s number in window at bottom of screen then scan selected units.
  o "End Input"

• The **blood product** identification details (blood group and donation number and expiry date) must also be checked with the details on the compatibility label (blood tag) attached to the unit.

• **It is extremely important that the units of blood are transfused in expiry date order.** This is because some units of blood will have a shorter expiry time and must be used before other units.

**Receipt of Blood Products on the Ward**

• The blood **must** be **immediately** handed to the person responsible for administrating the transfusion and **not** left on the Nurses station

• **N.B.** Blood must only be stored in designated Blood Bank fridges and not in the Ward, drug or domestic fridges.
POLICY 8 - RETURNING BLOOD PRODUCTS TO BLOOD BANK

Returning Blood Products

Unboxed Single Units

- Blood and blood products should be transfused as soon as possible after delivery to the ward / clinical area i.e. within 30 minutes of leaving the blood fridge.

- If after collection of the blood a problem arises which prevents immediate transfusion, the unit must be returned to Blood Bank within 30 minutes of collection.

Boxed Units e.g. unused or part used MPH packs

- The transit box containing the units should be handed directly to a member of Blood Bank Staff.

There have been instances of blood being left on the ward/clinical area untransfused resulting in wastage of this valuable resource, this must be avoided.

Blood Products returned for disposal

- If blood has been out of the fridge for more than 30 minutes and there is no prospect of its immediate use, the hospital blood bank should be informed. The blood must be returned to the blood bank for disposal due to the risk of bacterial growth and breach of the cold chain regulations.

- The blood product for disposal must never be placed in a Blood Bank fridge; it must always be handed directly to a member of Blood Bank staff.
POLICY 9 - ADMINISTRATION OF BLOOD PRODUCTS AND TRACEABILITY

Key Points

- Final check must be conducted next to the patient by the same trained and competent licensed healthcare professional who administers the component.
- All patients receiving a transfusion must be positively identified.
- All patient core identifiers on the patient’s identification wristband must match the details on the blood component label.
- All blood components should be administered using a blood administration set with integral mesh filter.
- Transfusion should be completed within 4 hours of leaving temperature controlled storage.

Staff Responsible

Blood components are excluded from the current legal definition of medicinal products and the requirement for prescription by a registered medical practitioner but are viewed as medicines for administration purposes. Blood components should only be administered by a licensed professional such as doctor (GMC registered), or a nurse holding current registration of the NMC Professional Register as a Registered General Nurse (RGN), Registered Sick Children’s Nurse (RSCN), Registered Midwife (RM) or Operation Department Practitioner (ODP) who has completed the organisational NPSA based competency package in Receipt/Administration of blood and blood products. Competencies must be recorded on OLM.

Receipt of blood products in the clinical area

- The blood group and unit number of the blood product must be identical to that described on the attached blood tag label.
- The blood or blood component must be checked for compliance with any special requirements as specified on the prescription sheet e.g. Irradiated, CMV negative.
- The blood or blood component must be checked to ensure that it has not and will not have passed its expiry date during the transfusion period i.e. in date at the start and end of transfusion.

Inspection of Blood or Blood Products

It is essential that staff administering blood or blood products inspect each unit prior to transfusion and return the unit to the Blood Bank if any defects are found.

The inspection should pay attention to:

- The integrity of the pack by checking for leaks at the port or seams.
- Evidence of haemolysis in the plasma or at the interface between red cells and plasma.
• Evidence of unusual discoloration or turbidity.
• The presence of large clots.

Responsibility for the identity check of the Patient and the Blood Product

• Although two members of staff may be involved in the checking procedure it is recommended that one member of staff should be responsible for carrying out the identity check of the patient and the unit of blood at the patient's bedside.

• The member of staff must be a doctor, or a nurse holding current registration of the GMC Professional Register as a Registered General Nurse (RGN), Registered Sick Children's Nurse (RSCN) or Registered Midwife (RM).

The final bed side check

This is ESSENTIAL and is based on: Tag & Bag, Tag & Wristband Checks

Only the labelled blood product and the patient’s wristband are to be used as part of the final bedside check, not the prescription sheet.

Always start by direct questioning of the patient to establish positive identification. Ask their surname, first name and date of birth in the case of patients who are judged capable of giving an accurate reliable response. Checking this information against the wristband is mandatory.

• Check the details on the patient’s wristband match the blood tag label

  The surname, first name, gender, date of birth and unique identification number must be identical with the blood tag label attached to the blood component.

• Check the blood tag label is attached to the correct bag by checking the donation number, product type and blood group of both match.

• Any discrepancies identified by these checks should be reported to Blood Bank immediately and the transfusion delayed until clarification of any point is made.

• The transfusion of blood and blood components should begin as soon as possible.

• The minimum identification for an unconscious unknown patient is the NHS or district number and the gender of the patient. Follow the Trust protocol for the identification of unconscious patients.

• The prescription sheet must be readily available during the transfusion. The ideal location may vary from one clinical area to another, but a local policy should exist defining this location. The report must then be filed in the medical notes following completion.
Traceability

The return of the blood tags is mandatory.

- **The completed detachable blood tag must immediately be returned to Blood Bank** following the completed transfusion. This is to enable full traceability and to ensure the Trust fulfils its legal requirements as defined by BSQR 2005.

- The peel off sticker from the blood tag must be attached to the prescription sheet (WPR26561).

- The start and finish time of the transfusion must be recorded on the blood prescription sheet (WPR26561).

- The efficacy/ outcome/ benefit of this transfusion must be recorded in the patients notes.
POLICY 10 - TECHNICAL ASPECTS OF THE ADMINISTRATION OF BLOOD PRODUCTS

Giving sets

- Adhere to strict aseptic techniques when handling blood or blood components.
- Blood products should be transfused through a sterile giving set designed for the procedure.
- Filter size; 170 – 200 micron filter is required.
- Drugs must not be added to blood products under any circumstances.

Red Cells (RBC) (SAGM Volume 220 – 340ml)

- Electronic infusion pumps may damage blood cells and should not be used for administration of red cells unless the manufacturers have verified them as safe to use for this purpose, staff have been trained in their use and all maintenance requirements are met.
- To prevent bacterial growth a new giving set must be used after 12 hours or after 3 units whichever is earlier. Some giving sets may be issued with different instructions, if the usage life of a giving set is shorter always follow the manufacturers instructions.
- Start transfusion as soon as the unit is received from Blood Bank.
- Each unit of blood must be used within a maximum of four hours from leaving the Blood Bank fridge or validated sealed blood storage box, usually red cells are transfused over 2-3 hours.
- Washing through the remainder of the blood in the line with Sodium Chloride 0.9% is not recommended.
- All blood products are leucocyte depleted.
- Usually supplied as packed red cells in additive solution (SAGM).
- Red cells can be irradiated, HLA matched, HT, K, Hb S or CMV negative for specific patient groups. Blood Bank must be notified of any special requirements.
Plasma Products

Please note all plasma products must be inspected at the bedside and examined as with red cells. Any suspect colouration or particulate suspension must be reported to Blood Bank immediately and the unit returned to Blood Bank, do not transfuse.

Platelets (PLT) (Mean Volume 202ml)

- A standard blood or platelet giving set should be used for the administration of platelets.
- Platelets should be transfused through a new clean standard blood or platelet giving set (not one already used for blood).
- Never put platelets in a fridge.
- Start infusion as soon as the pack is received from the Blood Bank.
- Infuse stat or maximum time 30 minutes in an adult.
- In paediatrics infuse over 60 minutes via the designated pump (unless specifically directed otherwise in emergency situations).
- Children under the age of 16 should whenever possible receive apheresis platelets rather than pooled platelets.
- Issued following authorisation by Consultant Haematologist (unless Massive Haemorrhage Protocol activated. (See appendix 5)
- Platelets can be irradiated, HLA matched, HT or CMV negative for specific patient groups. Blood Bank must be notified of any special requirements.

Rh D Negative Female of Child Bearing Age:

If Rh D positive Platelets have to be given in a clinical emergency where a delay in waiting for RhD negative platelets would increase risk to the patient, prophylactic anti-D immunoglobulin must be given at a dose of 250 IU immediately, by intramuscular injection, after platelet transfusion.

This 250 IU dose is enough to cover five successive adult therapeutic doses of RhD positive platelets over a period of up to six weeks.

Nevertheless, if a unit of RhD positive platelets has been given and followed by anti-D prophylaxis, and if further treatment with platelet concentrates is required, RhD negative platelets are still preferred and recommended.
Fresh Frozen Plasma (FFP) (Mean Volume 271ml)

- Filter size; 170 – 200 micron filter is required (blood giving set).

- Do not refreeze. Use within 4 hours if maintained at 22°C ± 2°C or 24 hours if stored at 4°C (extended storage will result in a decline in labile coagulation factors).

- Issued following authorisation by Consultant Haematologist (unless Massive Haemorrhage Protocol activated. (See appendix 5)

- Start infusion as soon as the pack is received from the Blood Bank

- Infuse each bag over not more than 20-30 minutes.

- Neonates, children and young adults born after 1 January 1996 are issued non-UK MB FFP.

- See appendix 4 FFP dosage poster

Cryoprecipitate (CRYO) (Mean Volume Pooled pack 164ml)

- Filter size; 170 – 200 micron filter is required (blood giving set).

- Issued following authorisation by Consultant Haematologist (unless Massive Haemorrhage Protocol activated. (See appendix 5)

- Infuse stat or maximum time 30 minutes in an adult.

- In paediatrics infuse over 60 minutes via the designated pump (unless specifically directed otherwise in emergency situations).

- One bag of pooled Cryoprecipitate is equivalent to five single units.

- Never put Cryoprecipitate in a fridge

- Do not refreeze. Use within 4 hours maintained at 22°C ± 2°C

- Neonates, children and young adults born after January 1996 are issued non-UK MB Cryoprecipitate.
Prothrombin Complex Concentrate (PCC)

- Prothrombin Complex Concentrate (PCC) e.g. Beriplex is used for the rapid reversal of warfarin therapy. The formulary is available on the intranet.
- Out of hours PCC is located in A&E, Pharmacy emergency store.
- The request for Prothrombin Complex Concentrate must be approved by a Consultant Haematologist, who will also advise on dose.
- Baseline INR/coagulation screen must have been performed.

Indications for use:

- Immediate reversal required for intracranial haemorrhage (subarachnoid or intracerebral haemorrhage) or other life threatening haemorrhage.
- Reversal required within one hour for major urgent surgical procedure.

Cannula

A 20 gauge cannula is the minimum size required for transfusion in an adult. The size of cannula chosen can affect the speed at which the blood can be transfused.

Blood Warmers

- Blood should only be warmed using a specifically designed regularly maintained and calibrated commercial device with a visible thermometer and audible warning following manufacturer’s instructions.

A blood warmer is indicated:

- At flow rates of >50mL kg$^{-1}$ h$^{-1}$ in adults.
- At flow rates of >15ml kg$^{-1}$ h$^{-1}$ in children.
- For exchange transfusions.
- For patients with clinically significant cold agglutinins.

Drugs

- Drugs must never be added to blood products under any circumstances.
- Drugs should not be administered through the same cannula when transfusion of blood or blood products is in progress.
Disposal of Blood Bags

On completion of the transfusion the empty bag and tubing should be disposed as follows

- The **Blood Bank, Chatsfield Suite, Theatres** and **A/E** all sites & are to dispose of transfused bags and tubing via anatomical waste

  All Anatomical bins must also be labelled as “**Blood bag waste**”

  ![Yellow bin Red lid](image)

- **Ward Areas**

  Empty transfused blood and blood product bags and tubing are to be disposed of via the offensive hygiene waste i.e. **yellow bag with black stripe**.

  Snip bag and allow to drain naturally into sluice, then put bag and tubing into Yellow bag with Black Stripe.

  ![Yellow bag/Black stripe](image)

- **Following Massive Transfusions on Ward Areas**

  If 10 to 20 products (red cell, platelets, FFP or Cryoprecipitate) are transfused in an emergency situation then all bags to be disposed of in the Anatomical waste stream i.e. **yellow bin with red lid**.

  ![Yellow bin Red lid](image)

  All Anatomical bins must also be labelled as “**Blood bag waste**”
POLICY 11 - CARE AND MONITORING OF PATIENTS

All patients should be transfused in clinical areas where they can be directly observed, and where staff are trained in the administration of blood components and the management of transfused patients, including the emergency treatment of anaphylaxis.

Key Points

Neonatal and child observations see separate Appendix 1

Adults

Observations should be undertaken for every unit transfused. Minimum monitoring of the patient should include:

- Regular visual observation throughout the transfusion episode
- Pre transfusion pulse (P), blood pressure (BP), temperature (T), respiratory rate (RR) and O2 saturation. To be taken no more than 60 minutes before starting transfusion
- A complete set of vital signs should be taken 15 minutes after the start of each component transfusion for all patients.
- For a stable patient repeat vital signs at the halfway mark.
- More frequent observations may be required e.g. rapid transfusion, or patients who are unable to complain of symptoms which would raise suspicion of a developing transfusion reaction
- If the patient shows signs or symptoms of a possible transfusion reaction, the vital signs should be monitored immediately, recorded, and appropriate action taken. Vital signs must continue to be monitored every 5 - 15 minutes depending on severity of reaction and until the possible reaction has resolved.
- Post transfusion observations should be taken and recorded not more than 60 minutes after the end of the component transfusion
- Patients should be observed during the subsequent 24 hours for or, if discharged, counselled about the possibility of late adverse reactions. Clinical areas should ensure that systems are in place to ensure patients have 24 hour access to clinical advice

Staff Responsible

- The member of staff responsible for the care and monitoring of the patient during the transfusion must be a nurse holding current registration of the NMC Professional Register as a Registered General Nurse (RGN), Registered Sick Children's Nurse (RSCN), a Registered Midwife (RM) or a doctor.
• They must take charge of the patient during the transfusion and be responsible for ensuring that all care and monitoring of the patient is performed.

**Observation of the Patient**

• It should be stressed to the patient the importance of reporting any adverse effects that they may feel, including shivering, rashes, flushing, and shortness of breath, pain in the extremities or in the loins.

• Visual observation of the patient is often the best way of assessing the condition of the patient during transfusion. Transfusions should be given in clinical areas where patients can be readily observed by members of the clinical staff, patients should be able to alert staff if they experience any adverse effects.

• The start and finish time of the transfusion *must* be recorded on the peel off sticker from the blood tag which is attached to the blood prescription sheet (WPR26561).

• **Vital signs** – temperature, pulse, blood pressure, respirations and O2 saturation *must* be measured and recorded as follows:
  
  o Before the start of each unit of blood or blood component, 15 minutes after commencing, half way through and at the end of each transfusion episode.

  o Further observations during the transfusion of each unit of blood or blood product are at the discretion of each clinical area and need only be taken should the patient become unwell or show signs of a transfusion reaction or if advised by Blood Bank.

  o Unconscious patients are more difficult to monitor for signs of transfusion reactions and therefore it is recommended routine observation patterns should continue.

**Completion of transfusion episode**

• If a further blood component unit is prescribed
  
  o Repeat the administration/identity check with each unit.

• If no further units are prescribed
  
  o Remove the blood administration set and **dispose of bag and tubing**
  
  o Ensure all **transfusion documentation is completed and the tag is returned** immediately to Blood Bank.

• **Return any unused blood products** to Blood Bank.
POLICY 12 - REPORTING OF ADVERSE EVENTS/REACTIONS FOLLOWING OR DURING TRANSFUSION

See Appendix 2 and Appendix 3 Transfusion Reaction Flow chart.

Initial treatment of ATR is not dependent on classification but should be directed by symptoms and signs. Treatment of severe reactions should not be delayed until the results of investigations are available.

Patients should be asked to report symptoms which develop within 24 hours of completion of the transfusion.

Initial clinical assessment

Initial clinical assessment seeks to quickly identify those patients with serious or life threatening reactions so that immediate treatment/resuscitation can be initiated. Appendix 2 provides a practical guide to recognition and Appendix 3 initial management of suspected ATR.

Immediate management of ATR

If a patient develops new symptoms or signs during a transfusion, this should be stopped temporarily, but venous access maintained. Identification details should be checked between the patient, their identity band and the compatibility label of the blood component. Perform visual inspection of the component and assess the patient with standard observations.

Mild Adverse Reactions

For patients with mild reactions, such as pyrexia (temperature of > 38°C and a rise of 1-2°C), and/or pruritus or rash but without other features, the transfusion may be continued with appropriate treatment and direct observation.

- If at any time a transfusion reaction is suspected, the doctor in charge of the patient should be contacted by the nurse responsible for the patient during the transfusion and should review the patient promptly.

- Any adverse events should be recorded in the patient’s notes and logged on the blood prescription sheet (WPR26561).

- It is the doctor’s responsibility to ensure the adverse reaction is reported to Blood Bank.
• It is the responsibility of Blood Bank staff to report the event to senior Blood Bank staff or the Transfusion Practitioner to enable external reporting to SABRE (Serious Adverse Blood Reactions and Events) and/or SHOT if appropriate.

Patients with mild isolated febrile reactions may be treated with oral paracetamol (500-1000mg in adults). Patients with mild allergic reactions may be managed by slowing the transfusion and treatment with an antihistamine.

**Standard observations**

The patient's pulse rate, blood pressure, temperature and respiratory rate should be monitored and abnormal clinical features such as fever, rashes or angioedema frequently assessed. A patient who has experienced a transfusion reaction should be observed directly until the clinical picture has improved.

**Severe Adverse Reactions**

Management is guided by rapid assessment of symptoms, clinical signs and severity of the reaction.

• The transfusion must be stopped **immediately**.

• The blood administration set should be changed and venous access maintained using Sodium Chloride 0.9% running slowly to keep the vein open.

• The patient’s physician must be informed.

• A Consultant Haematologist must be informed.

• The reaction should be reported **immediately** to the Blood Bank, who will issue a Transfusion Reaction Investigation sheet. Follow the instructions carefully, complete the sheet and return to Blood Bank as instructed along with any remaining blood products which may have been involved in the reaction.

• The vital signs should be monitored immediately, recorded, and appropriate action taken. Vital signs must continue to be monitored every 5-15 minutes depending on severity of reaction and until the possible reaction has resolved.

• The volume and colour of any urine passed should be recorded in the patient’s notes.

**Anaphylaxis**

Anaphylaxis should be treated with intramuscular adrenaline (epinephrine) according to UKRC guidelines. Patients who are thrombocytopenic or who have deranged coagulation should also receive intramuscular adrenaline if they have an anaphylactic reaction.
Hypotension

If a patient being transfused for haemorrhage develops hypotension, careful clinical risk assessment is required. If the hypotension is caused by haemorrhage, continuation of the transfusion may be life-saving. In contrast, if the blood component is considered the most likely cause of hypotension, the transfusion must be stopped or switched to an alternative component and appropriate management and investigation commenced.

Febrile symptoms of moderate severity

If a patient develops sustained febrile symptoms or signs of moderate severity (temperature > 39°C or a rise of > 2°C and/or systemic symptoms such as chills, rigors, myalgia, nausea or vomiting), bacterial contamination or a haemolytic reaction should be considered.

Investigation of a Suspected Severe Transfusion Reaction

- The completed form and samples should be sent immediately to the Blood Bank with the Blood Product bag/s and giving set.

- Samples required are group & save, FBC, U/E, LFT, coagulation screen, blood cultures.

- Blood Bank will report on its investigation as soon as possible.

- No further transfusion of units currently cross-matched should undertaken until the Blood Bank investigation is complete – this may be mitigated by the Consultant Haematologist depending on circumstances.

Documentation of Severe Adverse Events / Reactions

- Any adverse events should be recorded in the patient’s notes and logged on the blood prescription sheet (WPR26561).

- Report via DatixWeb.

- All adverse events related to blood / blood product transfusion will be reviewed by the Hospital Transfusion Committee.

- Serious adverse events should be reported to the MHRA via SABRE (Serious Adverse Blood Reactions and Events) and to SHOT (Serious Hazards of Transfusion) via the Blood Bank.

- Suspected cases of transfusion-transmitted infection / TRALI should be reported immediately to the local Transfusion Centre via the Blood Bank.
POLICY 13 - DOCUMENTATION OF TRANSFUSIONS

Full documentation of transfusions is mandatory and a legal requirement.

Documentation in the Patients Notes

A permanent record of the transfusion must be held in the patient’s medical notes, including the following.

- A complete record of the transfusion on the blood prescription sheet (WPR26561), with the following information
  - Start and finish time of the transfusion on the blood prescription sheet.
  - The indication for the transfusion.
  - The type and number of blood products used.
  - The efficacy/ outcome/ benefit of this transfusion must be recorded in the patient's notes
  - The occurrence and management of any adverse effect.
  - The peel off sticker from the blood tag must be attached to the prescription sheet

- The sheets used for nursing observations during the transfusion.

Documentation to be returned to Blood Bank

The return of the tags is mandatory

- The completed detachable blood tag must be returned to Blood Bank immediately following transfusion to enable full traceability and ensure the Trust fulfils its legal requirements as defined by BSQR 2005.
POLICY 14 - JEHOVAH’S WITNESS, PATIENT OR FAMILY REFUSAL OF BLOOD TRANSFUSION

Some people may refuse blood transfusion for a variety of reasons. The aim of this policy is to ensure that Jehovah’s Witnesses beliefs are acknowledged and respected and to provide information with regard to the treatment of all patients who refuse Blood transfusion.

If refusal by non Jehovah’s Witnesses is based on fear of transfusion transmitted infection, the risks should be clearly explained.

Refusal of blood transfusion should be carefully documented in the patient’s medical notes by the consultant / most senior doctor present, with the reasons given together with date, time and signature.

Jehovah’s Witnesses have definite objections to blood transfusions for both religious and medical reasons. Witnesses rule out the transfusion of red cells, whole blood, fresh frozen plasma, platelets and white cells, Pre-donation (PAD) and may refuse to donate bone marrow/ stem cells. Anti-D immunoglobulin and Cryoprecipitate may be accepted and should be offered where appropriate.

In many cases without prior anaemia pre-operative Erythropoietin therapy is unnecessary unless blood loss is likely to be in excess of 1000ml. In such patients post-operative iron and folate supplement will restore the lost red cells over a few weeks.

However, in cases where blood loss of **more than 500 ml is likely**, the following actions should be considered:

**Major elective surgery**

E.g. orthopaedic, should only be done after visiting pre-assessment clinic at least 4 weeks prior to surgery and liaison between surgeon, anaesthetist and consultant haematologist to consider strategies and get approval from the patient. Other clinical situations would need to be discussed with the consultant haematologist

- At this visit the FBC, Reticulocytes, Ferritin, B12 & folate must be checked.

**Pre-operative treatment with Erythropoietin**

- Preoperative Erythropoietin 40,000 units subcutaneously weekly for 3 weeks + 40,000 units post op day 1. This dosage is for an adult (55-80Kg), outside this range discuss with Consultant Haematologist.
• Start Erythropoietin 4 weeks prior to planned surgery – this date should not be changed once pre op treatment started due to its expense.

• Check FBC, reticulocytes & ferritin after 2 weeks of Erythropoietin therapy

**Iron & folate supplementation pre op and post op.**

Use of IV Iron may be preferable to oral iron. Folic acid should also be given orally at 5 mg daily.

**Intra-operative cell salvage or Post-operative salvage**

Consider the use of intra-operative cell salvage or post-operative salvage from wound drains if acceptable to the patient. This should be documented on the patient consent form.

NB. Preoperative haemodilution is often acceptable to the JW patients and this possibility should be explored.

**Tranexamic acid, Prothrombin Complex Concentrate**

May be suitable interventions, and should be explored as appropriate with the consent of the Witness. All plasma derivatives can be considered and consent to transfuse is a matter of personal choice for the individual patient.

**Sampling**

Consider the impact of blood sampling; are all the tests requested indicated? Could microtainers be used?

**Communication**

Any of the above measures may be used but again there needs to be good communication between surgeon, anaesthetist and consultant haematologist and the local liaison team if necessary.
Jehovah’s Witnesses Hospital Liaison Team

Contact the local Jehovah’s Witnesses Hospital Liaison Committee with regard to alternative care or to locate doctors experienced in the management of Witnesses.

Local Liaison Team Contact Details

Richard Colley

Tel: 01142 899263
Mobile: 07598957852

richardcolley@sheffield-hlc.org.uk

Rory Tamplin

Tel: 01246 769675
Mobile: 07841235868

rorytamplin@sheffield-hlc.org.uk

Alternatively contact:

Hospital Information Services

IBSA House,
The Ridgeway,
London
NW7 1RN

his@uk.jw.org

24-Hour Contact Number: (020) 8906 2211
Treatment of Jehovah's Witnesses

Children

If a child is judged to be of sufficient age and maturity to fully understand the implications of their beliefs, they should be treated as previously stated. If however elective or emergency treatment of a child is required and this is against the parents or guardians wishes then the following questions should be addressed:

- Has the Hospital Liaison Team been contacted and asked for assistance?
- Have the parents / guardians been given the full details regarding the need for treatment?
- Have ALL non-blood medical management options been fully explored?
- Is there another hospital willing to treat without blood?

Once all these questions have been addressed and it is still felt that treatment is essential then a court order should be sought. The parents or guardians should be immediately notified of the intent to obtain such an order and invited to attend any case conference, which takes place. The support of a minimum of two practitioners of consultant status is required to seek the order and it should be limited to the immediate medical incident.

Medical Treatment

- Abortion

  Deliberate abortion is unacceptable. If, at the time of birth a choice has to be made between the life of the mother and that of the child, it is up to the individuals concerned to make that decision.

- Cell Salvage

  Many Jehovah's Witnesses will accept cell salvage, providing the system used is constantly linked to the patient's circulatory system and there is no storage of the patient's blood.

- Sampling

  Consider the impact of blood sampling; are all the tests requested indicated? Could microtainers be used?
• **Proactive Patient Management**

Planning, good communication and documentation are essential. Proactive and responsive management of bleeds is critical.

• **Blood Transfusion**

Jehovah’s Witnesses believe that blood transfusion is forbidden by Biblical commands and therefore will refuse the transfusion of blood, plasma, white cells and platelets. However, these beliefs do not absolutely rule out the use of products plasma derivatives such as albumin, immunoglobulins and anti-haemophilic preparations. Each Witness will decide whether he / she will accept these products.

• **Heart Bypass**

Some Witness patients permit the use of heart-lung machines when the pump is primed with non-blood fluids and blood is not stored in the process.

• **Haemodialysis**

This is a matter for each witness patient to decide for him or herself. A closed circuit should be used with no blood prime or storage.

• **Haemodilution**

Induced haemodilution is a matter for the witness patient to decide according to his / her conscience when a closed circuit is used and no blood storage is involved. Jehovah’s Witnesses do not accept preoperative collection and storage of blood and its later transfusion (autologous).

• **Plasma Derivatives**

Such as albumin, Anti-D immunoglobulin, Cryoprecipitate and anti-haemophilic preparations are not forbidden and should be offered, although some witnesses may conscientiously refuse them.

• **Expanders**

Plasma volume expanders are acceptable e.g. Sodium Chloride 0.9%.
POLICY 15 - FMH TESTING & THE USE OF ANTI-D IMMUNOGLOBULIN

Purpose

To provide healthcare professionals with practical guidance on the use of anti-D Ig as immunoprophylaxis to prevent sensitisation to the D antigen during pregnancy or at delivery for the prevention of haemolytic disease of the fetus and newborn (HDN)

Potentially sensitising events in pregnancy

- Amniocentesis, chorionic villus biopsy and cordocentesis
- Antepartum haemorrhage/Uterine (PV) bleeding in pregnancy
- External cephalic version
- Abdominal trauma (sharp/blunt, open/closed)
- Ectopic pregnancy
- Evacuation of molar pregnancy
- Intrauterine death and stillbirth
- In-utero therapeutic interventions (transfusion, surgery, insertion of shunts, laser)
- Miscarriage, threatened miscarriage
- Therapeutic termination of pregnancy
- Delivery – normal, instrumental or Caesarean section
- Intra-operative cell salvage

Dose Required

This is dependent on the gestation of the foetus and the volume of fetal cells in the maternal circulation, as guided by fetomaternal haemorrhage (FMH) tests.

A FMH test is performed when the gestation is above 20 weeks. It is required to detect fetal cells in the maternal circulation and, if present, to estimate the volume of FMH to allow calculation of additional anti-D doses required to clear the fetal cells.

The dose calculation is traditionally based on 125 IU anti-D Ig/mL fetal red cells for IM administration e.g. a dose of 500 IU, IM is considered sufficient to treat a FMH of up to 4mL fetal red cells. Where it is necessary to give additional doses of anti-D Ig, as guided by tests for FMH.

Following potentially sensitising events, anti-D Ig should be administered as soon as possible and always within 72 h of the event. If, exceptionally, this deadline has not been met some protection may be offered if anti-D Ig is given up to 10 days after the sensitising event.
If FMH >4mL is detected, follow-up samples are required at 72 h following an intramuscular (IM) dose of anti-D to check for clearance of fetal cells.

**Potentially sensitising events in pregnancies of less than 12 weeks gestation**

- In pregnancies<12 weeks gestation, anti-D Ig prophylaxis is *only* indicated following *ectopic* pregnancy, *molar* pregnancy, *therapeutic termination* of pregnancy and in cases of uterine bleeding where this is repeated, heavy or associated with abdominal pain.

- If indicated the minimum dose for confirmed D negative women who are not known to be already sensitised to D should be 250 IU. FMH testing is not required.

**Potentially sensitising events in pregnancies of 12 weeks to less than 20 weeks gestation**

- A maternal blood group and antibody screen should be performed to determine or confirm the Rh D group and check for the presence of anti-D.

- If anti-D is identified, further history should be obtained and investigation undertaken to determine whether this is immune or passive (as a result of previous injection of anti-D Ig). If no clear conclusion can be reached as to the origin of the anti-D detected, then the woman should continue to be offered anti-D prophylaxis on the assumption that it may be passive.

- Women with indeterminate Rh D typing results should be treated as *D negative* until confirmatory testing is completed.

- A test for FMH is NOT required before 20 weeks gestation.

**Samples Required**

1 x 6ml pink EDTA sample.

**Dose Required**

A minimum anti-D Ig dose of 250 IU should be administered within 72 h of the event.
Potentially sensitising events in pregnancies of 20 weeks gestation to term

There is an additional requirement to assess the volume of FMH.

Samples required

- 1 x 6 ml pink EDTA sample.

- 1 x 4 ml purple EDTA sample \(\text{taken within 2 hrs of the sensitising event}\)

  Samples should be taken prior to anti-D administration.

Dose required

- A minimum anti-D Ig dose of 500 IU should be administered within 72 h of the event

- If a FMH of >4mL is indicated, a larger dose of anti-D will be required. The Blood Bank will advise on the dose required and further testing.

Prophylaxis following birth of a D positive child or intrauterine death

- Following birth, ABO and Rh D typing should be performed on cord blood and if the baby is confirmed to be D positive, all D negative, previously non-sensitised women should be offered at least 500 IU of anti-D Ig within 72 h following delivery. Maternal samples should be tested for FMH and additional dose(s) given as guided by FMH tests

- If a cord sample is not collected for any reason, a heel prick sample from the baby should be obtained as soon as possible.

- Direct Antiglobulin Test (DAT) should be performed if haemolytic disease of the newborn is suspected or anticipated because of a low cord blood haemoglobin concentration &/or the presence of maternal immune red cell antibodies.

- Maternal samples for confirmatory ABO and D type and FMH testing should be collected after sufficient time has elapsed for any FMH to be dispersed in the maternal circulation. A period of 30-45 minutes is considered adequate and the samples should ideally be taken within 2 h of delivery primarily to ensure that the sample is taken prior to woman’s discharge from the hospital.

- Following birth of a D positive infant at least 500 IU anti-D immunoglobulin (IM) must be administered to the woman if the FMH is ≤ 4 mL.
• Additional dose of anti-D immunoglobulin is necessary for larger FMH with the dose to be administered by intramuscular route. The Blood Bank will advise on the dose required and further testing.

• In the event of an intrauterine death (IUD), where no sample can be obtained from the baby, an appropriate dose of prophylactic anti-D Ig should be administered to D negative, previously non-sensitised women within 72 h of the diagnosis of IUD, irrespective of the time of subsequent delivery.

• Postpartum anti-D immunoglobulin prophylaxis should not be affected by previous routine antenatal anti-D prophylaxis (RAADP) or by antenatal anti-D given for a sensitising event.

Samples required

• Maternal Samples

  1 x 6ml pink EDTA sample
  1 x 4 ml EDTA taken within 2 hrs of the sensitising event

• Cord Samples

  1 x 6 ml pink EDTA sample

Dose Required

• A minimum anti-D Ig dose of 500 IU should be administered within 72 h of the event.

• If a FMH of >4mL is indicated, a larger dose of anti-D will be required. The Blood Bank will advise on the dose required and further testing.

Prevention of anti-D formation in the event of recurrent uterine bleeding in D-negative women during pregnancy

Recurrent uterine bleeding before 12 weeks gestation:

• Evidence that women are sensitised after uterine bleeding in the first 12 weeks of pregnancy where the fetus is viable and the pregnancy continues is scant.

• Therefore anti-D immunoglobulin is not necessary in women with threatened miscarriage with a viable fetus where bleeding completely stops before 12 weeks gestation.
• However it may be prudent to administer 250 IU anti-D Immunoglobulin where bleeding is heavy or repeated or where there is associated abdominal pain particularly if these events occur as gestation approaches 12 weeks. The period of gestation should be confirmed by ultrasound.

**Recurrent uterine bleeding between 12 and 20 weeks gestation**

D-negative women with recurrent PV bleeding between 12 and 20 weeks gestation should be given 250 IU anti-D immunoglobulin at a minimum of 6 weekly intervals.

**Recurrent uterine bleeding after 20 weeks gestation**

• Anti-D immunoglobulin 500 IU should be given at a minimum of 6 weekly intervals.

• Estimation of FMH by kleihauer technique should be carried out at a minimum of 2 weekly intervals.

• If the FMH is positive, additional dose of anti-D immunoglobulin (500 IU minimum, more if FMH exceeds 4mls) should be offered regardless of the presence or absence of passive anti-D in maternal plasma, and FMH should be retested after 72 hours.

• If the FMH is negative and anti-D is present in the maternal plasma and anti-D immunoglobulin as been given in the last 6 weeks no further anti-D immunoglobulin is required at this point.

• If there is no anti-D present in the maternal plasma a 500IU dose of anti-D immunoglobulin should be given.

**Intra-operative Cell Salvage (ICS)**

• When intra-operative cell salvage (ICS) is used for Caesarean section, reinfused blood may contain fetal red cells. Published literature using different cell salvage apparatus, techniques and volume of blood reinfused suggests that the volume of fetal red cells in re-infused blood varies from 1 to 20mL.

• Since the volume of fetal red cells in ICS blood is variable and can be relatively large, it is recommended that a minimum anti-D Ig dose of 1500 IU be administered to D negative, previously nonsensitised women after reinfusion of salvaged red cells, if the cord blood group is D positive (or if the cord group cannot be established for whatever reason).

• Maternal samples should be taken for estimation of FMH 30–45 min after the re-infusion of salvaged red cells, and additional dose(s) of anti-D administered if necessary, and appropriate follow-up FMH testing performed.
• It is important that clinicians inform the transfusion laboratory if ICS has been used to ensure that correct dose of anti-D Ig is issued

**Routine Antenatal Anti-D Prophylaxis (RAADP)**

• Rh D negative mothers who are not sensitised should receive 1500 IU of anti-D immunoglobulin by intramuscular injection at 28 weeks gestation.

• It is important that the 28-week sample for blood group and antibody screen is taken prior to the first routine prophylactic anti-D Ig injection being given. This forms the second screen required in pregnancy as stated in the BCSH Guidelines for Blood Grouping and Red Cell Antibody Testing during pregnancy

• Routine Antenatal Anti-D Ig Prophylaxis (RAADP) should be regarded as a separate entity and administered regardless of, and in addition to, any anti-D Ig that may have been given for a potentially sensitising event

• It has been shown that following RAADP anti-D immunoglobulin can cross the placenta, enter the fetal circulation and bind to fetal D antigen sites.

• A positive DAT in itself is not diagnostic of HDN. However if it is positive, the infant’s haemoglobin and bilirubin levels should be checked to diagnose/exclude HDN.

**Management of Transfusion of D Positive Blood Components to D Negative Girls or Women of Childbearing Potential**

**D Positive Platelet Transfusions**

• Whenever possible, D negative platelets should be transfused to D negative girls or women of child bearing potential, who need a platelet transfusion.

• Occasionally, if the appropriate product is not available or its availability would cause unacceptable delay, it may be necessary to transfuse D positive platelets. In these circumstances, prophylaxis against possible sensitisation to the D antigen by red cells contaminating the platelet product should be given.

• A dose of 250 IU anti-D immunoglobulin should be sufficient to cover up to five adult therapeutic doses of D positive platelets given within a 6-week period.

• In severely thrombocytopenic patients with platelet count of ≤30 × 10⁹/L, anti-D Ig should be given subcutaneously.
Inadvertent Transfusion of D Positive Blood

Less than 15mL Transfused

When less than 15mL have been transfused, the appropriate dose of IM anti-D Ig may be given. The Blood Bank will advise on the dose required and further testing.

More than 15mL Transfused

- When more than 15mL have been transfused, it is preferable to use the larger anti-D immunoglobulin preparation (1500 or 2500IU); however, IV anti-D immunoglobulin is the preparation of choice, achieving adequate plasma levels immediately.

- **IM only preparations of anti-D immunoglobulin must not be given IV.**

- The quantitation of D positive red cells should be performed by flow cytometry (FC) after 48h if an IV dose of anti-D has been given or 72 h if an IM dose has been given and further anti-D Ig given until there are no detectable D positive red cells in circulation.

- When more than one unit of D positive blood has been transfused, a red cell exchange transfusion should be considered to reduce the load of D positive red cells in the circulation and the dose of anti-D Ig required to prevent immunisation.

- In this situation advice should be sought from a specialist in Transfusion Medicine, and the patient should be counselled regarding the implications of both non-intervention (for future pregnancies) and of treatment, including any hazards from receiving donated blood, the exchange procedure itself and of larger doses of anti-D Ig, including IV anti-D Ig.

- A single blood-volume red cell exchange transfusion will achieve a 65–70% reduction in D positive red cells; a double volume exchange will achieve an 85–90% reduction. Shortly after the exchange transfusion, the residual volume of D positive red cells should be estimated using FC.

- Passive anti-D Ig given in large doses may remain detectable and tests for immune anti-D may not be conclusive for several months.
POLICY 16 - TRANSFER OF PATIENTS WITH BLOOD PRODUCTS

Blood is not normally crossmatched for transfer with patients, blood products will only be transferred for use in transit in extremely urgent cases such as an ECMO transfer.

When blood is transferred with a patient, the Trust remains legally responsibility for full traceability of the blood products we provided for the patient.

The escort team must include members of staff competent in transfusion and treatment of transfusion complications including anaphylaxis.

External Transfers (Hospital to Hospital)

Transfer from Bassetlaw (BDGH) to Doncaster (DRI)

- The transfer team must contact BDGH Blood Bank; during the working day phone ext 2452, out of hours bleep the on-call Haematology BMS via switchboard.

- The transfer team must ensure Blood Bank have received a request to package blood for transfer. If blood is not already crossmatched, immediately despatch a sample and/or request form to BDGH Blood Bank.

- Blood products can only be packaged by Blood Bank staff in validated blood transit boxes with appropriate transfer documentation.

- Blood will not be sent to DRI separately from the patient.

- The transfer team have responsibility for ensuring full traceability of any blood products used in transit.

- The transfer team must complete all accompanying transfusion related paperwork including the blood tags and ensure that all the paperwork is sent to Blood Bank at the receiving site.

- Any unused units and/or the blood transit box must be taken directly to Blood Bank at the receiving site.

Transfer from Mexborough Montagu to Doncaster (DRI)

- The transfer team must contact the on site lab on ext 5235 and DRI Blood Bank; during the working day phone ext 3779, out of hours bleep the on-call Haematology BMS via switchboard.

- The transfer team must ensure crossmatched blood is available for transfer.
- Blood products can only be packaged by authorised staff in validated blood transit boxes with appropriate transfer documentation.

- The transfer team have responsibility for ensuring full traceability of any blood products used in transit.

- The transfer team must complete all accompanying transfusion related paperwork including the blood tags and ensure that all the paperwork is sent to Blood Bank at the receiving site.

- Any unused units and/or the blood transit box must be taken directly to Blood Bank at the receiving site.

Transfer to Hospitals outside the Trust

- The transfer team must contact Blood Bank during the working day, out of hours bleep the on-call Haematology BMS via switchboard.

- The transfer team must ensure Blood Bank have received a request to package blood for transfer. If blood is not already crossmatched, immediately despatch a sample and/or request form to Blood Bank.

- Blood products can only be packaged by Blood Bank staff in validated blood transit boxes with appropriate transfer documentation.

- Blood will not be sent to the receiving hospital separately from the patient.

- The transfer team have responsibility for ensuring full traceability of any blood products used in transit.

- The transfer team must complete all accompanying transfusion related paperwork including the blood tags and ensure that all the paperwork is returned to Blood Bank at the sending site.

- Any unused units and/or the blood transit box must be taken directly to Blood Bank at the receiving site.
APPENDIX 1 - NEONATES AND CHILDREN

Summary

Definitions
- Neonate – child less than 28 days
- Infant – greater than 28 days but less than 1 year
- Child – age 1 year and above

Rate of Infusion
- RBC 10ml-20ml/kg
- PLT 15ml/kg
- FFP 10-15ml/kg
- CRYO 5ml/kg

Volume Required

\[
\text{desired Hb (g/L) - actual Hb (g/L) x weight (kg) x 3 = mls}
\]

Prior to Collection of Blood Products
- Prescribe products
- Obtain Consent
- Verify patient identification
- Cannula/Patency
- Ensure patient’s sample sent to lab
- Perform observations
- Check blood is ready for collection

Equipment
Volumes less than 50mls use syringe driver with appropriate blood pump tubing.
If A/E need to transfuse neonate/child A/E staff must contact neonatal unit or children’s ward for appropriate pump and blood tubing.
- Prior to connecting IV line to patient, purge lower part of line using the settings on the pump. Whilst purging, gently massage air vent until blood reaches end of line.
- Amount to be infused to child must be in the syringe. Clamp red port to blood bag. Check volume and rate of infusion on pump settings prior to connecting line to patient.

Volumes greater than 50ml use Baxter or Alaris pump with appropriate tubing. If pump and tubing not available in A&E, obtain from A3 Children’s Unit.

Observations
Perform before the start of each unit, then every 15 minutes following commencement for 1st hour, every 30 minutes for 2nd hour and hourly thereafter and at the end of each transfusion episode.

Patient Identification
Patient identification and blood product verification must be done at bedside. This is mandatory and is based on: Tag & Bag, Tag & Wristband Checks.
Red cell volume and rate for neonates and children

- Paediatric packs of O RhD negative (cde/cde) / O RhD positive) dependant on neonate’s Rh D type), CMV, Kell and HT negative are used for neonatal transfusions

- CMV negative blood should be used for all transfusions to infants in the first year of life.

- All intra-uterine transfusions (IUTs) and exchange transfusions in the neonatal period should be irradiated. The same applies to top-up transfusions in neonates if there has been an IUT or exchange transfusion or when the child has proven or suspected immunodeficiency

### Clinical situation:

<table>
<thead>
<tr>
<th>Clinical situation:</th>
<th>Aim for HB threshold (g/L):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaemia in the first 24 hours of life</td>
<td>&gt;120g/L</td>
</tr>
<tr>
<td>Ventilated more than 30% oxygen</td>
<td>&gt;120g/L</td>
</tr>
<tr>
<td>Ventilated less than 30% oxygen</td>
<td>&gt;100g/L</td>
</tr>
<tr>
<td>NCPAP more than 30% oxygen</td>
<td>&gt;100g/L</td>
</tr>
<tr>
<td>NCPAP less than 30% oxygen</td>
<td>&gt;80g/L</td>
</tr>
<tr>
<td>In low flow oxygen e.g. nasal prongs</td>
<td>&gt;80g/L</td>
</tr>
<tr>
<td>In air*</td>
<td>&gt;70g/L</td>
</tr>
</tbody>
</table>

### Volume and rate of administration for infants <45kg

<table>
<thead>
<tr>
<th>Volume</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vol (mls) = (desired Hb – actual Hb) x weight (kg) x 3 ÷10</td>
<td>Total volume prescribed ÷ 4 hours = hourly rate</td>
</tr>
</tbody>
</table>

### Children > 45kg weight

<table>
<thead>
<tr>
<th>Volume</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 unit (= approximately 260mls -350mls)</td>
<td>Total unit volume ÷ 4 hours = hourly rate (can be given over 3 hours if tolerated)</td>
</tr>
</tbody>
</table>
Platelet indications for neonates and children

- Apheresis derived and not pooled Platelets are used for children under 16 years of age.
- For neonates should be CMV negative

### Neonatal indications

<table>
<thead>
<tr>
<th>Neonatal indications</th>
<th>Threshold platelet count (x10⁹/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td></td>
</tr>
<tr>
<td>- pre-term (&lt;37 weeks)</td>
<td>&lt;50</td>
</tr>
<tr>
<td>- term</td>
<td>&lt;30</td>
</tr>
<tr>
<td>Symptomatic</td>
<td></td>
</tr>
<tr>
<td>- major organ bleeding e.g. haematuria</td>
<td>&lt;100</td>
</tr>
<tr>
<td>- minor bleeding e.g. petechiae, bruising</td>
<td>&lt;50</td>
</tr>
</tbody>
</table>

### Indications for prophylactic platelet transfusion in children as a result of reduced production. (x10⁹/L)

- <10
  - <20 and one or more of the following: Severe mucositis, Disseminated intravascular coagulation (DIC), Anticoagulant therapy, Platelets likely to fall <10 before next evaluation, Risk of bleeding due to a local tumour infiltration
  - 20–40 and one or more of the following: DIC in association with induction therapy for leukaemia, Extreme hyperleucocytosis, Prior to lumbar puncture or central venous line insertion

### Volume and flow rates

<table>
<thead>
<tr>
<th>Volume and rate of administration for infants and children</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume</strong></td>
</tr>
<tr>
<td>Children weighing &lt;15 kg</td>
</tr>
<tr>
<td>Children weighing &gt;15 kg</td>
</tr>
</tbody>
</table>
**FFP Volume and rate**

Children 16 years and under should receive only Pathogen Reduced Plasma (PRP) sourced from the USA. Non-UK sourced Methylene blue treated FFP (NON-UK MB-FFP) is available in small packs.

<table>
<thead>
<tr>
<th>Volume</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 to 20 ml/kg *</td>
<td>Haemorrhage due to haemorrhagic DN</td>
</tr>
</tbody>
</table>
|              | Coagulopathy and bleeding or risk from invasive procedure | Over 60 minutes

*Also consider Vitamin K

Efficacy is unpredictable and it may be helpful to recheck clotting function after administration

**Definitions**

- Neonate – child less than 28 days
- Infant – greater than 28 days but less than 1 year
- Child – age 1 year and above

**Pre-administration Checks**

- Consent obtained
- Completed prescription to transfuse
- Check patient wearing correct wristband; confirm identifiers are correct (including cot card, notes)
- Check IV access patent
- Check pre transfusion observations done
- A person trained in blood collection available. (Provide them with written patient information e.g. barcoded addressograph label)
Equipment Required

- Sterile gloves
- Apron
- Blood product giving set 2% chlorhexidine in 70% isopropyl
- 50ml syringe
- Extension set and pump.

Record Baseline Observations (the infant should be on a heart monitor)

- Temperature,
- Pulse
- Respiratory rate
- Blood pressure
- O2 saturation

Receipt of Products and Bedside Checks

Transfusion must be started within 30 minutes of the blood product leaving the blood fridge

- Assemble equipment
- Patient blood group to be checked on PAS
- Blood product to be checked by 2 members of staff at the bedside
- Check red tag donation number (G number) against donation number on the bag. If any discrepancy DO NOT proceed.
- Check red tag patient details against patient’s wristband. If any discrepancy DO NOT proceed.
- Check patient details with parent or guardian (if no parent / guardian available identify patient from notes with another staff member). If any discrepancy DO NOT proceed.
- Check integrity of the blood product; expiry date, CMV status and appearance (clots / discolouration). If any discrepancy DO NOT proceed.
- Verify the product to be transfused from the prescription, check for any special requirements.
- Commence the transfusion as below.

Administering the Blood Product via a Syringe Driver

- Attach blood administration set, extension set and 50ml syringe
- Spike blood bag and fill chamber
• Draw blood into syringe, press purge on pump to fill lower section of giving set line. Close the white Clamp.
• Ensure syringe contains volume of blood prescribed. Close red clamp to the blood bag.
• Both nurses check the pump settings, volume to be transfused and the rate as prescribed.
• Flush cannula with Sodium Chloride 0.9% to ensure it is patent.
• Use 2% chlorhexidine in 70% isopropyl to clean hub, and attach extension set to cannula using non touch technique.
• Commence transfusion.
• Both nurses should sign the adhesive portion of the red tag which is placed on the prescription sheet in the notes. The front portion of the red tag should be signed and dated and sent back to the lab immediately to Blood Bank.
• Diuretic therapy should be administered as prescribed and output recorded as necessary.
• Once transfusion is completed observation of temperature, apex and respirations should be recorded.
• Flush cannula with 2mls of normal saline for paed or till T piece clear for neonates.
• On completion of the transfusion the empty bag and tubing are to be disposed of in a yellow bag black stripe.

Administering Blood Product Volumes Greater than 50ml via a Blood Pump for a Child
• Using Blood pump giving set.
• Spike blood bag, fill chamber and line.
• Set pump to prescribed volume and transfusion rate
• 2 nurses to verify settings
• Clean hub with 2% chlorhexidine in 70% isopropyl prior to connecting to patients cannula using non-touch technique.

Neonatal/ Infant/ Child Observations during Transfusion
(The infant should be on a heart monitor)

Observations to be done pre transfusion and 15 minutes following commencement of the transfusion, observations to be recorded every 15 minutes for the first 60 minutes, then every 30 minutes for the next hour then hourly until completion. Observations must be documented on PAWS or Neonatal specific paper work. During this period stay in sight and sound of the infant. These minimum criteria for observations apply to a stable child. If the child is not stable, observations must be done more frequently in accordance with the (PAWS) Paediatric Advanced graded response strategy and clinical judgement.
Reactions

- **Pyrexia <2 degrees rise**

Inform paediatrician and Blood Bank, give paracetamol and resume infusion at a slower rate.

- **Pyrexia >2 degrees**

Observe for other signs and symptoms; inability to maintain saturations, bradycardia, tachycardia, respiratory distress, rigors. Hypotension, localised redness / itching / tracking

Any of the above inform paediatrician and Blood Bank, stop transfusion and return unit to Blood Bank along with a blood samples. Complete transfusion reaction form (available from Blood Bank) and liaise with Blood Bank.

Additional notes

- **Embrace** – blood on route is acceptable via a syringe driver.

- **Time critical transfers.** Any other ambulance other than Embrace. Blood must be packed in a validated sealed blood transit box. Blood and blood products cannot be transfused during transfer of patient. Blood in box must go directly to the receiving hospital’s Blood Bank.

- Blood product collection can be requested via Teletrack.
## APPENDIX 2 – ISBT/IHN CLASSIFICATION OF ATRs

<table>
<thead>
<tr>
<th></th>
<th>1 = Mild</th>
<th>2 = Moderate</th>
<th>3 = Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Febrile type reaction</td>
<td>A temperature ≥ 38°C and a rise between 1 and 2°C from pretransfusion values, but no other symptoms/signs</td>
<td>A rise in temperature of 2°C or more, or fever 39°C or over and/or rigors, chills, other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion</td>
<td>A rise in temperature of 2°C or more, and/or rigors, chills, or fever 39°C or over, or other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion, prompt medical review AND/OR directly results in, or prolongs hospital stay.</td>
</tr>
<tr>
<td>Allergic type reaction</td>
<td>Transient flushing, urticaria or rash</td>
<td>Wheeze or angioedema with or without flushing/urticaria/rash but without respiratory compromise or hypotension</td>
<td>Bronchospasm, stridor, angioedema or circulatory problems which require urgent medical intervention AND/OR, directly result in or prolong hospital stay, or <strong>Anaphylaxis</strong> (severe, life-threatening, generalised or systemic hypersensitivity reaction with rapidly developing airway and/or breathing and/or circulation problems, usually associated with skin and mucosal changes)</td>
</tr>
<tr>
<td>Reaction with both allergic and febrile features</td>
<td>Features of mild febrile and mild allergic reactions</td>
<td>Features of both allergic and febrile reactions, at least one of which is in the moderate category.</td>
<td>Features of both allergic and febrile reactions, at least one of which is in the severe category.</td>
</tr>
<tr>
<td>Hypotensive reaction</td>
<td>Isolated fall in systolic blood pressure of 30 mm Hg or more occurring during or within one hour of completing transfusion and a systolic blood pressure 80 mm Hg or less in the absence of allergic or anaphylactic symptoms. No/minor intervention required.</td>
<td>Hypotension, as previously defined, leading to shock (e.g., acidemia, impairment of vital organ function) without allergic or inflammatory symptoms. Urgent medical intervention required.</td>
<td></td>
</tr>
</tbody>
</table>

Febrile and allergic reactions may present within 4 hours, whilst hypotensive reactions are considered as presenting within one hour.
Comparison of TRALI and TACO

For patients who develop respiratory distress during or shortly after transfusion, and who do not have evidence of wheeze or stridor, the following table may be of help in determining a cause.

<table>
<thead>
<tr>
<th></th>
<th>TRALI</th>
<th>TACO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient characteristics</td>
<td>More frequently reported in haematology and surgical patients</td>
<td>May occur at any age, but characteristically age &gt; 70</td>
</tr>
<tr>
<td>Type of component</td>
<td>Usually plasma or platelets</td>
<td>Any</td>
</tr>
<tr>
<td>Speed of onset</td>
<td>During or within 6 hours of transfusion, usually within 2 hours.</td>
<td>Defined as occurring within 6 hours of transfusion</td>
</tr>
<tr>
<td>Oxygen saturation</td>
<td>Reduced</td>
<td>Reduced</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Often reduced</td>
<td>Often raised</td>
</tr>
<tr>
<td>JVP</td>
<td>Normal</td>
<td>Raised</td>
</tr>
<tr>
<td>Temperature</td>
<td>Often raised</td>
<td>Usually unchanged</td>
</tr>
<tr>
<td>CXR findings</td>
<td>Often suggestive of pulmonary oedema with normal heart size: may be a &quot;whiteout&quot;</td>
<td>Cardiomegaly, signs of pulmonary oedema</td>
</tr>
<tr>
<td>Echo findings</td>
<td>Normal</td>
<td>Abnormal</td>
</tr>
<tr>
<td>Pulmonary wedge pressure</td>
<td>Low</td>
<td>Raised</td>
</tr>
<tr>
<td>Full blood count</td>
<td>May be fall in neutrophils and monocytes followed by neutrophil leucocytosis</td>
<td>No specific changes</td>
</tr>
<tr>
<td>Response to fluid load</td>
<td>Improves</td>
<td>Worsens</td>
</tr>
<tr>
<td>Response to diuretics</td>
<td>Worsens</td>
<td>Improves</td>
</tr>
</tbody>
</table>

In addition to the categories of TRALI and TACO, SHOT is now collecting cases of transfusion associated dyspnoea (TAD). The International Haemovigilance Network (IHN) defines TAD as being characterized by respiratory distress within 24 hours of transfusion that does not meet the criteria of TRALI, TACO, or allergic reaction. Respiratory distress should be the most prominent clinical feature and should not be explained by the patient’s underlying condition or any other known cause. There are currently no other known distinguishing features to aid diagnosis of TAD.
Patient exhibiting possible features of ATR, which may include:
- Fever
- Chills
- Tachycardia
- Hyper/hypotension
- Rigors
- Flushing
- Urticaria
- Bone, muscle, joint, chest & loin pain
- Nausea
- General malaise
- Respiratory

**Stop the Transfusion; undertake rapid clinical assessment, check patient ID/blood compatibility label, visually assess unit**

**Evidence of:** Life-threatening **Airway** and/or **Breathing** and/or **Circulatory** problems and/or wrong blood given and/or evidence of contaminated unit

---

**SEVERE / LIFE-THREATENING**
- Call for urgent medical help
- Initiate resuscitation ABC
- Is haemorrhage likely to be causing hypotension? If not, discontinue transfusion (do not discard implicated units)
- Maintain venous access
- Monitor patient e.g. TPR, BP, urinary output, oxygen saturations

- If likely anaphylaxis/severe allergy – follow anaphylaxis pathway
- If bacterial contamination likely start antibiotic treatment
- Use BP, pulse, urine output (catheterise if necessary) to guide IV 0.9% saline administration.
- Inform Blood Bank
- Return unit (with administration set) to Blood Bank
- If bacterial contamination suspected, Blood Bank to contact NHSBT
- Monitor patient e.g. TPR, BP, urinary output, oxygen saturations
- Perform appropriate investigations

Review at HTC & Report to SHOT/SABRE as appropriate

---

**MODERATE**
- Temperature ≥39°C or ≥2°C and/or
- Other symptoms apart from uritis/rash only

- Consider bacterial contamination if the temperature rises as above and review patient’s underlying condition & transfusion history
- Monitor patient more frequently e.g. TPR, BP, oxygen saturations, urinary output.

---

**MILD**
- Isolated temperature ≥38°C and a rise of 1-2°C and/or
- Pruritus/rash only

- Continue transfusion
- Consider symptomatic treatment
- Monitor patient more frequently as for moderate
- If symptoms/signs worsen, manage as moderate/severe

---

Transfusion related event
- Transfusion unrelated

Document in notes that no notification required

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Author: Gill Bell
Title: Blood Transfusion Policy
Document No.: PAT/T2 v.5

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May 2014
Symptoms and signs of acute transfusion reactions (ATR)

Fever and related symptoms or signs

Although characteristic of FNHTR, pyrexia and other symptoms or signs of an inflammatory response (myalgia, malaise, nausea, chills or rigors) may also occur in acute haemolysis, TRALI and bacterial transfusion-transmitted infection (TTI).

Transfusion can often be continued in patients with mild FNHTR but differentiation from other causes is not always straightforward. Life-threatening haemolysis due to ABO incompatibility is unlikely if the correct unit of blood has been given. Acute haemolysis due to other antibodies may occasionally present with immediate clinical features suggesting a severe or moderate febrile reaction during the transfusion, with signs of haemolysis appearing later. TRALI can be reasonably excluded if the patient has no respiratory symptoms. The possibility of bacterial TTI should always be considered as early appropriate treatment is life-saving. Several authors report this to be more likely if the rise in temperature is 2ºC or more. In the 16 confirmed reports of bacterial TTI to SHOT between 2005 and 2010, all patients had symptoms or signs in addition to pyrexia and, in the five cases where a specific temperature was stated this was either 39ºC or above or associated with a rise of greater than 2ºC.

Inspection of the implicated unit is important as discoloration or abnormal particles are suggestive of contamination

Skin lesions and rashes

Urticaria is commonly seen with allergic reactions but other types of skin change may occur, such as maculopapular rashes, erythema or flushing. In some transfusion reactions there is no visible rash but itching is reported by the patient.

Angio-oedema

This describes localized, non-pitting, oedema of the subcutaneous or submucosal tissues and usually indicates an allergic reaction. The eyelids and mouth are most often affected, less commonly throat and tongue. If angio-oedema occurs, the transfusion must be stopped immediately and the patient promptly assessed and treated.

Dyspnoea

Shortness of breath is a non-specific symptom and successful management relies on careful clinical examination supported by the results of investigations such as radiology and measurement of oxygen saturation/blood gases. Possible causes include allergy, TRALI, TACO and TAD. Stridor and wheeze suggest an allergic reaction but also occur in patients with TACO and have been reported once, associated with chills and rigors, in bacterial TTI.
Pulmonary oedema with clinical signs of basal crackles and radiological evidence suggest a diagnosis of TACO or TRALI and helps exclude allergy. Low oxygen saturation is not diagnostic of a specific condition, although it gives information on severity.

The possibility that clinical features are related to the patient’s underlying illness must be kept in mind.

**Anaphylaxis**

The UK Resuscitation Council advises that a precise definition of anaphylaxis is not important for emergency treatment. An anaphylactic reaction involves a severe, life-threatening, generalised or systemic hypersensitivity reaction characterised by rapidly developing airway and/or breathing and/or circulation problems usually associated with skin and mucosal changes.

**Hypotension**

This is defined as a drop in systolic and/or diastolic blood pressure of greater than 30 mm Hg. It is a common and non-specific feature of acute haemolysis, severe allergic reaction, bacterial contamination or TRALI. It occurs rarely as an isolated finding and some cases have been attributed to the generation of bradykinin and angiotensin when blood components were exposed to the charged surface of leucoreduction filters. Patients taking ACE inhibitors and those with a genetic defect which prevents bradykinin breakdown were most at risk. In addition hypotension may be associated with the patient’s underlying condition, especially haemorrhage, so careful clinical risk assessment is required when deciding to stop the transfusion for this indication.

**Bleeding diathesis of acute onset**

This is highly suggestive of disseminated intravascular coagulation (DIC) especially when there is oozing from wounds or intravenous line insertion sites. It is most likely in severe acute haemolysis (especially ABO incompatibility) or bacterial contamination and is an alert that the transfusion must be stopped immediately and rapid clinical assessment undertaken.

**Tingling around the face and lips**

This is a recognised herald symptom of angioedema but may also occur in patients who are hyperventilating or during a plasma or red cell exchange procedure with citrate anticoagulant due to a fall in ionised calcium.

**Pain**

Patients with febrile reactions often complain of generalised muscular and bone aches, probably due to release of inflammatory cytokines. Acute haemolytic reactions, particularly those due to ABO incompatibility, may be characterised by pain at the infusion site, abdomen, chest and loins. Chest pain can also be an occasional feature of anaphylactic reactions, possibly due to myocardial ischemia.

**Severe Anxiety**

This is often reported in serious transfusion reactions. A feeling of impending doom has been described in acute haemolysis and bacterial transfusion-transmitted infection and should always initiate urgent review of the patient. However, mild anxiety is common in patients being transfused, especially for the first time.
APPENDIX 4

Fresh Frozen Plasma (FFP) Dosage

Fresh Frozen Plasma (FFP) has optimal value when transfused at the appropriate dose. The recommended adult therapeutic dose of FFP is 15ml/kg, and the dose of FFP should always be at least 10ml/kg; however a national audit showed in clinical practice 40% of adults received a FFP dose <10ml/kg.

The prescribed dose of FFP should be guided by clinical situation and coagulation results.

### Calculations for One Adult Therapeutic Dose FFP

<table>
<thead>
<tr>
<th>Patient Weight (kg)</th>
<th>FFP dose Volume / Units†</th>
<th>Units FFP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15ml/kg</td>
<td></td>
</tr>
<tr>
<td>Up to 60 kg</td>
<td>900 ml</td>
<td>3</td>
</tr>
<tr>
<td>65 kg</td>
<td>975 ml</td>
<td></td>
</tr>
<tr>
<td>70 kg</td>
<td>1050 ml</td>
<td>4</td>
</tr>
<tr>
<td>75 kg</td>
<td>1125 ml</td>
<td></td>
</tr>
<tr>
<td>80 kg</td>
<td>1200 ml</td>
<td></td>
</tr>
<tr>
<td>85 kg</td>
<td>1275 ml</td>
<td></td>
</tr>
<tr>
<td>90 kg</td>
<td>1350 ml</td>
<td>5</td>
</tr>
<tr>
<td>95 kg</td>
<td>1425 ml</td>
<td></td>
</tr>
<tr>
<td>100+ kg</td>
<td>1500 ml</td>
<td></td>
</tr>
</tbody>
</table>

†Volume of FFP in a unit is variable, mean FFP unit volume ≈ 273mls (rounded up to 275mls for ease of calculation).

This document is intended as a guide to the appropriate adult dose of FFP, it is not a directive, and should not be used in place of clinical assessment.

Caution should be exercised if using this chart for calculating FFP volumes for overweight patients as the volume suggested may be an over estimation and may risk fluid overload.

Protocols for the Management of Massive Haemorrhage contain alternative strategies for the adult dose of FFP; please refer to Appendix 5 Massive Haemorrhage Protocol as appropriate.
APPENDIX 5  MASSIVE HAEMORRHAGE PROTOCOL

Explanatory Notes:

1. Recognise trigger and activate pathway for management of massive haemorrhage.
   - If you need the emergency O RhD Negatives you need to activate the Massive Haemorrhage protocol.

2. Allocate team roles
   - Team leader
   - Communication lead dedicated person for communication with other teams, especially the transfusion laboratory and support services not the most junior member of the team
   - Sample taker / investigation organiser / documenter
   - Transporter - porter, member of team from clinical area

3. Complete request forms / take blood samples, label samples correctly / recheck labelling
   - FBC, Crossmatch, PT, APTT, Fibrinogen, U+E, Calcium

4. Request blood / blood components
   - Communication lead to contact laboratory and inform the BMS of the following:
     - Activation of the massive haemorrhage protocol using the trigger phrase “I would like to activate the Massive Haemorrhage Protocol “
     - Your name, location and ext number / bleep number
     - The patient’s details: ideally surname, forename, District number.
     - Order massive haemorrhage pack 1 (MHP1)
     - Contact Blood Bank if blood has been transferred in with the patient from another Trust or patient is being transferred to another Trust

5. The clinical / laboratory interface
   - Communication lead to arrange for transport of samples / request form to the laboratory
   - BMS to ring communication lead when blood / blood components are ready
   - Communication lead to arrange to collect blood and blood components from the Blood Bank.
   - Abnormal results or advice required – Clinical Lead contact Consultant Haematologist

   - Take repeat bloods at the end of event
   - Continue to monitor patient closely for signs of re-bleed

7. Ensure documentation is complete
   - Clinical area: monitoring of vital signs, timings of blood samples, communications, transfusion documentation in patient case notes, return traceability information to Blood Bank (Tags / emergency O RhD Negative slips),
   - Blood Bank: keep record of communications / telephone requests on worksheet, MHP issued (including O RhD negatives)
   - Transfusion Practitioner: completion of audit proforma, ideally within 24 hours
**Massive Haemorrhage**

Patient bleeding / collapses. Ongoing severe bleeding eg: 150 mls/min. Clinical shock

**Activate Massive Haemorrhage Protocol**

Most senior clinician in charge to contact Blood Bank, using the trigger phrase “I would like to activate the Massive Haemorrhage Protocol”

STOP THE BLEEDING

Transfusion lab 🆘 3779 (DRI) 2452 (BDGH)
Out of hours bleep Haematology BMS.
(Consultant Haematologist not required to activate protocol)

RESUSCITATE
Airway
Breathing

**Haemorrhage Control**

- Direct pressure / tourniquet if appropriate
- Stabilise fractures
- Surgical intervention – consider damage control surgery
- Interventional radiology
- Endoscopic techniques
- Obstetric techniques

**Haemostatic Drugs**

- Tranexamic acid 1g bolus IV followed by 1g after 3 hrs
- Vit K and Prothrombin complex concentrate (PCC) for warfarinised patients and
- Other haemostatic agents discuss with Consultant Haematologist

**Cell salvage**
If available & appropriate

**Thromboprophylaxis**
should be considered when patient stable

**MHP = massive haemorrhage pack**

**STOP THE BLEEDING**

**Take bloods and send to lab:**

- XM FBC PT, APTT, fibrinogen U+E, Ca²⁺

**Collect MHP 1**

- Red cells* 4 units
- FFP 4 units
- Platelets 1 unit
- *Emergency group O blood or group specific blood or XM blood may be issued; dependent on group & save status

**Give MHP 1**

**Reassess**
Proceed or Stand down
Suspected continuing haemorrhage requiring further transfusion

**Take repeat bloods as above and deliver to lab in exchange for MHP 2**

**MHP 2**

- Red cells 4 units
- FFP 4 units
- Platelets 1 unit
- Cryoprecipitate 2 pooled packs

**Give MHP 2**

**Reassess**
Proceed or Stand down
Suspected continuing haemorrhage requiring further transfusion

**Take repeat bloods as above and deliver to lab in exchange for MHP 3**

**Give MHP 3**

**Prevent Hypothermia**

- Use fluid warming device
- Used forced air warming blanket

- Consider 10 mls Calcium chloride 10% over 10 mins

**FBC PT, APTT, fibrinogen Abnormal results or advice required – contact Consultant Haematologist**

**Aims for therapy**

- Hb 80-100 g/L
- Platelets >75 x 10⁹/l
- PT ratio < 1.5
- APTT ratio <1.5
- Fibrinogen >1g/l
 (>2g/l Obstetric)
- Ca²⁺ > 1.8mmol/l
- Temp > 36°C
- pH > 7.35 (on ABG)
- Monitor for hyperkalaemia

**STAND DOWN**

- Inform lab
- Return unused components
- Complete documentation (including blood tags & audit data)
- Take repeat bloods at the end of event