Blood Transfusion Policy
and related guidelines

Ashford & St Peters Hospital
Frimley Park Hospital
Royal Surrey County Hospital
and satellite sites

Amendments

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<tr>
<td>January 2014</td>
<td>Whole Document review Merging of two previous guidelines (Blood Transfusion and Anti-D Prophylaxis).</td>
<td>SPS Hospital Transfusion Team ASPH Hospital Transfusion Committee &amp; ASPH Quality Governance Committee FPH Hospital Transfusion Committee RSCH Hospital Transfusion Committee &amp; RSCH Clinical Quality Governance Committee</td>
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Compiled by: Dr John de Vos (Chairman SPS Hospital Transfusion Team & Consultant Haematologist RSCH) & Nicola McVeagh (Lead Transfusion Practitioner SPS)

Rated by: Quality Governance Committee

Date Ratified: February 2014

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Target Audience: All Medical, Nursing, Midwifery, Operating Department Practitioners and relevant support staff who manage patients who require transfusions or other blood products

Impact Assessment

Carried Out By: Nicola McVeagh

Policy Owner: Nicola McVeagh
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# BLOOD TRANSFUSION POLICY

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BLOOD TRANSFUSION POLICY

1. INTRODUCTION
This policy fully supports the recommendations for clinical practice and training in transfusion medicine published by the British Committee Standards for Haematology (BCSH), National Patient Safety Agency (NPSA), Serious Hazards of Transfusion (SHOT) scheme and other national and local guidelines as referenced. This policy encompasses all blood products and components. Specific information on individual blood products/components can also be found in the guideline section (e.g. Reversal of oral over-anticoagulation (Beriplex)). This policy applies to all hospitals supplied by Surrey Pathology Services; namely Ashford & St Peters NHS Foundation Trust, Frimley Park Hospital NHS Foundation Trust and the Royal Surrey County Hospital NHS Foundation Trust and all satellite hospitals that use blood components/products supplied by those blood banks:

- Farnham Hospital and Renal Dialysis Unit
- Haslemere Hospital
- Milford Hospital
- Phyllis Tuckwell Hospice
- Sam Beare Hospice
- Spire Clare Park Hospital
- BMI The Runnymede Hospital
- Walton Community Hospital
- Woking Community Hospital
- Woking Hospice

2. PURPOSE
The purpose of the policy is to assist all staff involved in any aspect of blood transfusion to ensure the right blood products/components are given to the right patient at the right time. It also aims to ensure a standardised approach to the management of patients receiving blood products/components, reflecting best practice, thereby reducing the risks associated with transfusions. The policy includes guidelines for the use of specific components and products, and for the management of patients with specific needs (e.g. paediatric patients).

3. DEFINITIONS
See also the abbreviation section at the end of this document.

3.1 ‘BLOOD COMPONENTS’ includes blood, platelets, fresh frozen plasma (FFP) and cryoprecipitate, i.e. items which are blood group specific. There are also separate sections within this document on the use of platelets, fresh frozen plasma and cryoprecipitate.

3.2 ‘BLOOD PRODUCTS’ relates to manufactured, non-cellular blood derived items, such as albumin solutions and factor concentrates, and genetically engineered concentrates, such as recombinant Factor VIII and Novoseven.

3.3 ‘UNIQUE PATIENT NUMBER’ Patients are increasingly moving across to having both NHS and hospital numbers. Patients may also have other numbers instead such as a Major Incident, Accident and Emergency (A+E) or a Military number. Therefore throughout this document the term unique patient number has been used to cover these possibilities.

3.4 ‘MEDICAL RECORD’ refers to the journal portion of the patient’s case notes.

3.5 ‘BLOOD REFRIGERATOR/FRIDGE’ refers to a refrigerator specifically designated for the storage of blood products/components for transfusion, fitted with a temperature recording device, and an alarm system.

3.6 ‘COMPATIBILITY TAG’ refers to the label hanging from the blood product/component, attached by blood bank, and used as part of the checking process.
3.7 ‘BLOOD BAG LABEL’ is the label pasted to the blood component by the National Blood Service, which states the product type, unit number, group and expiry.

4. DUTIES
Healthcare organisations have an obligation to provide a safe and effective transfusion service to their patients and appropriate training to their staff. A suitable infrastructure is required to establish and continue support for these activities.

4.1 TRUST BOARD has overall responsibility for the strategic development and effective implementation of the policy across the Trusts.

4.2 GENERAL MANAGERS must ensure adequate dissemination and implementation of policy, ensuring all staff are aware of their respective roles and responsibilities, in the event of a transfusion.

4.3 WARD / DEPARTMENTAL MANAGERS must ensure staff attend mandatory transfusion training relevant to their role every 2 years and are assessed as competent every 3 years.

4.4 THE HOSPITAL TRANSFUSION COMMITTEE & JOINT SPS HOSPITAL TRANSFUSION TEAM must ensure the development, monitoring and auditing, of safe and effective transfusion policies and guidelines across all sites. The Joint SPS Hospital Transfusion Team meets monthly to discuss all aspects of transfusion; the outcome of this is fed into the quarterly Hospital Transfusion Committee meetings at each site. This enables monitoring of all aspects of transfusion as reported in section 26 ‘Process for monitoring compliance and effectiveness of this policy’.

4.5 TRANSFUSION PRACTITIONER (TP) TEAM IS RESPONSIBLE FOR
- Ensuring development and provision of competency based transfusion training courses for clinical staff in order to meet the training needs analysis, and sustaining training targets in accordance with recommendations from Better Blood Transfusion Health Service Circular 2007/001, and the National Patient Safety Agency Safer Practice Notice 14.
- Maintaining an accurate database of staff attendance at transfusion training courses and achievement of competency
- Monitoring implementation of the policy through data collection and audit activities
- Providing an expert resource to support practitioners and representing the Trust at relevant regional and National meetings
- Investigation of incidents and instigation of corrective and preventative actions
- Policy and guideline review in line with national directives and changes in practice
- Production of traceability statistics and reports

4.6 TRUST STAFF
Staff must read and adhere to the policy and any other transfusion guidelines that pertain to their role and area of work. Staff must also meet the training and competency requirements outlined in section 25.

4.7 ASSESSORS of blood competency must themselves have been competency assessed by a member of the TP team to competency level 5 (Benner 1984). Registered nursing/midwifery staff also require an approved mentor qualification e.g. mentorship, mentor preparation, ENB 998/997 or Certificate in Education.

5. APPROVAL OF THE TRANSFUSION POLICY
The policy has been ratified by the joint Hospital Transfusion Team and each Trusts Hospital Transfusion Committee. Other ratification required as follows:
- ASPH – Quality Governance Committee
- FPH: no further ratification required
- RSCH – Clinical Quality Governance Committee
6. WHO MUST READ THIS DOCUMENT?
All staff involved in sampling, prescribing, ordering, collecting, administration of blood products/components and care/monitoring of a patient receiving a transfusion must read the sections relevant to their place of work and role.

PROCESSES

7. COLLECTION OF BLOOD SAMPLES FOR PRE-TRANSFUSION TESTING
Blood taken from one patient and labelled with another patient’s details may result in the laboratory issuing ABO incompatible blood. This may have a fatal outcome. The following guidelines are designed to prevent such errors.

- Cross matched blood can only be supplied if there are 2 results for the patient confirming their blood group.
- The 2 blood group results must have been from samples taken at different times; one can be an historical result and one must be from a current sample.
- Staff taking blood must not take 2 samples at the same time as this defeats the object of the 2 group request (2 samples from the wrong patient will give 2 wrong but identical results).
- Staff should continue normal practice of sending one sample at a time for a patient.
- Blood bank will ask for another sample if required and if contact details/ward are provided; this request will also be added to the results on Winpath.
- In emergency situations this will not delay issue of blood; emergency O RhD negative blood will be issued and should be used instead of cross matched blood.

7.1 WHO CAN TAKE SAMPLES?
Staff who are assessed as competent in blood transfusion sampling are allowed to take samples for group and save / cross matching.

7.2 WHO CAN REQUEST?

- **Group and Save requests:** Requests for Group and Save (G+S) may be made by medical staff, midwives, and nurses.

- **Cross match requests (written or telephone):** Requests for issue of blood products/components may be made by medical staff, specialist nurses, and midwifery staff (anti-D only).

A blood transfusion request form (paper or electronic where in place) must be completed for each request.

7.3 PROCESS FOR COLLECTION OF BLOOD SAMPLES FOR PRE-TRANSFUSION TESTING

**Patient Identification**
Positively identifying the patient is essential to ensure the patient receives the right product/component. Any discrepancies in identity details must be resolved before taking the sample.

**Patients able to confirm their identity**
- Ask the patient to state their full name and date of birth (do not use closed questions such as “Are you Mrs Smith?”).
- Check these details match exactly with the identity bracelet if an inpatient; for out-patients confirm this against the notes/request form.
- Check the patient’s unique number, full name and date of birth exactly matches the identity bracelet (inpatient) or the notes (outpatient) and the request form.
• Where electronic order communication systems are in place the wristband ID barcode must be scanned using the portable device in use and patient’s identity confirmed.

**Patients unable to confirm their identity**

- Check that the full name, date of birth and patient’s unique number exactly matches the identity bracelet, the request form, and the patient’s notes.
- The parent or carer can also be asked to confirm the patient’s identity.
- Where electronic order communication systems are in place the wristband ID barcode must be scanned using the portable device in use and patient’s identity confirmed.
- A system exists in the A+E Departments to provide an unconscious, unidentified, patient with a unique identity to ensure continuity of identification. The minimum requirements are a unique number and gender.

**Labelling the sample**

- Do not use pre-labelled containers.
- Once identity has been confirmed blood must be taken and labelled, in one uninterrupted operation, **at the bedside**.
  - Where electronic order communication systems are in place labels which are printed ‘on demand’ at the patient’s side at the time of phlebotomy can be affixed to the sample.
  - Samples not taken using electronic ordering must be labelled by hand at the patients side.
- The identity details on the sample must exactly match the identity bracelet so label the sample from the identity bracelet.
- Labelling samples away from the bedside raises the risk of labelling it with another patient’s details which could have a fatal outcome.
- Staff taking samples from central or arterial lines must follow the same processes.

**Minimum data accepted on the sample and request form:**

- Surname
- First name
- date of birth
- Patients unique number
- Samples taken from mothers and babies at birth must both have different unique numbers
- Signature of person requesting the blood on the form
- Signature or initials of the person who took the sample on the sample bottle
- Clinical details, blood components/products being requested, location and the time and date required

Do not label a sample that someone else has taken. The only exception to this rule would be during an emergency situation where you have seen the clinician positively identify the patient and can verify the identity and label the sample from the identity bracelet as above.

The sample must be sent to the blood bank in the most appropriate way, dependent on its urgency, and according to local policy.

**7.4 INADEQUATELY LABELLED SAMPLES AND FORMS**

Samples or forms missing one or more data items, or with data items which do not match between the form and sample bottle, will be rejected completely and attempts will be made to notify the requestor. Under no circumstances will amendments or changes to samples be allowed once they have been received in the laboratory. The laboratory will keep a record of such incidents and present them to the Hospital Transfusion Committee for investigation.
8. TRANSFUSION TO CROSS-MATCH INTERVAL
In situations where patients are being repeatedly transfused, a daily sample is not a requirement. These patients must be screened for the development of irregular antibodies at least every 72 hours. This interval has been selected to be both practical and safe.

The British Committee for Standards in Haematology provide the following rules for sample validity:

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<th>Patient transfused/pregnant</th>
<th>Sample to be taken not more than</th>
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<tr>
<td>Less than 3 months</td>
<td>72 hours before transfusion</td>
</tr>
<tr>
<td>More than 3 months</td>
<td>7 days before transfusion</td>
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It is recognized that for some individuals e.g. haematology patients, who have been repeatedly transfused for several years and who have not had an antibody response, a more tolerant approach may be taken. This can only be undertaken by the Consultant Haematologist caring for the patient, who must notify Blood Bank of this in writing, using a transfusion request form.

9. PROVISION OF SAMPLES FOR BLOOD IN A LIFE THREATENING SITUATION
All of the above principles regarding identification and labelling must be followed.

- If the minimum data requirements are not met on the sample or form in a life-threatening situation, emergency group O RhD negative blood (flying squad) will be issued until a correctly labelled sample is provided.
- Emergency O RhD negative blood may not be suitable for all patients. If a patient has known antibodies they must receive cross matched blood wherever possible.
- Group specific blood can be obtained from a patient sample in 15 minutes
- An urgent full group and antibody screen, and (if no antibodies) electronic cross match takes approximately 45 minutes; however patients with antibodies may take considerably longer.
- Please refer to the Massive Haemorrhage guideline and Local Trusts Patient Identification policy for further guidance.

10. TELEPHONE REQUESTS
An electronic record will be kept by the laboratory of all telephoned requests for blood components. The identity of the person making the request and the person receiving the request must be recorded.

In critical situations Registered Nurses/Midwives/ODP’s may make telephone requests for blood components if the following conditions have been met:

- A valid G+S or crossmatch request form and sample sent
- The name of the requesting Medical Dr must be provided by the Nurse/Midwife/ODP

In all situations the following information must be provided:-

- the patient’s surname and first name
- patients unique number
- the patient’s location
- the number and type of blood components required
- the date and time required
- any special requirements (e.g. irradiated or Cytomegalovirus (CMV) negative - see sections 34 and 38 of this policy)

11. PATIENT INFORMATION AND CONSENT
- Where possible, patients (and/or for paediatric patients those with parental responsibility) should have the risks, benefits and alternatives to transfusion explained to them in a timely and understandable manner to allow the patient to make an informed choice on whether to accept the transfusion or not.
- For some patients the exclusion from future blood donation, as a result of a transfusion, will be a significant factor in their decision making so it is important to discuss this with them.
- Patient information is contained within the Blood transfusion care pathways (where these are in use), and National Blood Service leaflets. Please contact the Transfusion Practitioner (TP) team. This information should be given to patients to support the discussion.
- Leaflets for patients who speak other languages are available from the TP team.
- Verbal consent must be taken, where possible, and documented in the relevant area of the patients' notes and care pathway where one is in use.
- If a patient refuses a transfusion please refer to section 42 ‘Refusal of Transfusion’ and contact the Haematologist/TP team if necessary.
- If a patient receives a transfusion whilst unconscious or whilst unable to give consent for any reason, they should be informed of this as soon as possible.
- Advice or patient information can be obtained from the TP team.

12. THE PRESCRIPTION OF BLOOD PRODUCTS/COMPONENTS

12.1 MINIMISING TRANSFUSIONS:
Transfusion of blood / blood components is not without risk, blood is a finite resource, and safety requirements increase the cost. The decision to transfuse must therefore be based on a thorough clinical assessment of the patient. Clinicians prescribing red cell transfusions should be aware of the appropriate indications and the risks and benefits of transfusion.

Alternatives to transfusion should be considered wherever possible and available; e.g. oral or intravenous iron, erythropoietin, intra-operative cell salvage.

The cause of anaemia should be established, and treatment with red cell transfusions should not be given where effective alternatives exist, e.g. treatment of iron deficiency, megaloblastic and autoimmune haemolytic anaemia unless the anaemia is life-threatening. See also the section 44: Surgical Transfusion guideline for pre-operative management of anaemia.

There is no universal ‘trigger’ for red cell transfusions, i.e. a given concentration of haemoglobin at which transfusion of red cells is appropriate for all patients. Clinical judgement plays a vital role in the decision to transfuse red cells or not.

- Patients are not normally be transfused if the haemoglobin concentration is above 10 g/dl.
- A strong indication for transfusion is a haemoglobin concentration below 7 g/dl.
- Transfusion will become essential when the haemoglobin concentration decreases to 5 g/dl.
- A haemoglobin concentration between 8 and 10 g/dl is a safe level, even for those patients with significant cardio respiratory disease. Symptomatic patients should be transfused.
- Patients must not be transfused just to achieve a ‘normal’ haemoglobin concentration.

Some patients refuse blood transfusion, e.g. Jehovah’s Witnesses, and need to be managed without giving blood products (please refer to section 42 ‘Refusal of Transfusion’).

12.2 PRESCRIPTION
Blood products/components must be prescribed on a prescription chart by a registered medical doctor. The prescription must specify:-

- the patient’s full identity details
- the blood product/ component(s) to be administered,
- each unit must be prescribed separately
- any special requirements (e.g. irradiated, CMV negative blood - see sections 34 and 38)
- the quantity to be given (usually stated as number of units or volume in mls)
- the duration of transfusion for adults as follows
  - Red cells: usually 2-3 hours for each unit, however can be transfused rapidly if clinically indicated and prescribed. Blood can only be out of the fridge for a maximum of 4 hours so this limits transfusion time.
  - Platelets: 30 minutes for one adult dose
  - Fresh Frozen Plasma (FFP): 30 minutes for each 300 ml
• any special instructions e.g. medication required before or during transfusion must be prescribed separately
• **drugs must never be added to the product/component bag**
• if blood is required to be warmed during transfusion this must be prescribed on the prescription chart (with the exception of intra-operative patients)

There must be a clear entry in the case notes detailing:
• the indication for the use of blood products/components (to include Hb result)
• number and type of components to be transfused
• date to be transfused
• any special instructions e.g. for transfusion at night
• consent (see also section 11)

### 13. STORAGE OF BLOOD AND BLOOD COMPONENTS

**Red cell concentrate (RCC)**
- Must only be stored at 4°C +/- 2°C in a blood refrigerator or an accredited blood cool box
- Accredited cool boxes keep blood at the correct temperature for a maximum of 4 hours only and will be supplied by blood bank
- The blood refrigerator must not be used for any other purpose.
- The blood refrigerator must be in an area that cannot be accessed by members of the public

**Platelets** must be stored at 22°C +/- 2°C – i.e. NEVER in a blood refrigerator or cool box. Special arrangements are required due to the limited life of packs outside of agitators.

**Thawed Fresh Frozen Plasma:** after thawing and when FVIII replacement is not required, FFP may be stored at 4°C +/- 2°C in a blood fridge/cool box before administration to a patient so long as the infusion is completed within 24 hours of thawing

**Thawed Cryoprecipitate** must be stored at room temperature and the transfusion completed within 4 hours of thawing

### 14. COLLECTION OF BLOOD COMPONENTS FROM/TO THE BLOOD BANK/BLOOD FRIDGE/COOL BOX

**14.1 WHO CAN COLLECT/RETURN BLOOD COMPONENTS:** Nurses, midwives, operating department practitioners, health care assistants, and (FPH only) ward clerks, housekeepers and (ASPH & FPH only) porters, who have been trained and competency assessed to collect blood. Registered medical doctors are not usually assessed to collect blood.

**14.2 COLLECTING RED CELLS**
Where electronic tracking of red cells (Blood Tracker) is in place please see Appendix 1 Electronic Tracking section 30 for process to follow.

Red cells (blood) will be in the Blood Bank Issue fridge and in the following satellite fridges:
- **ASPH**
  - Ashford: Pathology
  - SPH Theatre
  - SPH Labour ward
- **BMI The Runnymede Hospital**: Theatre
- **Woking Hospice**: ward
- **Walton Community Hospital**: Oatlands Ward
- **Sam Beare Hospice**: ward
• FPH
  o A+E Resus
  o Theatre
• Phyllis Tuckwell Hospice: ground floor corridor; near ward
• Spire Clare Park Hospital: Out Patients Department

• RSCH
  o Chilworth ward
  o Maternity unit

14.3 PROCESS FOR COLLECTION OF BLOOD PRODUCTS/COMPONENTS FROM THE BLOOD BANK/BLOOD FRIDGE/Cool BOX

The same process applies at every blood fridge, and to a cool box, if that is being used in place of a blood fridge. The processes are detailed below and are general principles that apply to every unit regardless of whether removed and checked manually or electronically.

If more than one unit is required for an emergency situation but blood is not going to be immediately transfused, e.g. transferred with a patient, an approved cool box must be used which the transfusion laboratory will supply.

If taking blood to another blood fridge within the Trust the blood must be put into the blood fridge immediately (within 30 minutes of removal) and the time and date recorded in the ‘Placed in blood refrigerator’ box at the base of the pink register form that accompanies the blood. This form then becomes the register for subsequent removal/return of the product to the fridge.

• It is important to firstly check that the blood is ready for collection by checking on the Trust pathology IT system
• Entry to blood banks and blood fridges is controlled: make sure you know how to access the blood fridge before going.
• ASPH & FPH only: Requests for the porters to collect blood may be made; a collection form with patient’s full ID details must be available for the porter and must state what is to be collected.

One of the following approved documents bearing full patient identification details (surname, first name, date of birth, and unique number) must be taken to the fridge:
  o Transfusion record (ASPH only)
  o Transfusion care pathway (preferred form where one is in use)
  o Prescription chart
  o PAS print out (ASPH porters only)
  o Written request form (ASPH Theatre Porters)
  o MR120 form (FPH only)

• At the blood fridge, the digital readout must show a temperature between 2 and 6°C. If the fridge is outside of these limits or/and alarming, do not proceed and contact the blood bank immediately.

• Only one unit of blood can be removed at any one time unless
  o this is an emergency situation where blood is going to be immediately transfused
  o the blood is going into an approved cool box
  o it is being taken immediately (within 30 minutes) to another blood fridge

• The delivery of blood to a ward must be brought to the attention of a senior member of staff/the person who is to administer the transfusion to avoid undue delay in starting the transfusion.
• The unit of blood must be checked and put up immediately as red cells cannot be returned to the fridge/cool box after 30 minutes from the time removed from the blood fridge. (See administration section 17).
• Red cells, once removed from the fridge/cool box, have a 4 hour life span and the transfusion must be completed or ended after 4 hours
• If blood cannot be put up within 30 minutes due to circumstances beyond your control, but the patient still needs the blood, the unit can be commenced but must be stopped after the blood has been out of the fridge/cool box for four hours.

14.3.2 COLLECTING RED CELLS
• Locate the unit for the patient and ensure the fridge door is closed completely/cool box lid replaced after removal.
• Check the 4 points of patient identification; Surname, first name, date of birth and patients unique number exactly match on approved document and the compatibility tag attached to the blood.
• Then check on the 2 labels on the blood (compatibility tag and blood bag label) that the unit number, blood group including RhD status, expiry date and type (i.e. red cells) exactly match.
• If all details exactly match, and the unit is in date, then record removal by printing your name, and the date and time of removal, against the correct unit number on the appropriate register form in the folder by the fridge/product.
• Document the time removed and the unit number on the transfusion care pathway (where one is in use).
• If there is any discrepancy in the details at any point do not continue, return the unit to fridge/cool box if within 30 minutes of removal, or to Blood Bank if more than 30 minutes.

14.3.3 COLLECTING PLATELETS
The units must be checked in the same way as blood regarding patient identity and unit details. Documentation remains as for red cells.
• Platelets will be in a platelet agitator in the blood bank.
• Platelets must be kept at room temperature at all times.
• Do not place in any form of refrigerator including a blood fridge.
• All units can be collected at the same time.

14.3.4 COLLECTING FRESH FROZEN PLASMA (FFP)/CRYOPRECIPITATE
The units must be checked in the same way as blood regarding patient identity and unit details apart from the expiry date which is detailed below. All units can be collected at the same time. Documentation remains as for red cells.
• FFP will either be in the issue fridge or the blood bank.
• FFP must be collected and transfused as soon as possible. It has a maximum storage time, once thawed, of 4 hours if not in a blood fridge or 24 hours if it has been kept in a blood fridge. Please note therefore that the expiry date on the label on the bag will differ from the expiry date on the compatibility tag. Please ensure both dates have not passed.
• Cryoprecipitate will be in the Blood bank.
• Cryoprecipitate must be collected and transfused as soon as possible. It has a maximum storage time, once thawed, of 4 hours. Please note therefore that the expiry date on the label on the bag will differ from the expiry date on the compatibility tag. Please ensure both dates have not passed.

14.4 COLLECTING OTHER BLOOD PRODUCTS (ANTI-D / HUMAN ALBUMIN SOLUTION (HAS) / BERIPLEX / NOVOSEVEN)
• The units must be checked in the same way as blood regarding patient identity and unit details. Documentation remains as for red cells.
• These products will be in the blood bank.
• All of the products can be removed at the same time.
15. THE REMOVAL OF EMERGENCY O RH D NEGATIVE (FLYING SQUAD) BLOOD

Emergency group O RhD negative blood is kept in the following locations:

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Number O RhD neg units available for immediate use</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASPH</td>
<td>Ashford: Pathology issue fridge</td>
<td>4 adult units</td>
</tr>
<tr>
<td></td>
<td>SPH Main issue fridge</td>
<td>2 adult units</td>
</tr>
<tr>
<td></td>
<td>SPH Theatre issue fridge</td>
<td>2 adult units</td>
</tr>
<tr>
<td></td>
<td>SPH Labour ward issue fridge</td>
<td>2 adult units for Obstetric patients</td>
</tr>
<tr>
<td>FPH</td>
<td>Main issue fridge</td>
<td>4 adult units</td>
</tr>
<tr>
<td></td>
<td>A+E Resus issue fridge</td>
<td>2 adult units</td>
</tr>
<tr>
<td></td>
<td>Theatre issue fridge</td>
<td>2 adult units suitable for Obstetric patients &amp; 1 paediatric unit</td>
</tr>
<tr>
<td>Spire Clare Park Hospital</td>
<td>Out Patient Department</td>
<td>2 adult units</td>
</tr>
<tr>
<td>RSCH</td>
<td>Main issue fridge</td>
<td>4 adult units</td>
</tr>
<tr>
<td></td>
<td>Delivery Suite issue fridge</td>
<td>2 adult units for Obstetric patients and 1 paediatric unit</td>
</tr>
</tbody>
</table>

Emergency group O RhD negative blood is reserved for those patients who do not have crossmatched blood already available and who are so acutely unwell that they cannot wait 15 minutes for group compatible blood / 45 minutes for fully cross matched blood.

Two units of Emergency group O RhD negative blood can be removed at the same time if they will be transfused within 4 hours.

It is the responsibility of the blood transfusion competent professional removing the Emergency group O RhD negative blood to inform the blood transfusion laboratory (or on-call haematology BMS if out of hours) as soon as possible so that the blood fridge can be restocked. Failure to inform the laboratory of the use of the emergency blood could leave the blood fridge without blood for subsequent life threatening haemorrhages.

15.1 PROCESS FOR THE REMOVAL OF EMERGENCY O RH D NEGATIVE (FLYING SQUAD) BLOOD

- All Emergency group O RhD negative blood must be collected as described above in section 14.3.2 with the exception that there are no patient identity checks to be made.
- The removal of Emergency group O RhD negative blood must be recorded in the blood register.
16. RETURN OF BLOOD PRODUCTS/COMPONENTS TO THE BLOOD FRIDGE/COOL BOX

16.1 WHO CAN RETURN BLOOD COMPONENTS: Nurses, midwives, operating department practitioners, health care assistants, and (FPH only) ward clerks, housekeepers and (ASPH & FPH only) porters, who have been trained and competency assessed to collect blood. Registered medical doctors are not usually assessed to return blood.

- If blood is not to be used it must be returned to the blood issue fridge/cool box within 30 minutes of removing it.
- Only blood that has not been pierced by a giving set can be returned to the fridge/cool box.
- Any bags that have been pierced and are not to be transfused must be returned to the transfusion laboratory complete with compatibility tag.
- If returned to the fridge/cool box within 30 minutes it may then be removed again for the patient as described in section 14.3.2 above.
- If 30 minutes is exceeded, and the blood is no longer required for the patient, it must be returned to the Transfusion Laboratory (do not return it to a blood fridge/cool box) stating time removed from the fridge and why it is no longer required. The senior nurse on duty on the ward must also complete a Trust adverse incident report.
- If the blood transfusion has not been commenced within 30 minutes and the patient still requires the blood, the blood can still be given as long as the transfusion is completed within 4 hours of removal from the fridge/cool box.
- If you are in any doubt about whether to administer the blood please contact the TP team or blood bank.
- All unused blood products/components must be returned to the transfusion laboratory to ensure they are fated properly.

16.1 PROCESS FOR RETURN OF BLOOD PRODUCTS/COMPONENTS TO THE BLOOD FRIDGE/COOL BOX

- On returning blood to the fridge/cool box the date and time returned must be recorded on the register form for that patient against the appropriate unit number.
- The person returning the unit must also print their name on the register.

17. ADMINISTRATION OF BLOOD PRODUCTS/COMPONENTS

The Serious Hazards of Transfusion reporting scheme has noted that all cases of incorrect blood being given to a patient would have been prevented if the final check had occurred correctly AT THE BEDSIDE.

17.1 WHO CAN ADMINISTER:
Registered medical doctors, nurses, midwives and operating department practitioners, who have been trained and competency assessed in administration of blood products/components. Two registered and competent members of staff must carry out this check. Staff who are not yet competent, and students, may only observe the process.

17.2 PROCESS FOR THE ADMINISTRATION OF BLOOD PRODUCTS/COMPONENTS

Ensure the patient has:
- a valid prescription
- received information regarding transfusions
- verbally consented to the transfusion
- had a baseline set of observations taken within an hour of the start of the transfusion
- a patent cannula (n.b there is no set minimum or maximum cannula gauge for blood transfusion. Larger gauges will allow more rapid transfusion and are preferred in cases of major haemorrhage.)
  - Peripheral cannulae must not be used for any other IV fluids.
  - When multi-lumen central venous access devices are used it is generally safe to co-administer other IV solutions through a different lumen as rapid dilution occurs in the blood stream.
17.2.1 PATIENT IDENTIFICATION
Positively identifying the patient is essential to ensure the right patient receives the right blood product/component; this check MUST take place at the bedside for each unit of blood product/component administered. Any discrepancies in identity details must be resolved before starting the transfusion.

Patients able to confirm their identity
- Ask the patient to state their full name and date of birth (do not use closed questions such as "Are you Mrs Smith?").
Check that these details and the patients’ unique number match exactly with the identity bracelet, the compatibility tag, and the drug chart.

Patients unable to confirm their identity
- Check that the full name, date of birth and patients’ unique number exactly matches the identity bracelet, the compatibility tag, and the drug chart.
- The parent or carer can also be asked to confirm the patients’ identity.

If the compatibility tag is missing for any reason the transfusion cannot proceed; contact the blood bank for further advice and return the product to the blood bank. Similarly if there is no identity band then the transfusion cannot proceed until there is one.

If any of the items listed above do not match, the transfusion must not proceed. The blood bank must be contacted for advice.

17.2.2 PRODUCT CHECK
Check the 2 labels (compatibility tag and blood bag label) on the blood and ensure that the following exactly match
- type (i.e. red cells)
- Check special requirements
- unit number
- blood group including RhD status,
- expiry date and that the unit is in date
  - NB: FFP/Cryo-precipitate has 2 expiry dates (2 years frozen and 24/4 hours post thawing respectively) both must be in date as for section 14.3.4 above
  - The ‘expiry date’ must not be confused with the ‘reserve date’. For products past the reserve date contact blood bank for advice on whether the product can be administered.

If any of the items listed above do not match, or the unit has expired, the transfusion must not proceed. Blood Bank or the TP team must be contacted for advice.

Check that the time elapsed since the product was removed from the fridge (using the area on the transfusion care pathway where one is in use) has not exceeded the approved time for that product
- Red Cells – 4 hours
- FFP/Cryoprecipitate – 4 hours

17.2.3 DOCUMENTATION
- Place the small sticker from the middle of the compatibility tag on the drug chart against the prescription of blood and sign, date and time the prescription.
- Document the date and start time of transfusion on the bottom portion of the compatibility tag attached to the blood product.
- Both staff members must print their name on the bottom portion of the compatibility tag.
- Before hanging the blood tear the bottom portion of the compatibility tag off along the perforated edge and return to blood bank, either via the collection wallet system or by internal post. It is the responsibility of the qualified nurses commencing the transfusion to ensure this happens.
• Leave the remaining compatibility tag on the blood bag in case you need to reconfirm the identity of the recipient.

**Emergency group O RhD negative blood** will have 2 compatibility tags attached to it, both of which will have no patient details but will state that this is Emergency Blood. Tear the top blank tag off and complete the patient details and the date/time administered and who administered and checked the blood and make sure the whole tag is returned to blood bank either by the pink wallet system or by post.

17.2.4 **TRANSFUSING THE UNIT**

- Ensure you have a standard blood administration set incorporating a 170 - 200µm filter.
- Only prime the blood administration set after all checks have been carried out and are found to be correct.
- The administration set must be changed every 12 hours, or after 4 units, and taken down at the end of the transfusion.
- A new administration set must be used if other infusions are to follow the blood transfusion.
- Special paediatric sets must be used for paediatric cases. A screen filter must be used if blood or platelets are to be administered via a syringe; 170 - 200µm filter is preferable, the minimum size the filter can be is 40µm.
- **Platelets** may be transfused through a blood administration set but **not after** it has been used for blood.
- **Under no circumstances shall any drug be added to blood components.**

17.3 **INFUSION PUMPS** specifically approved by the manufacturer for infusion of blood products/components may be used. A blood administration set, with a 170 - 200µm filter, **as approved by the manufacturer of the pump** must be used. Please refer to the Trust Medical Device Policy.

17.4 **BLOOD WARMERS**

- Only those specifically approved by the manufacturer for infusion of blood may be used.
- Improvised methods (e.g. placing unit on a radiator) must not be used.
- If blood bank is aware of a specific haematological indication that blood needs to be warmed they will indicate this on the compatibility tag.
- Blood warmers are not routinely used and not available on all wards; they are often present on A&E, Haematology Day Units, Recovery and/or Theatres. At ASPH they are also available from the medical equipment libraries. Staff in those areas should be trained in the use of blood warmers and will assist staff from other areas in the use of the warmers.
- Please refer to the Local Trust Medical Device Policy.
- Please contact the TP team with any issues relating to warmed blood.

**Warmed blood is indicated:**

- In patients with cold agglutinins or cold haem agglutinin disease (blood bank will indicate the need for this blood to warmed on the compatibility tag)
- When an adult flow rate of >50mL/kg/hr or a paediatric flow rate of >15mL/kg/hr is required.

18. **TRANSFUSIONS AT NIGHT**

A study reported in the 2005 Serious Hazards of Transfusion (SHOT) report concerning the safety of night time transfusions found that whilst only 29% of transfusions happened at night, almost 40% of all transfusion incidents happened at night. SHOT therefore concluded that transfusions at night are inherently less safe than during the day.

Therefore unless clinically necessary e.g. patient is symptomatic due to anaemia, or is actively bleeding, patients must not be transfused at night (between 23.00 and 07.00). If there is a medical reason then this should be documented in the medical notes.
19. CARE AND MONITORING OF PATIENTS DURING TRANSFUSION

- The primary aim of monitoring a patient during a transfusion is patient safety. Most severe reactions occur within 15 minutes of starting a unit.
- The responsibility for performing observations and monitoring the patient during transfusion rests with the registered professional responsible for the patient’s care. A Health Care Assistant or Student may carry out this part of the process under the direct supervision of the registered professional. In the operating theatres responsibility rests with the anaesthetist during surgery.
- Patients must be alerted by the nurse to the importance of reporting immediately any adverse effects such as shivering, rashes, flushing, itching, shortness of breath, pain in the loins or extremities or the passing of red urine.
- The staff caring for the patient must ensure that the patient is able to access help easily if left alone.
- Recording of the observations must be onto either the transfusion care pathway where one is in use, the electronic system in use (PISCIS/Symphony/Real Time) or the satellite sites transfusion observation chart.
- Observations are required for patients receiving red cells, FFP, platelets and cryo-precipitate only.
- Monitoring of patients receiving any other blood products such as albumin must follow the Local Trust Policy for intravenous drug administration.

19.1 OBSERVATION REGIME: - Temperature, pulse rate, respiration rate, blood pressure, oxygen saturation rate and the early warning score must be recorded at the following intervals as a minimum requirement:

- Baseline – within an hour of the start of the transfusion
- 15 minutes after the start time of the transfusion
- 30 minutes after the start time of the transfusion
- Throughout the transfusion the patient must be visually observed for any signs of reaction.
- If there are no reported/observed problems; a complete set of observations must be taken within an hour of the end of the transfusion.

If there are any concerns about any change in the patients’ condition during a transfusion the transfusion must be stopped immediately and senior/medical advice sought. See section 31 ‘Acute Transfusion Reaction Management guideline’ for further guidance on treating a suspected transfusion reaction.

19.1.1 FOR NEONATAL TRANSFUSION:

- Immediately before the start of the transfusion
- Every 15 minutes for the first half hour of the transfusion
- Every 30 minutes for the remainder of the transfusion
- Hourly observations for two hours post transfusion
- Check infusion site and amount infused every 30 minutes throughout the transfusion

19.1.2 FOR CHILDREN UNDER TWO YEARS OF AGE:- After the first half an hour, observations as above should continue every half an hour throughout the transfusion and for an hour afterwards.

19.1.3 UNCONSCIOUS PATIENTS require particular attention. Transfusion reactions must be suspected if the patient’s condition deteriorates or if hypo/hypertension, haemoglobinuria or unexplained increased bleeding occurs.
20. TRANSFERRING A PATIENT HAVING A BLOOD TRANSFUSION OR WHO MAY NEED BLOOD IN TRANSIT

- Patients should not be transferred, either within the hospital or to another Hospital, whilst having a blood transfusion unless it is absolutely essential.
- If it is absolutely essential the patient must be escorted by a competent, registered professional (nurse/midwife/Doctor) at all times.
- If a patient is transferred to another Hospital with a transfusion in progress, the completed lower half of the compatibility tag must be returned to the issuing laboratory to ensure traceability.
- If blood is to be transferred with the patient, i.e. to be transfused during transfer, it must be transferred in a transfusion accredited cool box provided and packed by the laboratory according to the Satellite fridge procedure (BST SOP 00015). If a cool box is required ask Blood bank for this in advance of the transfer time.
- Transfusion accredited cool boxes keep blood at the correct temperature for 4 hours. The same principles of checking, documentation of removal/return, and time frames that apply to a blood fridge for collection, return and administration of blood also apply to a cool box (see also section 14).
- The pink register form must accompany the blood in the cool box, as supplied by the laboratory; this then forms the register for removal or return of the product to the cool box. The time the blood was put into the coolbox will be documented here by blood bank staff.
- Transfusion of transferred units must be completed before the patient’s identity wrist band (applied at the originating hospital) is removed.
- The hospital receiving the patient and blood must satisfy itself via its own procedures that the blood is safe to transfuse to that patient. The use of the NHS number on all documentation and wrist bands should enable the safe transfer of blood between Trusts.
- Patients transferred into the hospital with blood issued by another transfusion laboratory must have their details checked using the NHS number as the unique identifier. New samples must be obtained as soon as possible. The decision to use the blood lies with Consultant or Registrar present.
- If blood is not transfused in transit to an acutely unwell patient the cool box must be sent to the receiving hospitals Blood Bank within 4 hours of being packed to prevent wastage.
- Platelets must never be put into a cool box, or a fridge, as it renders them unusable due to aggregation.

21. COMPLETION OF THE TRANSFUSION

If no reaction has occurred dispose of the transfusion equipment as follows:

- Place empty units in a clear plastic bag in the sluice area until the last unit has been transfused.
- When taking the last unit down leave the giving set attached to the unit.
- Dispose of all bags immediately in the yellow clinical waste bags at the end of the transfusion.
- NB If a transfusion has started in A+E, MAU or theatres all used units must accompany the patient back to the ward until all units have been transfused and then disposed of as above.

22. SATELLITE BLOOD FRIDGE MAINTENANCE

- Ashford fridge is monitored by Blood Bank
- SPH labour ward blood fridge is monitored by Blood Bank. The fridge is maintained and cleaned by Blood bank.
- SPH Theatre blood fridge is monitored by Blood Bank, management of patient specific blood is by the ODP’s, with cleaning and maintenance undertaken in partnership with blood bank.
- Satellite Hospital blood fridges are monitored, maintained, and cleaned by staff as allocated by the Satellite hospital management. (Runnymede is monitored by ASPH blood bank)
- FPH A+E blood fridge is monitored by Tutela (a remote electronic monitoring system); no patient specific blood is to be placed in the fridge. The fridge is maintained and cleaned by Blood bank.
• FPH Theatre blood fridge is monitored by Tutela, management of patient specific blood is by the ODP’s, with cleaning and maintenance undertaken in partnership with blood bank.
• RSCH Delivery Suite blood fridge is monitored, maintained and cleaned by the midwives in partnership with blood bank.
• RSCH Chilworth blood fridge is monitored, maintained and cleaned by the nurses in partnership with blood bank.
• Satellite Hospital blood fridges are monitored, maintained, and cleaned by staff as allocated by the Satellite hospital management.
• See BST SOP 00015 for full details and the required monitoring forms. Each satellite area should have a copy of this document, provided by the supplying Blood Bank, please contact the TP team if this document is not available.

23. ADVERSE EVENT REPORTING
Severe transfusion reactions and events are reported locally at each Trust using the Datix system, to the Serious Hazard of Transfusion scheme and to the Medicines and Healthcare Products Regulatory Agency under “The Blood Safety and Quality Regulations 2005 No 50”.

23.1 PROCESS FOR REPORTING ADVERSE EVENTS: NEAR MISS AND CLINICAL INCIDENTS
Incidents requiring urgent clinical attention must be reported directly to the Consultant responsible for the patient and the Consultant Haematologist. The Transfusion Practitioner team must also be notified at the earliest opportunity.

The person first detecting the error must follow the Local Trust incident policy and complete a standard ‘Accident & Untoward Incident Form’ in all cases. The form must be sent to the Health & Safety Adviser in the relevant ‘Risk’ department. Where electronic systems such as ‘DATIX’ are in use, the incident report should be completed electronically in line with Trust policy.

The Health and Safety Adviser must copy the report to the TP team.
The Consultant Haematologist/TP/Blood Transfusion Quality Manager will:-
• Investigate the incident
• Work with key stakeholders to identify corrective and preventative actions and monitor completion of these
• Report to appropriate forums e.g. Hospital Transfusion Team and Committees, Clinical Governance, Operational Risk Management Group, Clinical Risk Management Group.
• Report incidents to the Serious Hazards of Transfusion (SHOT) organisation in accordance with SHOT guidance for reporting.
• Report incidents to the Medicines and Healthcare Regulatory Agency via the haemovigilance scheme Serious Adverse Blood Reactions and Events (SABRE) as required.

24. DOCUMENTATION
Records of who received all blood products/components must be kept for 30 years in case of transmission of existing or new blood borne viruses. This is essential for the Trust from a patient safety and litigation perspective. Compliance with this Medicines and Healthcare Products Regulatory Agency (MHRA) standard is mandatory and is set at 100%.

24.1 TRACEABILITY
Returning the completed bottom portion of the compatibility tag to blood bank enables Blood bank to trace blood and blood products.

25. TRAINING & COMPETENCY ASSESSMENT REQUIREMENTS
All clinical staff involved in the transfusion process will receive training at their induction (Blood Transfusion Health Service Circular 2007/001). Thereafter at all sites updates are provided on a minimum 2 yearly basis (BCSH 2009) as part of mandatory training. The training will be appropriate to the role they are expected to undertake.
Staff cannot play any part in transfusion without being competency assessed by a qualified assessor in the part of the process relevant to their role (assessment of prescribing can only be undertaken by the TP team or Haematologist). This must be repeated every 3 years (NPSA Safer Practice Notice (SPN) 14 2006). Assessors must have a mentor qualification and have been assessed at level 5 (Benner 1984) by the TP team. Competency assessment is carried out either as a ward based assessment or a simulated assessment in a class room setting. The TP team have created an approved transfusion competency document based on the tool created by National Patient Safety Agency in response to the SPN 14.

Medical staff: All medical staff new to the trust, and existing medical staff, are required to complete an on line blood transfusion training module, successful completion of which will meet the requirements for both training and competency. In addition junior medical staff new to the trust receive a taught session, and assessment in sampling and prescribing blood products. There is opportunity for medical staff to 'opt out' of blood transfusion training and assessment should the role they undertake not involve them in the transfusion process.

25.1 RECORDING OF TRAINING AND COMPETENCY
Attendance sheets are used for every training and competency session. These are used to maintain records of training and competency status. All training and competency is recorded on the TP team training and competency database. The Oracle learning system records all training at induction.

Monthly compliance reports are generated by the TP team and discussed at the Hospital Transfusion Team meetings, the Hospital Transfusion Committee and various Trust Clinical Governance Committees. Compliance reports are also shared with ward managers as required but with particular emphasis on areas where compliance needs attention.

25.2 NON-ATTENDANCE
Non-attendance at transfusion training or induction sessions is managed in line with the trust training policy. Non-attendance at competency sessions is managed by the TP team.

Satellite: Non-attendance at blood sessions is managed locally by the hospital where the session is taking place.

25.3 FAILURE TO ACHIEVE COMPETENCY
Staff who fail to complete a satisfactory competency assessment will have an action plan agreed between the individual, their ward manager, and the TP team. The individual is given the opportunity to develop and to be assessed at a later date once this is complete.

26. PROCESS FOR MONITORING COMPLIANCE WITH, AND THE EFFECTIVENESS OF, THIS POLICY
Audits of practice against the Blood Transfusion Policy are undertaken at intervals pertinent to each Trust as relevant to any incidents, identified risks or concerns relating to levels of training and competency. The minimum audit frequency will be a regular audit of approximately 30-40 patients over the year.

The audit will be of the care and management of patients receiving transfusions and will be undertaken by the Transfusion Practitioners to monitor the following:-
- Training and competence
- Informed consent
- Patient identity and blood component checks
- Patient monitoring & care-plan/observation chart completion (NB when auditing transfusion observation timings a 5 minute window either side of the 15 and 30 minute observations is allowed).
- Traceability
An action plan will be developed in the report, and monitored at appropriate Trust meetings including the HTT and HTC’s.

An annual report is also presented at the HTT each year, by the TP team and the Chair of the Hospital Transfusion Team (HTT).

The report includes:
- Summary of the above audit and any other pertinent audits
- Reports on training and competency assessment achievements against targets
- Reports on incidents including trends and corrective/preventative actions taken
- Policy and guideline updates
- Reports on traceability target achievement
- National and local initiatives

Where monitoring identifies deficiencies recommendations and action plans will be developed and changes implemented accordingly. The Hospital Transfusion Team, and Committee, will monitor the implementation of the action plan and report completed actions to the various appropriate committees.

27. PROCESS FOR REVIEWING, APPROVING, RATIFYING AND ARCHIVING THE DOCUMENT

This document will be reviewed 3 yearly or whenever national policy or guideline changes are changed (whichever occurs first), primarily by the Hospital Transfusion Team. The policy will then be subject to re-ratification as outlined on the cover page of this document. Out of date policies are archived electronically.

28. DISSEMINATION AND PUBLICATION OF THIS DOCUMENT

This policy must be implemented and disseminated throughout the Trust immediately following ratification and will be published on the Trusts intranet site. Access to this document is open to all.

29. EQUALITY IMPACT ASSESSMENT

See Appendix 2.

30. ARCHIVING ARRANGEMENTS

This is a Trust-wide document and archiving arrangements are managed by the Quality Department, who can be contacted to request master/archived copies.
# 31. ACUTE TRANSFUSION REACTION MANAGEMENT

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31. ACUTE TRANSFUSION REACTION MANAGEMENT

31.1. INTRODUCTION
The purpose of the guideline is to ensure staff who manage transfusions:
- Recognise, manage and investigate patients who develop acute adverse reactions to blood components effectively, both during transfusions and in the 24 hours following a transfusion
- Report reactions promptly and effectively
- Report any deaths during transfusions
- Manage subsequent transfusions safely

The guideline recognises that the precise nature and severity of the reaction may not be obvious initially. This guideline will consider all causes of a possible reaction during transfusions and focus on initial recognition and general management of the clinical problem, guided mainly by symptoms and clinical signs and assessment of the severity of the problem. It also aims to ensure a standardised approach to the management of patients who may be having a transfusion reaction, reflecting best practice, thereby reducing the risks associated with transfusions. All staff who provide care for patients receiving a transfusion must read this document.

31.2. DEFINITION OF A TRANSFUSION REACTION
Transfusion reactions can be defined as any adverse effect on the patient which may have been caused by the administration of blood, blood products or blood components both during the transfusion and in the 24 hours following a transfusion.

31.3. MANAGEMENT OF A TRANSFUSION REACTION
Please see section 31.8 for flow chart detailing management of the signs and symptoms of a transfusion reaction according to the severity of the reaction. If a severe transfusion reaction is suspected further transfusions can only occur after approval by a Consultant Haematologist. In the case of a mild or moderate transfusion reaction being suspected further transfusions can be commenced before the blood bank investigation has been carried out, but the ward staff must have discussed the patient’s condition with the patient’s doctor.

31.4. TRANSFUSION REACTION CLASSIFICATION AND PRESENTING SIGNS/SYMPTOMS.
Please see section 31.9 for the types of transfusion reactions and presenting signs and symptoms.

31.5. REPORTING TRANSFUSION REACTIONS.
All transfusions that are discontinued must be reported to blood bank using the reporting form (please see section 31.10 for the transfusion reaction reporting form). Any patient that dies during a transfusion must be reported to blood bank using the above form for investigation of a possible transfusion reaction.

The Transfusion Practitioner Team, in conjunction with the Blood Transfusion Quality Manager, will report severe adverse reactions to the appropriate haemovigilance bodies (Serious Hazards of Transfusion / Serious Adverse Blood Reactions and Events) and to the appropriate Consultant Haematologist / NHS Blood Transfusion department. See also section 31.7.

31.6. ADVICE
Further advice should be sought from either:
- Transfusion Practitioner (TP) team
  - Ashford & St Peters Hospital (ASPH) x 6178 / Pager 8110
  - Frimley Park Hospital (FPH) x 6532 / Pager: 07659 129960
  - Royal Surrey County Hospital (RSCH) x 4482 / Pager: 76 - 6506
- Blood Bank
  - ASPH x 3044 / 3036
  - FPH x 4408
  - RSCH x 4691
- Haematologist on-call
31.7. TRANSFUSION PRACTITIONER ROLE

- Review patient
- Discuss with Consultant Haematologist if appropriate
- Complete incident form if required
- Report moderate and severe reactions to SHOT and SABRE
- Report any cases of suspected TRALI, bacterial contamination, or where severe neutropenia or thrombocytopenia is associated with an ATR, as associated components from the implicated donation must be removed from the blood supply to NHS Blood Transfusion.
31.8 Clinical Management of Suspected Acute Transfusion Reaction up to 24 hours post transfusion

Patient exhibiting possible symptoms / signs of an Acute Transfusion Reaction, which may include: Pyrexia, chills/rigors, tachycardia, hyper or hypotension, collapse, flushing, urticaria, itching, rash, pain (bone, muscle, chest and/or abdominal), shortness of breath, nausea, generally feeling unwell, respiratory distress, anxiety

**STOP TRANSFUSION**

Rapid clinical assessment, check patient ID / blood compatibility label, visual assessment of unit

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

**YES**

**SEVERE / LIFE THREATENING**
- Call for urgent medical help
- Initiate resuscitation: ABC
- Maintain venous access
- Monitor patient: TPR, BP, urinary output, O2 sats

Consider bacterial contamination if temperature ≥ 39C or rise ≥ 2C. Review patients underlying condition and transfusion history. Monitor patient more frequently: TPR, BP, urinary output, O2 sats. If consistent with condition & history consider continuation of transfusion at slower rate and appropriate symptomatic treatment. Otherwise discontinue transfusion (do not discard implicated unit). Inform Blood bank (BB) & complete reaction form. Return unit & any previous units (with administration set) to BB.

**NO**

**MODERATE**
- Temperature 39°C ≥ / rise ≥ 2°C AND/OR
- Other signs/symptoms apart from itching/rash only

Inform medical staff

Consider bacterial contamination if temperature ≥ 39C or rise ≥ 2C.

If signs and symptoms worsen
- Discontinue transfusion (do not discard implicated unit) / Inform Blood bank (BB) & complete reaction form. Return unit & any previous units (with administration set) to BB

**MILD**
- Temperature ≥ 38°C / rise ≤ 1 – 2°C
- Itching/rash only

Continue transfusion
- Consider symptomatic treatment. Monitor patient more frequently as for moderate reactions

**YES**

**Discontinue transfusion unless hypotension caused by haemorrhage (do not discard implicated unit)**

**NO**

Inform Blood bank (BB) & send completed reaction form with samples as detailed on form. Return unit (with administration set) to BB. Specifically alert BB to suspicion of bacterial contamination.
31.9 TYPES OF TRANSFUSION REACTIONS

Acute/severe complications of transfusions
These are:
  a) Acute Haemolytic transfusion reactions
  b) Anaphylaxis
  c) Bacterial contamination of a transfused unit
  d) Transfusion Related Acute Lung Injury (TRALI)
  e) Transfusion Associated Circulatory Overload (TACO)
  f) Transfusion associated graft versus host disease
  g) Post transfusion purpura

Non acute complications of transfusion
These are:
  h) Febrile non-haemolytic transfusion reactions
  i) Delayed haemolytic transfusion reaction
  j) Mild Allergic Reaction

Each reaction is detailed below, including further management.

31.9.1 ACUTE HAEMOLYTIC TRANSFUSION REACTION (AHTR)
Acute HTR’s are defined as fever and other symptoms/signs of haemolysis (destruction of red cells) within 24 hours of a transfusion; confirmed by one or more of the following haematology results:
  • A fall of Hb
  • Rise in LDH
  • Positive DAT
  • Positive crossmatch

Signs and symptoms
The patient may have some or all of the following signs and symptoms:

<table>
<thead>
<tr>
<th>Pyrexia</th>
<th>Chest/ abdominal Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachycardia</td>
<td>Bone/ Muscle pain</td>
</tr>
<tr>
<td>Hyper/Hypotension</td>
<td>Urticaria</td>
</tr>
<tr>
<td>Shortness of breath / Respiratory distress</td>
<td>Rigors</td>
</tr>
<tr>
<td>Collapse</td>
<td>Generally feeling unwell/acute anxiety</td>
</tr>
<tr>
<td>Flushing</td>
<td></td>
</tr>
</tbody>
</table>

Further management
- Take down the transfusion and the giving set
- Maintain venous access
- Commence 100% oxygen therapy
- Resuscitate with crystalloid fluid
- Consider inotrope support if hypotension prolonged
- Seek urgent critical care and haematology advice
- Take blood samples as per section 31.10 “Investigation of a Suspected Transfusion Reaction”
- In addition take samples for UE’s and coagulation screen
- Take blood cultures from patient
- Monitor urine output, patient may need catheterising. Urine output should be maintained at >100mls per hour.
- If urine output drops or the patient is oliguric give IV Frusemide.
- If the patient has signs of DIC (Disseminated Intravascular Coagulation) then treat with the appropriate blood components.
- Urinalysis for haemoglobin
31.9.2 BACTERIAL CONTAMINATION REACTION
Bacterial contamination reaction is likely to cause a very severe acute reaction with rapid onset of hyper- or hypotension, rigors and collapse.

**Signs and symptoms**

<table>
<thead>
<tr>
<th>Pyrexia</th>
<th>Collapse</th>
<th>Hyper/Hypotension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachycardia</td>
<td>Rigors</td>
<td>Flushing</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>Generally feeling unwell/acute anxiety</td>
<td>Respiratory distress</td>
</tr>
</tbody>
</table>

**Further management**
- As for AHTR and take additional blood samples: blood cultures, FBC
- If bacterial infection is suspected seek microbiology advice
- In absence of expert microbiology advice it is generally appropriate to follow the local protocol for antibiotic management of sepsis in neutropenic patients OR to follow the guidance in the ‘Handbook of Transfusion Medicine’ (p59 4th Edition 2007).

31.9.3 SEVERE ALLERGIC REACTION / ANAPHYLAXIS
Anaphylaxis is a rare but life-threatening complication usually occurring in the early part of a transfusion.

**Signs and symptoms**
- Bronchospasm
- Angioedema
- Abdominal Pain
- Hypotension
- Chest/abdominal pain
- Nausea/Vomiting
- Erythema
- Urticaria
- Conjunctivitis

**Further management**
- Take down the transfusion and the giving set
- Maintain venous access by starting a saline infusion
- Take blood samples as above plus a clotting sample to Transfusion laboratory.
- Return the unit in progress (with giving set attached) and any other units, used or unused, to the blood bank
- Give Chlorpheniramine 10mg IV slowly.
- Commence 100% oxygen and give salbutamol nebuliser.
- If severe hypotension give adrenaline 0.5 ml of 1:1000 (i.e. 0.5mg) IM.
- Maintain observations as frequently as clinically indicated (not less than at 15 minute intervals).

31.9.4 TRANSFUSION RELATED ACUTE LUNG INJURY (TRALI)
TRALI (Transfusion Related Acute Lung Injury) typically occurs within six hours of a transfusion, whereby the patient develops breathlessness and a non-productive cough.

**Signs and symptoms**
- Acute dyspnoea
- Acute hypotension

**Further management**
- Take down the transfusion and the giving set
- Seek urgent haematological and critical care advice
• Take blood samples as above
• Monitor blood gases
• Chest X-Ray
• Measure CVP / Pulmonary capillary pressure:
• If CVP is raised: Fluid Overload
  o Maintain venous access
  o Give 100% oxygen therapy
  o Give IV Frusemide 40 – 80 mg
• If CVP is normal and there is chest x-ray “whiteout”
  o Maintain venous access
  o Give 100% oxygen therapy
  o Treat as Adult Respiratory Distress Syndrome (ARDS).
• The patient may require ventilatory support

31.9.5 TRANSFUSION-ASSOCIATED CIRCULATORY OVERLOAD (TACO)
TACO Transfusion-associated circulatory overload occurs when too much fluid is transfused or the transfusion is too rapid.

Signs and Symptoms

<table>
<thead>
<tr>
<th>Acute left ventricular failure (LVF)</th>
<th>Dyspnoea / Tachypnoea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal lung crackles</td>
<td>Frothy pink sputum</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>Non productive cough</td>
</tr>
<tr>
<td>Raised JVP</td>
<td>Hypertension</td>
</tr>
</tbody>
</table>

Further management
The transfusion should be stopped and standard medical treatment including diuretic and oxygen given.

31.9.6 POST-TRANSFUSION PURPURA (PTP)
Post-transfusion purpura (PTP) is an adverse reaction to a blood transfusion or platelet transfusion that occurs when the body produces alloantibodies to the introduced platelets' antigens. These alloantibodies destroy the patient's platelets leading to thrombocytopenia, a rapid decline in platelet count. PTP usually presents 5–12 days after transfusion, and is a potentially fatal condition.

31.9.7 DELAYED HAEMOLYTIC TRANSFUSION REACTION (HTR)
Delayed HTR’s are defined as fever and other symptoms/signs of haemolysis (destruction of red cells) more than 24 hours after a transfusion; confirmed by one or more of the following:
• A fall in Hb or failure of increment Rise in bilirubin
• Positive DAT
• Positive crossmatch not detectable pre-transfusion

Signs and symptoms
Often asymptomatic, however may experience pyrexia.

Further Management
• Take blood samples as per section 31.10 “Investigation of a Suspected Transfusion Reaction”
• In addition take samples for U&E’s and LDH
• Urinalysis for haemoglobin
• Renal function should be closely monitored
31.9.8 FEBRILE NON-HAEMOLYTIC TRANSFUSION REACTION (FNHTR)
Febrile non-haemolytic transfusion reaction is a type of transfusion reaction that is associated with fever but not directly with haemolysis.

Signs and symptoms
The patient may have one or all of the following signs and symptoms:
- Fever
- Shivers
- Flushing

Further management
- If the patients’ temperature rise is between 1 - 2°C (as per flow chart) and the observations are otherwise stable and the patient generally feels well, give paracetamol.
- Dr to advise whether to restart the transfusion at a slower rate
- Maintain 15 minute observations until stable.

31.9.9 MILD ALLERGIC REACTION
Mild allergic reactions to blood transfusion are quite common, particularly with components including large volumes of plasma. Symptoms usually subside if the transfusion is slowed and antihistamine is given.

Signs and symptoms
- Urticarial Rash
- Itching

Further management
- Give Chlorpheniramine by the most appropriate route and restart the transfusion at a slower rate.
- Maintain observations at not less than 15 minute intervals until stable

31.9.10 ALLERGIC REACTION TO PLATELETS
Allergic and anaphylactic reactions can occur after platelet transfusions. The risk of an allergic reaction ranges from 1-21% in patients who receive platelet transfusions. Clinical signs and severity vary highly. Isolated pruritus and urticaria as the only symptoms are the most common. Systemic reactions such as broncho-constriction, hypotension and shock are much less common. Only a small number of allergic reactions are associated with a rise in temperature of 1 °C or more. The likely cause of an ‘allergy to platelets’ is (clinically not significant) antibodies in the recipient against plasma proteins in the transfused product (not against the platelets!). It is therefore difficult to predict whether a reaction will occur again with future platelet transfusions as the reactions are ‘donor’ specific. It is however common practice to pre-medicate with hydrocortisone and piriton if a previous allergic platelet reaction has occurred, though this is not essential.

See also section 41.10.1 for guidance regarding HLA and HPA matched platelet requirements.
Transfusion Reaction Reporting Form:

WARD STAFF use (for use when transfusion discontinued/patient dies during transfusion)
Inform Blood Bank immediately ASPH x 3044; FPH x 4408; RSCH x 4691 & send the following to Blood Bank:

<table>
<thead>
<tr>
<th>This transfusion reaction reporting form fully completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>The current Unit/giving set attached &amp; previously transfused empty bags</td>
</tr>
<tr>
<td>Post Transfusion x 2 pink top, x 1 purple top, x 1 gold top venous samples, And x 2 red top for FFP/Platelet/Cryo-precipitate reactions only</td>
</tr>
<tr>
<td>Next available Urine sample</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital / NHS number</td>
</tr>
<tr>
<td>Patient surname</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transfusion details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administered by</td>
</tr>
<tr>
<td>Ward</td>
</tr>
<tr>
<td>Time transfusion started</td>
</tr>
<tr>
<td>Reason for transfusion</td>
</tr>
<tr>
<td>Was anything added to the unit (give details)</td>
</tr>
<tr>
<td>Unit numbers</td>
</tr>
<tr>
<td>Approx vol transfused</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reaction details (NB: a copy of the observation chart is also acceptable for vital sign section)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vital signs</td>
</tr>
<tr>
<td>Pre Tx</td>
</tr>
</tbody>
</table>

Sign / symptom: TICK ALL PRESENT

<table>
<thead>
<tr>
<th>Inflammatory changes</th>
<th>Rigors</th>
<th>Chills</th>
<th>Nausea</th>
<th>Pain; especially loin pain during or just after administration of blood.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy symptoms</td>
<td>Anaphylaxis</td>
<td>Urticaria (hives/welts)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wheeze</td>
<td>Angioedema</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bronchospasm</td>
<td>Stridor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flushing</td>
<td>Rash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypotensive; usually present ≤ one hour of end transfusion</td>
<td>Isolated fall in systolic blood pressure of 30mm or more and a systolic blood pressure ≤80mm.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypotension (fall in systolic blood pressure of 30mm or more and a systolic blood pressure ≤80mm) leading to shock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Free haemoglobin being present in urine during/just after administration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient c/o “sense of impending doom” / acute anxiety/distress during or just after administration of blood.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Collapse</td>
<td>Patient death during transfusion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 32. ALLOGENEIC TRANSPLANT RECIPIENT TRANSFUSION GUIDELINE

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<th>Page</th>
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<td>32.2 Communication</td>
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<td>32.3 Patient Transfusion Plan</td>
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<td>32.4 Definition of Major, Minor and Bi-directional ABO mismatch</td>
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<td>32.5 Table 1: Choice of Red Cells and Platelets for Transfusion</td>
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<td>32.8 Rh(D) Mismatching</td>
<td>34</td>
</tr>
</tbody>
</table>
32. ALLOGENEIC TRANSPLANT RECIPIENT TRANSFUSION GUIDELINE

32.1. INTRODUCTION
This guideline provides information about the selection of blood products (red blood cells, platelets and plasma) for patients immediately prior to, and following allogeneic stem cell transplantation. It covers the selection of the appropriate blood groups, not CMV selection or need for irradiated blood products which are covered in sections 34 and 38 of this Policy.

Stem cell transplantation where the ABO or RhD groups of the donor and recipient differ leads to a unique set of circumstances such that:
- the blood group of the recipient will change over time to that of the donor
- the preferred blood group of products may change over time
- the preferred blood group of red cells may differ from that of platelets and plasma products due to the presence of antibodies.
- selection of red cell and plasma products from different groups may be necessary
- antibodies directed against the patient’s previous blood group may emerge during the engraftment phase giving rise to autoimmune haemolysis

32.2. COMMUNICATION
In view of the complex decisions required about selection of blood product groups it is important that medical, nursing and blood transfusion staff are aware of these requirement and guidelines. This guideline is relevant as patients will be seen in the trusts prior to and after transplant, although the transplant procedure itself will be performed at a referral centre.

32.3. A PATIENT TRANSFUSION PLAN should be provided by the patient’s stem cell transplant unit. This should include a statement about:-
- The donor and the recipient’s (the patient’s) ABO and RhD groups
- Selection of correct blood group (ABO and RhD) for blood, platelet and plasma transfusions
- Requirements in respect of irradiation of cellular blood products and CMV status

The plan should be copied to the local transfusion laboratory and the patient’s notes. Ensure the patient and ward nursing staff are aware of the plan and the need for blood products other than the patient’s original group.

If a plan has not been provided by the transplant unit, it should be requested urgently. Until this plan has been received, all decisions regarding transfusion should be discussed with the Haematology SpR or consultant.

32.4. DEFINITION OF MAJOR, MINOR AND BIDIRECTIONAL ABO MISMATCH

32.4.1 MAJOR ABO MISMATCH:
Recipient (patient) has antibody(s) to donor ABO antigens e.g.:-
- O recipient with A, B or AB donor
- A recipient with AB donor
- B recipient with AB donor

32.4.2 MINOR ABO MISMATCH:
Donor has antibody(s) to recipient ABO antigens e.g.
- A recipient with O donor
- B recipient with O donor
- AB recipient with A, B or O donor

32.4.3 BIDIRECTIONAL ABO MISMATCH:
Both donor and recipient have antibody(s) against each other’s antigens.
- A recipient with B donor and vice versa
### 32.5. CHOICE OF RED CELLS AND PLATELETS FOR TRANSFUSION

The following table should be used to guide the selection of red cells, platelets and plasma of the appropriate group according to the patient's and donors blood groups and the changes over time (stages 1-4 indicated by bold vertical lines) following transplantation.

<table>
<thead>
<tr>
<th>Stage 1. Conditioning</th>
<th>Stage 2. Transplant</th>
<th>Stage 3. ABO Ab to donor group undetectable and DCT negative</th>
<th>Stage 4. Recipient group RBCs undetectable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ABO Major Incompatibility e.g. A donor O recipient</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Cells</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets / Plasma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ABO Minor Incompatibility e.g. O donor A recipient</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Cells</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets / Plasma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ABO Bidirectional Incompatibility e.g. B donor A recipient</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Cells</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platelets / Plasma</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recipient’s Group</td>
<td>Group O</td>
<td>Group AB Plasma</td>
<td>Group A or B Platelets</td>
</tr>
<tr>
<td>Donor’s Group</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
32.6. CONVERSION FROM RECIPIENT TO DONOR GROUPS FOR RBC TRANSFUSIONS
In cases of major ABO incompatibility between donor and recipient, the patient may reach the conversion point (stage 3) after returning to the local unit. The local blood transfusion laboratory should routinely check all samples for ABO antibodies and direct antiglobulin test (DAT/DCT). The laboratory should inform the medical staff when ABO antibodies to donor group are no longer detectable and the DAT/DCT negative (vertical line 3 on table) and that the ABO group of RBC transfusions can and should be switched from patient to donor type.

32.7. PLATELET TRANSFUSIONS AND CHOICE OF BLOOD GROUP
The following table shows the initial choice of Platelet blood group based on donor/recipient blood group as well as platelet availability. This applies to the initial choice of platelets (and plasma products) from conditioning onwards. If the patient requires HLA matched platelets due to platelet refractoriness then this should take precedence over the ABO group selection indicated in this table to ensure that HLA matched platelets are given.

<table>
<thead>
<tr>
<th>Donor</th>
<th>Recipient</th>
<th>1st choice</th>
<th>2nd choice</th>
<th>3rd choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAJOR/BI-DIRECTIONAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>O</td>
<td>A</td>
<td>B</td>
<td>O</td>
</tr>
<tr>
<td>B</td>
<td>O</td>
<td>B</td>
<td>A</td>
<td>O</td>
</tr>
<tr>
<td>AB</td>
<td>O</td>
<td>A</td>
<td>B</td>
<td>O</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B*</td>
<td>O*</td>
</tr>
<tr>
<td>B</td>
<td>A</td>
<td>B</td>
<td>A*</td>
<td>O*</td>
</tr>
<tr>
<td>AB</td>
<td>A</td>
<td>A</td>
<td>B*</td>
<td>O*</td>
</tr>
<tr>
<td>AB</td>
<td>B</td>
<td>B</td>
<td>A*</td>
<td>O*</td>
</tr>
</tbody>
</table>

| MINOR | | | | |
|-------| | | | |
| O     | A         | A          | B*         | O*         |
| O     | B         | B          | A*         | O*         |
| O     | AB        | A*         | B*         | O*         |
| A     | AB        | A*         | B*         | O*         |
| B     | AB        | B*         | A*         | O*         |

*Risk of haemolysis but do not withhold

32.8. RH (D) MISMATCHING
In a Rh (D) mismatched transplant if the donor’s serum contains anti-D, production of anti-D by donor lymphocytes may cause immune haemolysis. Anti-D may be detected for up to one year post stem cell transplantation.

32.8.1 CHOICE OF RED CELLS AND PLATELETS SHOULD BE AS follows.

<table>
<thead>
<tr>
<th>RhD+ donor to RhD- recipient</th>
<th>RBC Transfusions</th>
<th>Platelet Transfusions</th>
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<tr>
<td>Use RhD- RBCs</td>
<td>Use RhD+ or RhD-</td>
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<th>RhD- donor to RhD+ recipient</th>
<th>RBC Transfusions</th>
<th>Platelet Transfusions</th>
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<tbody>
<tr>
<td>Use RhD- RBCs</td>
<td>Use RhD+ or RhD-</td>
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HLA and CMV requirements should take precedence over RhD grouping.
### 33. ANTI-D PROPHYLAXIS GUIDELINE

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33. ANTI-D PROPHYLAXIS GUIDELINE

33.1 INTRODUCTION
Anti-D prophylaxis is an essential intervention to reduce the prevalence of maternal sensitisation (creation of immune antibodies (immune anti-D) to the RhD antigen). The development of anti-D antibodies usually occurs as a result of fetomaterna haemorrhage (FMH) in a rhesus D (RhD) negative woman with a rhesus D positive fetus. These antibodies may then cross the placenta in future pregnancies, and cause haemolytic disease of the newborn (HDN). The clinical severity of HDN can vary from intrauterine death to serologic abnormalities detected in an asymptomatic infant. An affected fetus may develop "hydrops fetalis" or anaemia severe enough to cause cardiovascular failure, tissue hypoxia and death in utero. Less severely affected infants experience jaundice which results from accelerated red cell destruction generating large quantities of bilirubin.

See also:
- Antenatal Screening Tests for the Healthy Pregnant Woman
- Patient information leaflet - YOU, YOUR BABY & THE RhD FACTOR (BPL)

33.2 RECOMMENDATIONS:
All non-sensitized Rh-D negative pregnant women:
- Should be offered routine Anti-D prophylaxis (RAADP) during the pregnancy; this covers any ‘silent’ events (‘silent’ means no signs and symptoms) that can cause sensitisation during pregnancy.
  - In all 3 units (ASPH / FPH / RSCH) a single dose of 1500 iu between 28-30 weeks gestation is used.
  - Patients who transfer in may be on the alternative regime of 2 doses of 500iu at 28 and 34 weeks gestation; see section 33.6.6
- Require anti-D prophylaxis for any obvious (i.e. not silent) events that may trigger sensitisation during pregnancy (see section 33.7).
- Require a further dose of Anti-D at delivery if the baby is Rh-D positive.

33.3 ESSENTIAL INFORMATION
- Routine anti-D prophylaxis is always given regardless of whether the patient has already had a dose of Anti-D for a potentially sensitizing event earlier in the pregnancy.
- Similarly the use of postpartum Anti-D should not be affected by whether the patient had routine antenatal prophylaxis or antenatal prophylaxis for a sensitizing event.
- As with any medicinal product there is a very low risk that Anti-D can cause allergic / anaphylactic reactions. Patients receiving anti-D should remain in the surgery for at least 20 minutes post-administration and be advised to report any new symptoms. If anti-D is given in the home the midwife must have an anaphylaxis kit and be competent to use it. The midwife must also stay with the patient for at least 20 minutes post-administration.
- If an allergic reaction is suspected the case should be discussed with a Consultant Haematologist before any further Anti-D is given.

33.4 THE PRODUCT
Anti-D is a blood product. It is produced from plasma collected from donors across a number of sites in the USA, all of which comply with US Food and Drug Administration standards. The production process includes steps to minimize the risk of viral contamination.

The patient information leaflet currently states that 'The possibility of infection from using medicines made from human blood plasma cannot be totally ruled out. This includes known, unknown and new viruses and some other germs. Several different steps have been taken to make this possibility very unlikely. These include the careful selection of donors and the careful testing of the plasma they provide. The current procedure (including solvent/detergent treatment) applied in the manufacture of medicinal products derived from human blood or plasma are effective against enveloped viruses such as HIV, hepatitis B and hepatitis C viruses, but are of limited value against
33.6 ROUTINE ANTENATAL ANTI-D PROPHYLAXIS (RAADP)

33.6.1 REQUEST AND COLLECTION OF BLOOD SAMPLES AT BOOKING (USUALLY BEFORE 12 WEEKS)
- The midwife collects a specimen for blood group and antibody screen which is sent to the blood transfusion laboratory (see section 7 for process).
- The specimen is taken in a pink EDTA bottle and must be hand labelled with the patient’s forename, surname, unique number and date of birth.
- An antenatal booking request form with all areas completed must accompany the specimen.
- The request form must also contain all four points of identification, either hand written or the patient’s addressograph label affixed to the request form.
- The request form must be signed and dated by the healthcare professional ordering the tests.

33.6.2 ANTENATAL VISIT AT APPROXIMATELY 16 WEEKS
- The midwife/obstetrician performing the 16 week review is responsible for reviewing the printed blood group and antibody screen results with the woman.
  - If the woman has not received her booking blood results the healthcare professional is responsible for obtaining a duplicate report
  - another appointment to discuss booking blood results may be necessary, this should be clearly documented in the woman’s hand held notes
- If the woman is RhD negative the midwife/obstetrician explains implications of RhD type and supplies her with the information leaflets (YOU, YOUR BABY & THE RhD FACTOR).
- The midwife/obstetrician must discuss and obtain consent for routine antenatal Anti-D prophylaxis
  - At ASPH use the Trust consent form 3. The healthcare professional should leave the blue copy with the hand held notes. The healthcare professional is responsible for ensuring that the white copy is returned to antenatal reception and filed in the medical notes
  - At FPH & RSCH use the section in the handheld notes to document consent has been given
- Complete an anti-D request form including the date of the 28 week review/appointment at which the first dose of Anti-D will be required
- If the patient has recently changed their surname it is helpful to document this on the anti-D request form
- Use of the NHS number can also be helpful if the patient is having shared care.
- No sample is required with this request form
- The Anti-D will be delivered to the address on the request form within the 27th week

33.6.3 POSITIVE ANTIBODY SCREENS
- Positive antibody screens indicate either that
  - the woman has had Anti-D recently in this pregnancy
  - OR the woman has developed antibodies to RhD (has been sensitised)
• If blood bank detect antibodies to RhD they will add a comment to the report stating "Anti-D detected. If anti-D has been given within the preceding six weeks no further sample is needed; please inform blood bank. If no anti-D has been given, or prophylactic anti D was administered >6 weeks before testing, please take additional samples (2 x 6mL EDTA). Discuss with blood bank the dose(s) and date(s) of any anti-D administered"
• So please confirm with blood bank if the patient has had Anti-D
• If they have not had Anti-D discuss the situation with blood bank regarding repeat samples and whether to give Anti-D (routine or sensitising). Whilst investigating whether the antibodies are passive (from injected Anti-D) or immune (patient has sensitised) the woman should be treated as normal i.e. given Anti-D at the usual times.
• If the woman is confirmed as having developed antibodies to RhD she should be referred to a consultant obstetrician. No further doses of prophylactic Anti-D will be administered.
• The Transfusion Practitioner is also available for advice/support.

33.6.4 ANTEPARTUM VISIT AT 28 WEEKS
• **Anti-D 1500 IU should be given between 28 – 30 weeks and should not be given before 28 weeks**
• **Anti-D 1500 IU at 28/40 must be given regardless of when/if any sensitising doses of Anti-D have been given**
• Late or missed doses must be reported to the Transfusion Practitioner who must report them to SHOT. See also section 33.11 for management of late/missed doses.
• Before administering Anti-D, the midwife must review the woman’s blood group and antibody results (see 33.6.3)
• 1 pink EDTA specimen for blood group and antibody screen must be drawn before giving Anti-D (see section 7 for process of obtaining a transfusion sample)
• Remove Anti-D from storage (see section 33.5).
• Check patients identity and the ampoule of anti-D (see section 17 for checking process)
• Check that the patient’s blood type is the same in her hand held notes and on the blood transfusion tag. The woman must be Rh-D negative. If she has a positive antibody screen please see section 33.6.3 above.
• Do not administer anti-D if there is any discrepancy with demographics or product.
• Administer one dose of Anti-D (one vial of 1500 IU) into the deltoid muscle. Women who have a bleeding disorder should receive the anti-D via the subcutaneous route.
• It is recommended that the woman waits for at least 20 minutes after administration before leaving the clinic/surgery to detect cases of allergy/anaphylaxis
• Return fully completed compatibility tag, request form and specimens to the Blood Transfusion Laboratory. **NOTE:** Tag must be fully completed and returned to comply with the Blood Safety and Quality Regulations (BSQR) 2005 as outlined in section 17.2.3
• Attach unit number of anti-D in woman’s handheld notes.

33.6.5 ANTEPARTUM VISIT AT 34 WEEKS
• The midwife/obstetrician performing the 34 week review is responsible for reviewing the printed 28-week blood group and antibody screen results with the woman.
  o If the woman has not received her 28-week blood results the healthcare professional is responsible for obtaining a duplicate printed report from the computer
  o If the woman has developed antibodies to RhD see 33.6.3
33.6.6 WOMEN TRANSFERRING INTO ASPH/FPH/RSCH MID-PREGNANCY
- The woman should be assessed according to standard booking procedure, including routine booking bloods.
- If already known to be RhD negative, it must be clearly established and documented whether she has received any doses of Anti-D.
- If she has received 500 IU Anti-D at 28 weeks elsewhere, a second dose of 500 IU should be given at 34 weeks.
- On-going management should be as per standard protocol for her current gestation.
- If she is already greater than 28 weeks gestation, has not received any prophylaxis and no antibodies to RhD have been detected in her serum, she should be recalled as soon as possible for her routine dose of 1500 IU Anti-D.

33.7 ANTENATAL ANTI-D PROPHYLAXIS FOLLOWING SENSITISING EVENTS
These events have the potential to cause a feto-maternal haemorrhage (FMH) which can lead to sensitisation.
1. Vaginal bleeding associated with severe pain at < 12 weeks
2. A miscarriage requiring evacuation of retained products of conception at <12 weeks (D&C)
3. A miscarriage at ≥ 12 weeks with/without D&C
4. Termination of pregnancy (medical or surgical regardless of gestation)
5. Ectopic/molar pregnancy
6. Amniocentesis, chorionic villae sampling or other invasive procedures
7. Vaginal bleeding after 12 weeks gestation
8. Abdominal Trauma
9. External cephalic version
10. Delivery

33.7.1 MANAGEMENT
- See also section 33.15
- Anti-D following a sensitising event must be prescribed by a doctor.
- Always take a group and antibody screen prior to administering any Anti-D.
- Always take a kleihauer EDTA specimen if the patient is more than 20 weeks gestation.
- Anti-D must be given within 72 hours of the sensitising event (see also section 33.11 for management of late/missed doses which must be reported).
- A potentially sensitising event at less than 20 weeks requires a dose of Anti-D 500 IU.
- A potentially sensitising event at more than 20 weeks requires a dose of Anti-D 500 IU.
  - The kleihauer result should be followed up as soon as possible to see if extra Anti-D is required (see also section 33.9 for management of a large feto-maternal haemorrhage).
  - Blood bank will advise whether extra Anti-D is required and will issue it.
  - This should also be given within 72 hours of the initial bleed (see also section 33.11 for management of late/missed doses).
- Tag must be signed and dated by practitioner administering anti-D and returned to blood bank.
- Attach unit number of Anti-D in the appropriate document dependent on where the patient is i.e. hand-held notes, integrated care pathway in ASPH day surgery, or prescription chart in Early Pregnancy Unit/ Day assessment unit.

33.7.2 RECURRENT EPISODES OF BLEEDING
Anti-D 500 IU must be given at a minimum of 6 weekly intervals when bleeding is continuous. Kleihauers must be taken for estimation of FMH at regular intervals as guided by clinicians and may range from 1-3 weekly. If the FMH is positive, an additional dose of Anti-D must be offered regardless of the presence or absence of antibodies to RhD and FMH must be retested as appropriate to route of administration/clinicians guidance.
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 is not necessary in women with threatened miscarriage, with a viable fetus, where bleeding completely stops before 12 weeks gestation.
- **However** administer 500 IU Anti-D 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 must be confirmed by ultrasound.

12 – 20 weeks gestation
- Give 500 IU Anti-D; if episodes of bleeding persist give 2nd dose 500 iu Anti-D 6 weeks after 1st dose

> 20 weeks gestation
- Give 500 IU anti-D at a minimum of 6 weekly intervals.
- Check Kleihauer at 2 weekly intervals, if it becomes positive give an additional Anti-D (as recommended by the blood transfusion laboratory).
- If additional doses of Anti-D are required, the Kleihauer should be repeated 72 hours later.
- An EDTA specimen for a Kleihauer test and Anti-D is still required following a potentially sensitizing event (after 20 weeks) even if the woman has already received one or more doses of Anti-D.

**NB:** Women who have received sensitising doses of Anti-D should still be offered routine anti-D prophylaxis at 28 weeks gestation. Administration of routine Anti-D prophylaxis does not affect the need for anti-D after delivery, as recommended by the blood bank.

33.8 POSTNATAL ANTI-D PROPHYLAXIS
Delivery is a sensitising event. Therefore all non-sensitised Rhesus D negative women need a cord sample taken at birth to determine the RhD status of the baby. If the baby is RhD positive, or the RhD status is unknown, the woman will require post-natal prophylaxis. The community midwife should apply all points of midwifery practice following homebirths.

33.8.1 AT BIRTH
- At the birth take cord blood for group and direct Coombs test
- The cord blood must be hand labelled as such, with the baby’s hospital number, Mother’s surname and infant of.
- Take maternal blood for group, antibodies and Kleihauer test within 30-45 minutes (maximum 2 hours) of the birth.
- The maternal specimen must be hand labelled with the woman’s forename, surname, hospital number and date of birth.
- Send directly to the laboratory

33.8.2 INTRAOPERATIVE CELL SALVAGE
- Where intraoperative cell salvage (ICS) is used during caesarean section on RhD negative women, and that blood is reinfused 1500 iu anti-D must be given if the baby is RhD positive.
- Informing blood bank of the use of ICS and need for 1500 iu anti-D will be essential.
- A kleihauer should be taken between 30-45 minutes post-delivery to determine whether further anti-D is required.

33.83 RESULTS
- Blood Transfusion department will notify the requesting area if Anti-D is required.
- Anti-D is required if the baby is RhD positive or the RhD unknown (e.g. due to sample rejection)
• The routine dose is 500 IU but more may be required dependent on the kleihauer result. Blood Bank will inform the requesting area if more is required.
• If any results (Kleihauer/baby group) are delayed for any reason and cannot be obtained within the deadline for administration (72 hours from delivery) the routine prophylactic dose of 500 IU of Anti-D must be issued and given (with consent).
• Obtaining the results must be a priority for both laboratory and midwifery staff.
• If the woman decides to leave hospital post delivery, before the laboratory results are available, the onus is on the midwife to ensure that Anti-D is given within 72 hours of delivery. Either the woman will need to return to hospital to be given it or the community midwife must give it.
• However, if the woman decides to leave hospital and requests to be given Anti-D before she leaves, it may be given prior to confirmation of the baby’s blood group. The midwife must ensure, and clearly document, that the woman is aware that it might not be required and she is willing to accept a blood product under these circumstances.
• **Anti-D may be given in the woman's home as long as the midwife carries an anaphylaxis kit with them and also stays with the woman for at least 20 minutes following administration.**

### 33.9 MANAGEMENT OF A LARGE ANTE/POSTNATAL FETOMATERNAL HAEMORRHAGE

Where a fetomaternal haemorrhage (FMH) of more than 4ml has been identified additional Anti-D will be required.

- The additional dose of Anti-D will be calculated by Blood bank on the basis of an extra 125 IU for each ml of fetal cells present.
- If a large dose is required intravenous Win-Rho IV Anti-D may be suggested on the advice of clinical Haematologist.
- A follow up maternal sample is required at 48 hours if given IV, and 72 hours if given IM; this will be tested to assess the clearance of fetal cells following an FMH of >4ml.
- More Anti-D may be necessary if fetal cells remain (BCSH 1999). A clinical decision may need to be made in determining the dose and frequency of more injections dependent upon the volume of residual fetal cells detected 72 hours after the original injection (48 hours if Anti-D was administered intravenously).
- It is the responsibility of the clinical service that patients return for these follow-up services.

### 33.10 WOMEN WHO DECLINE ANTI-D

A woman may choose to decline anti-D; this decision must be respected by the obstetrician /midwife. However the healthcare professional must clearly document in the woman’s hand held notes her reasons for declining. The healthcare professional must be fully satisfied that the woman understands the implications of this decision.

If the woman is considering declining because her partner is RhD negative:

- Partner screening should be discussed (SPS do not offer free partner screening unless unusual antibodies have been detected)
- Once the partner's results have been reviewed RAADP should be discussed again
- If the midwife is not sure about her response to the partner’s blood group she should discuss the result with the community midwifery manager/Transfusion Practitioner who will advise appropriate further action.
- If partner screening is declined or evidence of blood group is presented please document this clearly in the woman’s hand held notes

If the woman is considering declining because she will be sterilized shortly after birth and plans to use effective contraception in the interim:

- The obstetrician/midwife must discuss with the woman the fact that sterilization has a 1 in 200 failure rate.
- Also women sometimes change their mind about sterilization.
- If the woman is considering declining because she is certain she will have no more children:
• The midwife must discuss with the woman the possibility that she may subsequently change her mind.

33.11 MANAGEMENT OF MISSED OR LATE ANTI-D
Late Anti-D is classified as being given more than 72 hours after a sensitising event, or for the routine antenatal dose it was given outside of the 28-30 week gestation time frame. These events have to be reported both at Trust level using Datix, and by the TP team to the Serious Hazard of Transfusion (SHOT) scheme.

33.11.1 ANTE-NATAL PATIENTS
• Routine dose: if the dose has not been given by 30 week gestation it should be given as soon as possible.
• Sensitising doses: if it is detected that a woman required Anti-D but did not have it within 72 hours, it should still be given if possible (within 10 days from the sensitising event). The midwife must make every effort to contact the patient and arrange to administer the Anti-D as soon as possible. The midwife must document in the patients handheld antenatal notes the reason for the late/missed administration of Anti-D. The patient may need extra information/support (contact the Transfusion Practitioner team if needed).

33.11.2 POST-NATAL PATIENTS
• If a patient with an RhD positive baby is not given Anti-D within 72 hours of delivery, the dose must still be given as soon as possible, up to ten days after delivery.

33.11.3 FOLLOW UP
Patients should be informed that they did not receive the correct anti-D prophylaxis (for whatever reason i.e. could be due to patients non-compliance or failure of internal processes).

Patients who have missed a dose antenatally (whether routine or for a sensitising event), had a subsequent G+S which is negative, and from then on have had correct prophylaxis do not require follow up. Most patients will have a positive antibody screen as they will have had Anti-D at some point.

The TP team will instigate a letter from the Consultant Haematologist to the Consultant Obstetrician detailing the incident and the follow up required.

33.12 MANAGEMENT OF TRANSFUSION OF RHD POSITIVE BLOOD COMPONENTS TO RHD NEGATIVE FEMALES OF CHILDBEARING CAPACITY
(This must always be discussed with a Consultant Haematologist)

33.12.1 RHD POSITIVE PLATELET TRANSFUSIONS
Whenever possible, RhD negative platelets must be transfused to RhD negative pre-menopausal females (including children) of childbearing capacity/potential who need a platelet transfusion. Occasionally, if the appropriate component is not available or would cause unacceptable delay, it may be necessary to transfuse RhD positive platelets. In these circumstances, prophylaxis against possible Rh alloimmunisation by red cells contaminating the platelet product must be given. It is not necessary to administer Anti-D immunoglobulin to RhD negative females lacking childbearing potential or RhD negative males who receive RhD positive platelets.

A dose of 500iu Anti-D immunoglobulin must be sufficient to cover up to ten adult therapeutic doses of RhD positive platelets given within a 6 week period (BCSH b, 2003 Grade B). This would only be given following advice from a haematologist.

In severely thrombocytopenic patient with platelet counts of less the 30 x 10^9/l, consideration must be given to administering Anti-D IV to avoid the risk of haematoma following IM injection.
33.12.2 INADVERTENT TRANSFUSION OF RHD POSITIVE BLOOD TO RHD NEGATIVE PRE-MENOPAUSAL FEMALES

Emergency advice from a Consultant Haematologist must be sought and the patient may need to be transferred to a high dependency/specialist unit if an exchange transfusion is required.

The dose of Anti-D immunoglobulin given in this situation will be calculated on the following basis:

- IM Anti-D - 125iu will suppress sensitisation resulting from 1 ml of RhD positive red cells
- IV Anti-D – 50iu (Win-Rho) will suppress sensitisation resulting from 1 ml of RhD positive red cells

If less than 15mls is transfused the appropriate dose should be administered. The calculated dose will be prescribed after consultation between clinical haematology and the National Blood Service. Follow up testing will be required to demonstrate removal of RhD positive cells.

When two units or more of RhD positive red cells have been transfused, a red cell exchange transfusion must be considered to reduce the load of RhD Positive red cells in circulation, and the dose of Anti-D immunoglobulin required to suppress immunisation. In this situation, the patient must 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 including intravenous Anti-D (RCOG, 2011).

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 RhD positive red cells must be estimated using flow cytometry. Intravenous Anti-D immunoglobulin is the preparation of choice, achieving adequate plasma levels immediately and being effective microgram for microgram at clearing red cells. The dose to be administered must assume that 600iu of Anti-D will suppress immunisation by 10ml RhD positive red cells. Intramuscular preparations of Anti-D immunoglobulin must not be given intravenously. An appropriate combined dose of IV and IM Anti-D must be determined in discussion with a specialist in Transfusion Medicine. Follow up tests for D positive red cells must be undertaken every 48 hours and further Anti-D given until there are no detectable D positive red cells in circulation.

Free Anti-D in the patients plasma does not necessarily reflect adequate dosage; Anti-D immunoglobulin treatment must be continued until RhD positive red cells are no longer detectable (RCOG, 2011).

Passive Anti-D given in large doses may be detectable for up to 6 months or longer and tests for immune Anti-D may not be conclusive for several months. It is imperative that these patients are followed up until it is clear whether or not they have been sensitised and formed their own immune Anti-D.

33.13 CONTINGENCY PLAN FOR MANAGEMENT OF ANTI-D STOCK CRISES

Supplier stock crises have necessitated the creation of a contingency plan in case of failure of stock. In the event of a failure of stock the Blood bank will supply an alternative, which will usually come in a dose of 1500iu. The alternatives will either be BPL, who stock a 1500iu ampoule from which the required dose can be drawn up, or CSL who provide 1500iu in uncalibrated preloaded syringes, making dosage more difficult. The Head of Midwifery will be consulted and advised of the option that will be used and will be responsible for ensuring staff are aware of this change. The TP team will support the midwifery department with this temporary change in practice. The midwife will be supplied with an information sheet with every dose (see section 33.16) concerning how to ensure the right dose is given.
33.14 PROCESS FOR ROUTINE ANTENATAL ANTI-D PROPHYLAXIS

**Send Bloods for Group and Screen at Booking**

Pregnant Rhesus D negative Woman

Enter for Routine Antenatal Anti-D Prophylaxis between 28 - 30 weeks gestation

**Appointment before 22 weeks (approx)**
Discuss with woman whether she consents to receiving prophylactic Anti-D

Send completed request form for Anti-D to blood bank even if the woman is to decline the Anti-D (please write "DECLINED" across the bottom part of the request form)

Anti-D status will be assessed by blood bank

**Anti-D positive**

No Anti-D will be issued. Request form will be sent back to community midwife with comment and must be placed in hand held notes. Patient to be managed by Consultant Obstetrician.

**Antibody screen negative**

1500 IU of Anti-D will be issued along with the request form in time for the 28 week appointment.

28 – 30 weeks
Repeat Blood Sample for Group and Screen before you give 1500 IU of Anti-D into the deltoid muscle. Document in hand held notes that Anti-D has been given.

**Delivery**

**Cord and Maternal Bloods**
Send Anti-D Request form with samples

Baby Rh D Negative

No Anti-D required

Baby Rh D Positive

500 iu of Anti-D required. **Must be given within 72 hours**
Give anti-D immediately - do not wait for kleihauer result. Kleihauer test will indicate whether more Anti-D is required, again within 72 hours of birth.

Blood bank will issue Anti-D (on a named patient basis) along with the request form following blood tests. Document in hand held notes that Anti-D has been given.
### Surrey Pathology Services
### Anti-D Administration Flowchart

#### Always confirm:
- the woman’s identity
- that the woman is RhD Negative using the latest available laboratory report
- that the woman does not have immune anti-D using the latest available laboratory report
- that a blood sample has been taken to confirm group & antibody screen, but do not wait for results before administration of anti-D Ig
- that informed consent for administration of anti-D Ig is recorded in notes

#### Potentially Sensitising Events (PSEs) during pregnancy

**Gestation less than 12 weeks**
- Therapeutic termination of pregnancy
- ERPC / Instrumentation of uterus
- Ectopic / Molar Pregnancy
- Miscarriage / vaginal bleeding associated with severe pain

**Regardless of Gestation**
- All the above, plus;
  - Amniocentesis, chorionic villus biopsy and cordocentesis
  - Antepartum haemorrhage / PV bleeding
  - External cephalic version
  - Fall or abdominal trauma (sharp/blunt, open/closed)
  - In-utero therapeutic interventions (transfusion, surgery, insertion of shunts, laser)

Administer anti-D Ig for a PSE irrespective of whether RAADP has already been given

**Does the Kleihauer Test indicate that further anti-D Ig is required?**

**For continuous vaginal bleeding at least 500iu** anti-D Ig should be administered at a minimum of 6-weekly intervals, irrespective of the presence of detectable anti-D, and a Kleihauer requested every two weeks in case more anti-D is needed

**Gestation 20 weeks to term**
- Request a Kleihauer Test and immediately administer at least 500iu anti-D Ig within 72 hours of event.
  - Confirm product / dose / expiry and patient ID pre administration

**Gestation 12 to 20 weeks**
- Administer at least 500iu anti-D Ig within 72 hours of event.
  - Confirm product / dose / expiry and patient ID pre administration
  - No need for a Kleihauer Test at <20 weeks

**Gestation LESS than 12 weeks**
- Administer at least 600iu anti-D Ig within 72 hours of event.
  - Confirm product / dose / expiry and patient ID pre administration
  - No need for a Kleihauer Test at <12 weeks

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

**For Routine Antenatal Anti-D Prophylaxis**
- (Irrespective of whether anti-D Ig already given for PSE)

**At Delivery (or at diagnosis of Intra Uterine Death >20 weeks AND at delivery)**

**Is the baby’s group confirmed as RhD positive?**
- OR
**Are cord samples not available?**

**Transfusion Laboratory staff will advise if further anti-D Ig is required**

- Request a Kleihauer Test
- Administer at least 500iu anti-D Ig within 72 hours of delivery
  - Confirm product / dose / expiry and patient ID pre administration
- Administer more anti-D Ig following discussion with laboratory

---

Adapted from the original SHOT flowchart by TD for use by Surrey Pathology Services Dec 2013
33.16 ANTI-D PROPHYLAXIS STOCK CRISIS COMMUNICATION

Due to Anti-D prophylaxis supply problems the blood bank will be issuing either BPL 1500iu or Rhophylac 1500iu as Anti-D prophylaxis from ___ / ___ / _____ until further notice.

**Guidelines for administration of 500iu dose using BPL 1500iu ampoule**

BPL 1500iu is supplied in an ampoule containing 2mls of solution
Therefore for doses of 500iu the midwife will need to:

- Open a 1ml syringe
- Attach a needle
- Draw up the correct dose as follows
  - 2mls = 1500iu
  - 0.66mls = 500iu
- The correct amount for a 500iu dose will therefore be 0.66mls

**Guidelines for administration of 500iu dose using Rhophylac 1500iu prefilled syringe**

Rhophylac is designed as a single dose of 1500iu in a pre-filled syringe of 2 mls.
The Rhophylac syringe is not calibrated to allow for calculation of a smaller dose.
Therefore for doses of 500iu the midwife will need to:

- Open the pre-filled syringe – snap the top off to reveal needle portal
- Snap off the base of the needle
- Open a 1ml syringe
- Attach the needle
- Draw up the correct dose as follows
  - 2mls = 1500iu
  - 0.66mls = 500iu
- The correct amount for a 500iu dose will therefore be 0.66mls

Please be aware of the risk of a needle stick injury when completing this task.
The rest of the solution in the syringe must be disposed of in the sharps bin.

For any enquiries related to either product please contact
Transfusion Practitioner Team
ASPH x 6178 / FPH x 6532 / RSCH x 4482 or via pager (switchboard) each site
## 34. CYTOMEGALOVIRUS (CMV) NEGATIVE BLOOD COMPONENTS

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34. CYTOMEGALOVIRUS (CMV) NEGATIVE BLOOD COMPONENTS

34.1. INTRODUCTION
The aim of this guideline is to inform clinicians regarding the clinical indications for Cytomegalovirus (CMV) seronegative cellular components (red cells, platelets and granulocyte transfusions). CMV infection can cause serious morbidity in certain immuno-compromised CMV negative patients. The use of CMV negative cellular components minimises the risk of complications for these patients.

NOTE: Paediatric patients in shared care should follow guidelines from tertiary centres regarding CMV status.

34.2 CYTOMEGALOVIRUS
Individuals previously unexposed to Cytomegalovirus (CMV) may be identified as seronegative (lacking IgG antibodies against CMV). Some of these individuals may be at risk of CMV infection through transfusion.

34.3 WHICH COMPONENTS
- Red cell, platelets and granulocytes should be CMV negative.
- FFP and Cryoprecipitate do not need to be CMV negative as CMV transmission does not occur via non-cellular plasma products.

From here on the term 'CMV negative blood' is used for CMV seronegative cellular components (red cells, platelets and granulocyte transfusions).

34.4 INDICATIONS FOR CMV NEGATIVE BLOOD
Up to March 2012 a generally adopted list of indications for CMV negative blood products in CMV negative haematology/haemato-oncology patients existed. However, a mission statement from SaBTo in March 2012 has given new guidance regarding this and it no longer supports this practise in this particular group of patients.

See section 38.9 for a poster with indications for both CMV negative components and irradiated components,

Indicated in the following groups irrespective of CMV status:
- Paediatric patients: follow shared care guidelines from tertiary centre.
- Transfusions in Pregnancy
- Intrauterine Transfusions
- Premature and low birth weight (<1500gram) babies and all infants < 1 month old

Check with the responsible consultant if the indication or patient status is uncertain.

34.5 IDENTIFICATION AND DOCUMENTATION OF PATIENTS REQUIRING CMV NEGATIVE BLOOD
- The need for CMV negative blood should be considered and identified at the earliest opportunity by the Consultant, SpR or SHO based on these guidelines. This may occur at the time of initial diagnosis or following specific management decisions. It should also be considered at the time of each and every transfusion request.
- The need for CMV negative blood should be clearly indicated on every transfusion request form, stating the reason.
- The laboratory will flag the patient’s computer record to ensure that CMV negative blood components are automatically requested for all subsequent transfusions.
- The prescription must clearly indicate that CMV negative blood is required.
- A dated entry should be made into the notes section of the patient’s case records stating the need for CMV negative blood, the reason and the duration.
- The need for CMV negative blood should be recorded in any Alert Areas on patient records.
- The laboratory should be informed if CMV negative blood is no longer required.
• The patient’s case notes alert should be cancelled with a single stroke and date.
• The reason for cancellation should be recorded in the notes section of the case notes.

34.6 REQUESTING CMV NEGATIVE BLOOD
A standard blood transfusion request form should be used and state the need for CMV negative blood products. The laboratory does not hold routine stock of CMV negative blood products, therefore a delay may occur. In life-threatening/life-saving circumstances blood products unscreened for CMV can and should be used if CMV-negative products are not readily available.

If the transfusion laboratory receives a request for a patient whose laboratory record is already marked CMV negative blood, CMV negative blood products will be supplied whether requested or not.
### 35. DOMICILIARY TRANSFUSION GUIDELINE

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35. DOMICILIARY TRANSFUSION GUIDELINE

35.1. INTRODUCTION
Surrey Pathology Service (SPS), which provides the Blood Transfusion service at Ashford & St Peters Hospital (ASPH), the Royal Surrey County Hospital (RSCH) and Frimley Park Hospital (FPH), has entered into an agreement to support the delivery of a home-based transfusion service for patients receiving palliative care. Thus far SPS has agreed to supply:
- The Midhurst Macmillan team
- The Beacon Centre

35.2. PURPOSE
SPS will supply blood and platelets for domiciliary transfusion on the proviso that the correct process and reporting procedures are in place. This document covers the operational process and safeguards to be adhered to on the part of both the above stakeholders and SPS. It is supported by the Blood Transfusion Policy and standard operating procedures.

35.3. PROCESS
The following process has been agreed. Please note that all aspects of transfusion, including training and competency requirements for all staff, are as stated in the relevant sections of this Policy.

The referring Dr will select and assess the patient, prescribe the transfusion, and complete the cross match request form for the blood

The referring Dr will communicate with the Macmillan/Beacon team to ensure that the crossmatch sample is taken and the Transfusion Team at the appropriate Hospital are informed; this will usually be the relevant member of the Transfusion Practitioner (TP) team.

35.4. ROLE OF THE TRANSFUSION PRACTITIONER (TP) TEAM
The TP team will coordinate the transfusion from the hospital perspective and will:
- Complete a ‘Domiciliary transfusion Communication Sheet’ (see section 35.14) and share this with the blood bank staff
- Verbally advise blood bank staff so that they:
  - Are aware of the transfusion
  - Cross match and prepare the blood product in time for the transfusion
  - Know the contact details of the member of the referring team
  - Organise transport of blood on the appropriate day
  - Organise transport of platelets on the appropriate day as above via an approved platelet transport box
  - Contact the member of the referring team who will receive the units to confirm dispatch and estimated time of arrival of unit

35.5. CROSS MATCH SAMPLING (please follow process as outlined in section 7 above)
Patients will have a cross match sample taken by a trained and competent member of staff from the referring team who will send this into the appropriate supplying Transfusion laboratory for testing. A new sample is required for each transfusion; samples need to be obtained as close as possible to the planned transfusion date. Samples are valid for up to 3 days if the last transfusion was given within the last 3 months or 7 days if the last transfusion was more than 3 months earlier. Patients who have never had a transfusion will need additional measures prior to the transfusion please see section 35.6 below.

35.6. PATIENTS WHO HAVE NEVER HAD A TRANSFUSION
Any patients who have never had a transfusion must have 2 separate groups and serum IgA measured prior to having their first transfusion at home. Samples will be taken by the requesting team, labelled as per policy, and sent into supplying blood bank for testing.
The requesting team will contact the Consultant Haematologist and the TP team to inform them of this. The TP team will obtain the result from immunology and ask the Consultant Haematologist to review the results before the first transfusion is approved.

The TP team will contact the requesting team with the IgA result:
- If the IgA result is satisfactory the TP team will advise the requesting team that the Consultant Haematologist has approved the transfusion and request that they obtain a cross match sample.
- If the IgA result is not satisfactory the transfusion will not be able to proceed at home and the patient will need to be referred to have a transfusion as an inpatient.

35.7. COLD CHAIN
Red cells (Blood) must be kept between 2-6°C. There must be evidence of maintenance of the ‘cold chain’ (the product being kept at the correct temperature throughout transportation). BST SOP 00020 ‘Transport of Blood/Platelets in cold boxes’ will be followed.

35.7.1 PROCESS:
- Once blood is removed from a blood refrigerator it must be packed for transport in a validated cool box.
- The cool box is then packed with cool packs (that have been in a blood bank refrigerator for a minimum of 8 hours as per BST SOP 00020).
- The maximum time blood can be in a cool box is 4 hours.
- The transfusion must be completed within 4 hours of the unit being removed from the cool box.
- Once blood has been removed from the cool box if the transfusion cannot go ahead immediately the blood can only be returned to the cool box if it has been out for less than 30 minutes and has not been pierced.
- Documentation of the cold chain is essential and the nurse must complete the register copies for removal and return of blood from/to the cool box.
- Failure to provide documentation of the cold chain places the patient at risk and could waste blood as it cannot be placed back into stock if the cold chain is incomplete.
- Failure to provide evidence of the cold chain could lead to suspension of the service.
- These issues will be covered in both training and competency assessment.

35.8. DELIVERY
The blood product will be sent in a product specific transport box, to either the nearest Community Hospital with a blood fridge, or it can be collected from the blood bank. A trained and competent member of the nursing team must be available to collect the blood product.

35.8.1 RED CELLS delivered to a community hospital with a blood fridge; Hospital staff should transfer the blood to the blood fridge, completing the documentation for delivery and for transferring it into the blood fridge as in section 14 above. The blood fridge should always have cool packs within it that have been in the fridge for at least 8 hours so that the blood can be re-packed for collection by the Macmillan nurse.

Blood sent to the home will be sent 2 units at a time in 2 approved cool boxes (i.e. 1 unit per cool box).

35.8.2 PLATELETS must be kept at room temperature using packs maintained at room temperature within the Platelet transport box (see BST SOP 00020: Transport of blood/platelets in cold boxes). Platelets must never be put in a fridge. Platelets can be stored in the transport box for 4 hours but can be off the agitator for up to 24 hours.
35.9. COLLECTION

- Please also see section 14 above
- Only a trained and competent nurse can check and collect blood products.
- This nurse must have patient identification documentation, and must check all patient identification details (first name, surname, unique number (NHS/Hospital) and date of birth) against this and the accompanying register copy and compatibility tag to confirm that it is for the right patient as per policy.
- The nurse must also check the unit number and the blood group match on the register copy, the unit, and the compatibility tag and that the expiry date has not passed.
- The nurse must complete the register copy stating the date and time of removal from the cool box or platelet transport box and print his/her own name.
- If the transfusion cannot go ahead immediately and the unit is intact (i.e. not pierced) blood can only be returned to the cool box if it has been out for less than 30 minutes.
- The register copy must be completed with date and time of return and print name of nurse.
- If the unit can then subsequently be transfused the date & time of removal must again be documented along with the name of the nurse.
- If a transfusion cannot go ahead at all the blood must remain in the cool box and the nurse must ensure it is returned to the supplying blood bank within 4 hours of it being packed into the cool box. Contact the Blood Transfusion department and ask for advice re courier pick up.

35.10. ADMINISTRATION

- Please also follow section 17 above
- Once removed from the cool box the blood transfusion must be completed within 4 hours; platelets are usually transfused over 30 minutes.

Two registered and competent nurses will check the blood products as per policy against the identity of the patient, their wristband (if worn) and the prescription, administer the transfusion, and complete all required documentation including traceability documents (section 35.11 below).

- The patient must be constantly supervised for the duration of the transfusion by the nurse who will monitor their vital signs as per policy.
- If the patient shows any signs or symptoms of a transfusion reaction the nurse should follow the Acute Transfusion reaction guideline (section 31); stopping the transfusion immediately and substituting calling a Dr for dialling 999 for an emergency ambulance.
- The nurse will also need to be competent to manage anaphylaxis and carry an anaphylaxis kit.

Any adverse events or reactions must also be reported to the TP team; see section 35.12 below.

35.11. TRACEABILITY

All blood products must be traceable for 30 years (BSQR 2005). The relevant blood transfusion department will issue ‘Transfer of blood’ documentation and traceability forms. The nurse is required to complete the traceability documentation for every unit of blood and to return this documentation to the relevant blood transfusion laboratory. These issues will be covered in both training and competency sessions. Failure to trace blood products could lead to suspension of the service.

35.12. MANDATORY HAEMOVIGILANCE

There are standard operating procedures for the notification of serious adverse reactions and events that are in place to meet the requirements of the Blood Safety and Quality Regulations (2005). Any incidents, adverse events or reactions associated with blood supplied by SPS blood transfusion laboratories to patients within the community must be notified via an incident form and, where appropriate, an acute transfusion reaction form. The TP team will then investigate and report the incident as appropriate.
35.13. TRAINING AND COMPETENCY
The British Committee for Standards in Haematology (BCSH) recommends that all staff involved in transfusion must be trained and updated every 2 years. Similarly the National Patient Safety Agency (NPSA) Safer Practice Notice (SPN) 14 states that all staff involved in transfusion must be competency assessed from November 2010, and must be reassessed every 3 years. Therefore staff who will participate in domiciliary transfusions must be identified by their Manager and the Managers must be responsible for ensuring these staff are trained and competency assessed as above before being allowed to participate in domiciliary transfusions. Staff need to keep their training and competency up to date in order to remain able to participate in domiciliary transfusion.

Training and competency for the Macmillan team is being provided by Simon Goodwin (TP East Surrey). Records of training and competency are Simon Goodwin with an understanding that he will alert the TP team if there are any concerns regarding compliance with the requirements.

Training and competency for the Beacon Centre staff is provided by the SPS Transfusion Practitioner Team and a database is maintained.
### 35.14 DOMICILIARY TRANSFUSION COMMUNICATION SHEET

TP to complete and copy to Blood bank staff

1. **Patient details:**

<table>
<thead>
<tr>
<th>Surname</th>
<th>Forename</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of birth</td>
<td></td>
</tr>
<tr>
<td>Hospital number</td>
<td>NHS number</td>
</tr>
<tr>
<td>Address transfusion to be delivered to</td>
<td></td>
</tr>
</tbody>
</table>

2. **Transfusion details:**

<table>
<thead>
<tr>
<th>Date of transfusion</th>
<th>Time product req</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Product(s) to be transfused</strong></td>
<td><strong>Number required</strong></td>
</tr>
<tr>
<td>Red cells / Platelets</td>
<td></td>
</tr>
<tr>
<td><strong>Cross match received</strong></td>
<td><strong>Sample rejected?</strong></td>
</tr>
<tr>
<td>Yes / No</td>
<td>Yes / No</td>
</tr>
<tr>
<td>(if yes inform Macmillan nurse)</td>
<td></td>
</tr>
</tbody>
</table>

Has the patient ever had a transfusion?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No further action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>See flow chart over page</td>
</tr>
</tbody>
</table>

3. **Community contact**

<table>
<thead>
<tr>
<th>Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile phone number</td>
<td></td>
</tr>
<tr>
<td>Base phone number</td>
<td></td>
</tr>
<tr>
<td>Time will be at patient address</td>
<td></td>
</tr>
<tr>
<td>Contacted by Blood bank re times of blood delivery</td>
<td>Please sign / date /time this entry</td>
</tr>
</tbody>
</table>

4. **Communication**

Blood bank diary entry completed YES / NO
35.15 HAS THE PATIENT EVER HAD A TRANSFUSION?

- **Yes**
  - No further action required

- **No**
  - Has an IGA and repeat group request been sent?
    - **Yes**
      - Contact Dr / Macmillan / Beacon team
    - **No**
      - Is the IGA result available?
        - **Yes**
          - Has a Haematologist approved IgA result?
            - **Yes**
              - Proceed with transfusion
            - **No**
              - Gain approval before proceeding with transfusion
        - **No**
          - Obtain result
### 36. EMERGENCY BLOOD MANAGEMENT PLAN FOR RED CELLS & PLATELETS

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36. EMERGENCY BLOOD MANAGEMENT PLAN FOR RED CELLS & PLATELETS

36.1. INTRODUCTION
The plan describes in detail actions which need to be taken during periods of reduced supply of red cells and platelets for transfusion which could come about at any time and for a variety of reasons, may be short lived or sustained, and may be moderate or severe.

Moderate or severe shortages will be signalled to the Hospital by the National Blood Service. For red cell shortages the on-call consultant haematologist will trigger an alert to key staff via a voice over on hospital’s bleeps, an alphanumeric message on hospital pagers and an email message.

36.2. THE EMERGENCY BLOOD MANAGEMENT PLAN
The National Blood Service (NBS) has identified a need for robust plans to deal with periods of reduction in the supply of donor blood for transfusion to ensure that sufficient blood is available for patients most in need. This will entail reduction or cessation of non-essential transfusions and elective procedures likely to result in the need for blood depending on the degree of shortage of blood supply. Notice of reduction in blood supply may occur with very little notice. Local plans are required so that they can be implemented rapidly when the need arises.

The NBS has requested a number of actions from all Trusts including:-

- To ensure the optimum use of blood during periods of normal supply
- Formation of a local Hospital Blood Management Team (HBMT)
- Production of a local plan for the management of blood during periods of shortage
- Ratification of the local plan by a Trust Emergency Blood Management Group (EBMG) which should include the chief executive, senior executive officers and clinical directors of the Trust
- Dissemination of the plan to all relevant parties to ensure effective implementation when blood supply fails

This document has been produced by the HBMT based upon the national guidance. The plan has been approved by the Hospital Transfusion Committee (HTC), Clinical Governance Committee and Trust Board.

The body of this document describes the arrangements for periods of red cell shortage and for managing platelet shortages.

Exclusion: These guidelines do not apply to neonatal or paediatric transfusion practice except where expressly stated.

36.3. THE THREE PHASES
The plan describes three phases, dependent on NBS stock levels of red cells

Green – normal supplies
Amber – red cells supply reduced by 33% - 50% for a short or prolonged period
Red – severe (>50%) reduction

Reduction in red cells supply may affect one or more blood groups at any one time.

36.4. ACTIONS REQUIRED DURING GREEN PHASE
The Green Phase is said to exist when red cell supply is normal.

36.4.1 EXPANSION OF THE HOSPITAL TRANSFUSION TEAM
A HBMT was convened to formulate this plan and will be reconvened during time of blood shortage.

Membership consists of:-

- Haematologist responsible for transfusion
- Network Transfusion lead
- Deputy Network Transfusion Lead
- Blood Transfusion Quality manager
- Lead Transfusion Practitioner
- Consultant Anaesthetist
- Critical Care and Anaesthetics Manager
- Surgical General Manager
- Deputy Chief Executive

<table>
<thead>
<tr>
<th>The HBMT is responsible for the following:</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensuring audit is undertaken so that red cells usage figures for surgical procedures are available to advise which elective surgical procedures can be undertaken at amber and red shortage levels.</td>
<td>The current laboratory information system allows routine collection of audit data. The hospital’s maximum surgical red cells ordering schedule will be used to guide transfusion during periods of shortage.</td>
</tr>
<tr>
<td>Implementation of the Hospital Codes for transfusion as recommended by the National Blood Transfusion Committee</td>
<td>Surgical blood is issued according to the maximum blood ordering schedule which is regularly reviewed. See section 39 for the Massive Haemorrhage Guideline to guide clinicians managing patients with acute blood loss. See also below.</td>
</tr>
<tr>
<td>Implementation of agreed transfusion protocols / transfusion thresholds for all transfusions</td>
<td>Guidance is set out in 36.12. Individual cases should be discussed with a consultant haematologist where the need arises.</td>
</tr>
</tbody>
</table>
| Ensuring pre-operative assessment and action to correct anaemia and defects in haemostasis, including optimisation of anti-thrombotic treatment prior to surgery | See sections 43 and 44 for guidance on:-
  - Reversal of over-anticoagulation (Beriplex) guideline
  - Surgical Transfusion management guideline |
| Maximise the use of intra-operative cell salvage for surgery with high blood loss (>1 litre) | Ashford & St Peters NHS Foundation Trust regularly undertakes intra-operative cell salvage for a variety of Specialties (Vascular, orthopaedic, gynaecology etc).
Frimley Park Hospital NHS Foundation Trust regularly undertakes intra-operative cell salvage for a variety of Specialties (Vascular, orthopaedic, gynaecology etc).
Royal Surrey County Hospital NHS Foundation Trust uses an external company to provide cell salvage when required. |
| Introduction of cell salvage techniques where appropriate | Postoperative cell salvage is used occasionally in orthopaedic patients. |
| Rational coagulation replacement based upon near patient testing and laboratory monitoring | See sections 37, 39, 41 and 43 respectively, for guidelines on
  - FFP, Cryoprecipitate and Cryosupernatant
  - Massive Haemorrhage
  - Platelet transfusion
  - Reversal of over-anticoagulation (Beriplex)
Requests for Novoseven and other anticoagulation factors should be discussed and approved by a Consultant Haematologist. |
| Pharmacological blood sparing interventions | Routine use of antifibrinolytic agents is currently recommended in patients receiving desmopressopressin (DDAVP). Tranexamic acid is indicated in massive blood loss especially if DIC or defibrination is present or |
suspected. It is contra-indicated in patients with a history of venous thrombo-embolism.

| Annual (or more frequent) revision of maximum surgical red cells ordering schedule. | Compliant; maintained on Winpath |
| Use of IV iron therapy | This is already in place for patients with documented iron deficiency anaemia who require treatment and are unable to tolerate oral iron. It requires day case attendance. |
| Use of epoetin for agreed indications | The HBMT has evaluated the use of epoetin in a preoperative setting and does not find its routine use cost effective. Epoetin may be considered for severe anaemia during red phase. The use of epoetin in solid cancer cases should only be considered in consultation with the patient’s oncologist in view of the possible adverse effects. |
| Introduction of electronic blood issue to reduce blood stocks held by hospital | Compliant |
| Education and training sessions for staff of all levels including induction and regular updates | The Transfusion Practitioner team provide induction and training activities, and assessment of competence, for all staff involved in blood transfusion. |
| Transfusion guidelines formulated and included in Junior Medical Staff Induction | Comprehensive transfusion guidelines are included in the local clinical guidelines which are issued to all new junior doctors. |
| Hospital wide education of existence of the Emergency Blood Management Plan | The plan is part of the Blood Transfusion policy. |
| 24 hour reservation period for red cells products | Compliant |
| Transfusion Laboratory Manager to monitor stock and wastage via the Blood Stock Management Scheme | Compliant |
| Transfusion Laboratory Manager to develop links with local hospitals with a view to movement of stocks between sites | Ashford & St Peters Hospital, Frimley Park Hospital and the Royal Surrey County Hospital are part of one organisation; stock is occasionally moved between these sites. |

### 36.5. ACTIONS REQUIRED DURING AMBER PHASE

#### 36.5.1 REDUCE STOCKHOLDING TO THE LEVEL NOTIFIED BY THE NBS/BLOOD STOCKS MANAGEMENT SCHEME

The NBS will inform the Network Transfusion Lead by fax of the switch to amber phase. The Network Transfusion Lead will in turn inform the consultant Haematologist with responsibility for transfusion. The Duty Consultant Haematologist (DCH) will:-

Contact Switchboard and ask for the amber phase alert to be issued to on call bleep and pager holders using voice-over and alphanumeric messages respectively. The message will be as follows: “Red cells shortage: Amber Phase Alert”. This will ensure that the alert is received by:-

- On call manager
- Transfusion Practitioner Team
- Individual consultants who use blood transfusion (anaesthetists, A+E specialists, surgeons, physicians, haematologists, oncologists, obstetricians and gynaecologists, paediatricians).
• Senior nurse on duty at the satellite sites listed in section 1.
• Acute Trusts on call junior doctors, matrons and speciality nurses

Send out a standard email announcing the onset of amber phase to the following individuals:-
• Chief Executive
• Director of Nursing
• Associate Director of Nursing
• Medical Director
• General Managers
• All consultants
• Critical Care and Anaesthetics Manager
• Head of Pharmacy
• PALS Manager
• Clinical Commissioning Groups
• Head of Admissions

36.5.2 TEXT OF THE EMAIL MESSAGE

Urgent Communication about a Reduction in the Supply of Red cells for Transfusions
The National Blood Service has informed us that there is a reduction in the supply of donor blood and asked us to implement the Amber Phase of the Hospital’s Emergency Blood Management Plan with immediate effect.

What are the effects of the switch to Amber Phase?
(1) The laboratory will reduce its stock levels to around 67% of normal as instructed by the National Blood Service
(2) In addition to the restrictions which apply during normal blood availability:--
• Red cells will not be supplied for elective surgery unless it is urgent and falls in to ASA categories III-IV or is for urgent cancer surgery with curative intent.
• Red cells will not be supplied for the correction of anaemia unless it is life-threatening or refractory to other treatment measures such as iron or erythropoietin, or if there is insufficient time to use these alternative measures
(3) In order to ensure that supply of uncrossmatched Group O RhD Negative red cells ('Flying Squad' blood) is safeguarded for genuine use, it will be kept in the transfusion laboratory during the day. It will only be issued by laboratory staff when group compatible red cells are not yet available. During on call periods it will be kept in the usual location in the main theatre blood bank refrigerator.

Red cells already reserved will be honoured but new requests falling in to the above categories will not be met.

What should I do next?
• Inform all your colleagues and team members of the contents of this email.
• Take immediate steps to ensure that all elective surgery requiring red cells (unless urgent) is cancelled until further notice. Refer to the maximum surgical red cells ordering schedule for a list of elective procedures which require red cells.
• Ensure that anaemia cases are managed without transfusion whenever possible. Erythropoietin should be used routinely for anaemia associated with renal failure, cancer and chemotherapy, see section 36.6 of the full plan document for further information.
• If you are uncertain about an individual case please discuss with the patient’s consultant and a Consultant Haematologist.

What happens if the supply of red cells falls further?
If these measures outlined above are insufficient to correct the stock deficit, further restriction of red cells supply will be introduced. You will be emailed with further information as it becomes available.
**How long will the reduction continue?**
We do not know at present. / The shortage is expected to last at least …..weeks. (delete first or second statement as appropriate)

You will be informed as soon as the restriction is lifted.

**Is there any further guidance available?**
Please refer to the SPS Emergency Blood Management Plan, copies of which are available in an annexe of the Trust’s Major Incident Procedure, which should be available in your clinical area. A copy of the full plan is also attached to this email.

This plan has been approved by the Hospital Transfusion Committee, Clinical Governance Committee and Trust Board. The aim of the plan is to ensure that red cells are reserved for those most in need during periods of shortage.

Name
Duty Consultant Haematologist

(36.5.3) HBMT
An emergency meeting of the HBMT will be convened by the Consultant Haematologist.

(36.5.4) MASSIVE HAEMORRHAGE
All cases of actual or potential massive blood loss should be discussed with a Consultant Haematologist to allow planning of patient management and blood product provision.

(36.5.5) REQUESTS FOR TRANSFUSION OUTSIDE THE AGREED INDICATIONS
All cases which are deemed to require transfusion outside of the indications for transfusion (see section 36.9) will be referred by the transfusion laboratory staff to a Consultant Haematologist for discussion with the requesting doctor.

(36.5.6) STAND DOWN FROM AMBER PHASE
- The Transfusion laboratory will check the status with the NBS on a daily basis.
- The NBS will inform the transfusion laboratory manager by fax of the switch to another phase.
- The Network Transfusion Lead will in turn inform the Consultant Haematologist with responsibility for transfusion.
- If the switch is back to green phase, the duty Consultant Haematologist will send out a standard message announcing the stand down to all those on the list given above.
- If the switch is to Red phase, the duty Consultant Haematologist with responsibility for transfusion will proceed to the actions in section 36.6 of this plan.

(36.5.7) TEXT OF THE STAND DOWN MESSAGE
Message for voice over bleeps and alphanumeric pagers: “Red cells Shortage: Return to Green Phase”

‘Urgent Communication about a Reduction in the Supply of Red cells for Transfusions
The NBS has informed us that normal red cells supply has resumed. The Hospital has been switched from Amber Phase back to Green Phase (normal red cells supply) with immediate effect. The restrictions to the use of red cells in patients undergoing elective surgery or non-life threatening anaemia have been lifted.
Please inform all your colleagues and team members of the contents of this email.

(Name)……………………………………………………..Duty Consultant Haematologist

(36 of email message)’
36.6. ACTIONS REQUIRED DURING RED PHASE

36.6.1 REDUCE STOCKHOLDING TO THE LEVEL NOTIFIED BY THE NBS/BLOOD STOCKS
MANAGEMENT SCHEME

The NBS will inform the Network Transfusion Lead by fax of the switch to red phase.
The Network Transfusion Lead will in turn inform the Consultant Haematologist with responsibility
for transfusion.

The Duty Consultant Haematologist (DCH) will:-

Contact Switchboard and ask for the red phase alert to be issued to on call bleep and pager
holders using voice-over and alphanumeric messages respectively. The message will be as
follows: “Red cells shortage: Red Phase Alert”. This will ensure that the alert is received by:-

- On call manager
- Transfusion Practitioner Team
- Individual consultants who use blood transfusion (anaesthetists, A+E specialists, surgeons,
physicians, haematologists, oncologists, obstetricians and gynaecologists, paediatricians).
- Senior nurse on duty at the satellite sites listed in section 1.
- On call junior doctors, matrons and speciality nurses

Send out a standard email announcing the onset of amber phase to the following individuals:-

- Chief Executive
- Director of Nursing
- Associate Director of Nursing
- Medical Director
- General Managers
- All Consultants
- Critical Care and Anaesthetics Manager
- Head of Pharmacy
- PALS Manager
- Head of Admissions
- Clinical Commissioning Groups

‘Urgent Communication about a Reduction in the Supply of Red cells for Transfusions

The National Blood Service has informed us that there is a severe reduction in the supply of donor
blood and asked us to implement the Red Phase of the Hospital’s Emergency Blood Management
Plan with immediate effect.

What are the effects of the switch to Red Phase?

- The laboratory will reduce its stock levels as instructed by the National Blood Service
- Red cells will only be routinely issued for patients in the following categories:-
- Resuscitation of life threatening / ongoing blood loss including trauma
- Emergency surgery (including vascular surgery), defined as patient likely to die within 24
hours without surgery (American Society of Anaesthesiologists (ASA) category IV)
- Urgent cancer surgery with curative intent
- Life threatening anaemia including patients requiring high dependency / SCBU care
- Severe post chemotherapy anaemia (subsequent chemotherapy should be deferred if
possible)
- Severe bone marrow failure

In order to ensure that supplies of uncrossmatched Group O RhD Negative red cells (‘Flying
Squad’ blood) are safeguarded for genuine use, it will be kept in the transfusion laboratory
during the day. It will only be issued by laboratory staff when group compatible red cells are
not yet available. During on call periods it will be kept in the usual location in the main theatre
blood bank refrigerator.
What should I do next?

- Inform all your colleagues and team members of the contents of this email.
- Take immediate steps to ensure that all elective surgery likely to require red cells is cancelled until further notice.
- Ensure that anaemia cases are managed without transfusion whenever possible. Erythropoietin should be used routinely for anaemia associated with renal failure, cancer and chemotherapy, see section 36.6.6 of the full plan document for further information.
- Avoid embarking on new procedures such as chemotherapy which will result in a need for transfusion.
- If you are uncertain about an individual case please discuss with the patient’s consultant and a Consultant Haematologist.

How long will the reduction continue?

We do not know at present. / The shortage is expected to last at least …..weeks. (delete first or second statement as appropriate)

You will be informed as soon as the restriction is lifted.

Is there any further guidance available?

Please refer to the SPS Emergency Blood Management Plan, copies of which are available in an annexe of the Trust’s Major Incident Procedure, which should be available in your clinical area. A copy of the full plan is also attached to this email.

This plan has been approved by the Hospital Transfusion Committee, Clinical Governance Committee and Trust Board. The aim of the plan is to ensure that red cells are reserved for those most in need during periods of shortage.

(Name)………………………………………………………Duty Consultant Haematologist

(end of email message)

36.6.2 HBMT

An emergency meeting of the HBMT will be convened by the Consultant Haematologist.

36.6.3 REVIEW OF STOCK LEVELS

Stock levels will be reviewed on a daily basis by the hospital transfusion team and changes conveyed to members of the HBMT and EBMG.

36.6.4 VETTING OF REQUESTS

All transfusion requests will be vetted by the DCH. An order of priority based on clinical need and the likelihood of a successful outcome of transfusion.

36.6.5 EARLY USE OF RECOMBINANT FACTOR VII IN CASES OF MASSIVE HAEMORRHAGE

Use of recombinant Factor VII will be recommended after the first ‘round’ of fresh frozen plasma and platelets rather than deferring its use until large quantities of blood have been given.

36.6.6 USE OF EPOETIN

Epoetin may be considered for severe anaemia during red phase. The use of epoetin in solid cancer cases should only be considered in consultation with the patient’s oncologist in view of the possible adverse effects.

36.6.7 STAND DOWN FROM RED PHASE

The Transfusion laboratory will check the status on a daily basis with the NBS. The NBS will inform the Network Transfusion Lead by fax of the switch back to another phase. The Network Transfusion Lead will in turn inform the Consultant Haematologist with responsibility for transfusion. If the switch is back to green phase, the DCH will send out a standard message announcing the stand down to all those on the list given above.

If the switch is to amber phase, the DCH will proceed to the actions set out in section 36.5 of this plan.
36.6.8 TEXT OF THE STAND DOWN MESSAGES
Message for voice over bleeps and alphanumeric pagers: “Red cells Shortage: Return to Amber Phase / Green phase* “ * depending on change

The text of the email for a return to Amber phase will be set out as in Section 36.5.2.

The text of the email for a return to Green phase will be as follows:

‘Urgent Communication about a Reduction in the Supply of Red cells for Transfusions
The NBS has informed us that normal red cell supply has resumed. The Hospital has been switched from Red Phase back to Green Phase (normal red cells supply) with immediate effect. The restrictions to the use of red cells in patients undergoing elective surgery or non-life threatening anaemia have been lifted.
Please inform all your colleagues and team members of the contents of this email.

Name
Duty Consultant Haematologist
(end of email message)"

36.6.9 RECOVERY FROM SHORTAGE
The HBMT needs to ensure that there is a phased return to normal activity levels to protect against a surge in demand which may return national stocks to critical levels; in particular elective surgery backlogs should not be compressed into the immediate post recovery period.

36.7. DEBRIEFING AFTER RED OR AMBER PHASE RESTRICTIONS
The HBMT will meet at the end of each amber or red phase period to discuss the effectiveness of the Emergency Blood Management Plan with the aim of improving its effectiveness in preparation for future periods of restriction in the supply of red cells.

36.8. ARRANGEMENTS FOR SHORTAGES IN SUPPLY OF PLATELETS

36.8.1 INTRODUCTION.
The Chief Medical Officers (CMO) National Blood Transfusion Committee identified the need for plans to address periods of reduced platelet supply in its document ‘An integrated Plan for the National Blood Service and Hospitals to address Platelet Shortages’ dated 06/09/2006 (gateway reference 6514). The following guidance uses a similar approach to that already set out for red cells. Reduced supply will be categorised as ‘moderate’ or ‘severe’ according to the degree of reduction. The terms ‘amber’ and ‘red’ phase will not be used to avoid confusion with the system used of reduced red cell supply already outlined. Since all platelet transfusion requests are vetted by the on call haematologist, reduced availability will be communicated to the requestor on a one to one basis.

36.8.2 ENSURING OPTIMAL USE OF PLATELETS DURING PERIODS OF NORMAL SUPPLY.
The Trust has comprehensive guidance on the use of platelets (see section 41). All requests are vetted by the on call haematologist.

36.8.3 ACTIONS TO BE TAKEN DURING MODERATE REDUCTION IN SUPPLY OF PLATELETS
- NBS will inform the hospital that platelets will only be issued for use in accordance with identified categories as defined in section 36.12.
- All requests to be authorised by the on call haematologist.
- Apheresis and pooled platelets will be used interchangeably (except HLA/HPA matched platelets). Where possible children under 16 years will be given apheresis packs.
- Long dated platelets will not be requested.
- Platelets of differing ABO groups will be accepted in accordance with BCSH guidelines (see local guidelines on platelet transfusion).
• Leucodepleted platelets will be accepted in place of CMV negative units.
• RhD positive units will be used with anti-D cover if RhD negative units are not available.

36.8.4 ACTIONS TO BE TAKEN DURING SEVERE REDUCTION IN SUPPLY OF PLATELETS
All the actions as outlined in 36.8.3 should be followed.
In addition:
• The on call haematologist should be available to discuss individual cases with NBS consultant where required by the NBS.
• Requests from hospitals should be accompanied by the following information:- hospital no./patient name, indication for transfusion, patient’s consultant, patient category as per section 36.12 and the patient’s blood group.
• NBS will tightly track each unit after issue to the hospital.
36.9 AGREED INDICATIONS FOR RED CELL TRANSFUSION IN GREEN, AMBER, AND RED PHASES

**Red cells Ordering Schedule**

This schedule includes the maximum surgical red cells ordering schedule and the red cells ordering agreement for non-surgical cases.

Red cell availability is dependent upon stock levels, which are designated by the National Blood Service as ‘GREEN’ - normal supply, ‘AMBER’ - a reduction of 33% in the usual stock level and ‘RED’ – a reduction of 50% in the usual stock level.

**BLOOD BANK WILL USUALLY BE OPERATING IN GREEN PHASE.**

In ‘AMBER’ or ‘RED’ red cells will only be available for a restricted range of indications as set out in the following two tables. Consultant staff will be informed of any change in the availability of red cells or blood products.

This schedule has been agreed with Consultant Staff of Frimley Park Hospital.

1. The schedule will be effective only if the requesting Doctor states clearly the proposed indication.

2. Reasons for requesting red cells in excess of the tariff must be discussed with the transfusion laboratory and if necessary will be referred to the Consultant Haematologist.

3. The schedule is not intended to be a comprehensive list of all procedures. Items have been omitted either because they do not require a group & screen / crossmatch or are too infrequent to warrant inclusion.

4. The laboratory will continue to inform the Doctor by phone if the pre-transfusion antibody screen is positive. Red cells cannot be guaranteed until the antibody has been identified and selected units of red cells obtained from the Regional Blood Transfusion Centre. This may take up to several days depending on the antibody present and will usually cause a delay in transfusion.
<table>
<thead>
<tr>
<th>PHASE →</th>
<th>GREEN</th>
<th>AMBER</th>
<th>RED</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED CELLS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute blood loss</td>
<td>Acute blood loss</td>
<td>Acute blood loss</td>
<td></td>
</tr>
<tr>
<td>Symptomatic anaemia with Hb &lt;80g/L</td>
<td>Anaemia with HB &lt;50g/l</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>Symptomatic anaemia with Hb &lt;100g/L in patient with CVS or respiratory disease</td>
<td>Symptomatic anaemia with HB &lt;80g/l in patient with CVS or respiratory disease</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>Critical care to maintain Hb &gt;70g/L</td>
<td>Critical care to maintain HB &gt;70g/l</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>Post chemotherapy to maintain Hb&gt;80g/L</td>
<td>Post chemotherapy to maintain HB&gt;50g/l</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>Radiotherapy to maintain Hb&gt;80g/L</td>
<td>Red cells available for curative radiotherapy</td>
<td>Not available unless course of radiotherapy already in progress</td>
<td></td>
</tr>
<tr>
<td>Chronic anaemia to maintain Hb above symptomatic threshold</td>
<td>Not available</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>Pre-operative according to protocols</td>
<td>Red cells available for curative cancer surgery</td>
<td>Red cells available for curative cancer surgery</td>
<td></td>
</tr>
<tr>
<td>Other: (please state)</td>
<td>Red cells available for curative cancer surgery</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>PLATELETS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone marrow failure with platelets &lt;10 x 10⁹/L</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Bone marrow failure with platelets &lt;20 x 10⁹/L with additional risk factors</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Bone marrow failure to prevent bleeding during invasive procedures or in presence of CNS lesion</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Massive transfusion with platelets &lt;50x10⁹/L</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Bleeding associated with acquired platelet dysfunction</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>DIC with bleeding</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Inherited dysfunction, pre-surgery or to stop bleeding</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Thrombocytopenia with major bleeding</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Post transfusion thrombocytopenia with major bleeding</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Neonatal alloimmune thrombocytopenia</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
<tr>
<td>Other (please state)</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td>Available for emergency surgery, major bleeding, platelet level of &lt;50, or severe platelet dysfunction only</td>
<td></td>
</tr>
</tbody>
</table>

(See also the separate document: Emergency Platelet Management Plan)
<table>
<thead>
<tr>
<th>PHASE</th>
<th>GREEN</th>
<th>AMBER</th>
<th>RED</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRESH FROZEN PLASMA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific factor deficiency</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>Reversal of warfarin in a bleeding patient</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>DIC with bleeding</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>TTP</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>During massive transfusion</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>To correct bleeding or pre-surgery if PT &gt; 1.5</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>Other (please state)</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>CRYOPRECIPITATE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIC with bleeding and fibrinogen &lt; 1g/L</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>Liver disease with bleeding and fibrinogen &lt; 1g/L</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>Thrombolytic therapy with bleeding and fibrinogen &lt; 1g/L</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>Massive transfusion and fibrinogen &lt; 1g/L</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>Renal / hepatic failure, to correct bleeding when DDAVP is contraindicated or ineffective</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
<tr>
<td>Other (please state)</td>
<td></td>
<td></td>
<td>As per Green</td>
</tr>
</tbody>
</table>
### 36.10 TABLE 2: MAXIMUM SURGICAL RED CELL ORDERING SCHEDULE

*RED CELLS NOT AVAILABLE UNLESS FOR CANCER SURGERY WITH CURATIVE INTENT*

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Operation</th>
<th>GREEN</th>
<th>AMBER</th>
<th>RED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT / MAX-FAC</td>
<td>Laryngectomy</td>
<td>AS MSBOS</td>
<td>*blood not available</td>
<td>*blood not available</td>
</tr>
<tr>
<td></td>
<td>Block Dissection of Neck</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glossectomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mandiblectomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maxillary Surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maxillectomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VASCULAR SURGERY</td>
<td>Aortic Aneurysm Repair (planned)</td>
<td>blood available if urgent</td>
<td>*blood not available</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aortic Aneurysm – Ruptured</td>
<td>blood available</td>
<td>blood available</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Femoropopliteal Bypass</td>
<td>blood available if limb saving</td>
<td>blood available if limb saving</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aorto- Bifem Bypass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Embolectomy</td>
<td>blood not available</td>
<td>blood not available</td>
<td></td>
</tr>
<tr>
<td></td>
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ASPH Blood Transfusion Policy
Current version is on the intranet
First ratified 12.02.14
Review date February 2017
Issue No. 1
Page 71 of 139
### 36.11 ASA PHYSICAL STATUS CLASSIFICATION SYSTEM

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<tr>
<th>I</th>
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<td>II</td>
<td>A patient with mild systemic disease</td>
</tr>
<tr>
<td>III</td>
<td>A patient with severe systemic disease</td>
</tr>
<tr>
<td>IV</td>
<td>A patient with severe systemic disease that is a constant threat to life</td>
</tr>
<tr>
<td>V</td>
<td>A moribund patient who is not expected to survive without the operation</td>
</tr>
<tr>
<td>VI</td>
<td>A declared brain-dead patient whose organs are being removed for donor purposes</td>
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### 36.12 CATEGORISATION OF PATIENT TYPE DURING PERIODS OF PLATELET SHORTAGE

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<tr>
<th>Category 1</th>
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<tbody>
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<td>(patients to be treated during severe shortage)</td>
<td>(patients to be treated during moderate shortage)</td>
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**Massive haemorrhage & Critical care**

Massive transfusion for any condition including obstetrics, emergency surgery and trauma, with on-going bleeding, maintain > 50 x 10^9/l. Aim for >100 x 10^9/l if multiple trauma or CNS trauma. Sepsis/acute DIC, maintain >50 x 10^9/l.

**Category 2**

**Critical care**

Patients resuscitated following massive transfusion with no on-going active bleeding, maintain > 50 x 10^9/l.

**Surgery**

Urgent but not emergency surgery for a patient requiring platelet support.

**Transfusion triggers for invasive procedures**

Invasive monitoring or biopsy work, maintain platelet count > 50 x 10^9/l.

General surgery – maintain count > 50 x 10^9/l.

Operations in critical sites such as brain or eyes.

**Bone marrow failure, and immune thrombocytopenia**

Active bleeding associated with severe thrombocytopenia or functional platelet defects.

**Bone marrow failure**

Prophylactic transfusion for thrombocytopenia (platelet count < 10 x 10^9/l) in patients who are not infected and haemodynamically stable. Consider support if platelet count is <20 x 10^9/l for patients at higher risk of bleeding.

**Surgery**

Elective, non-urgent surgery likely to require platelet support for thrombocytopenia or congenital/ acquired platelet defects.

**Neonates**

For neonatal alloimmune thrombocytopenia or severe thrombocytopenia in an otherwise well neonate, platelet transfusions are required when the platelet count falls to between 20 – 30 x 10^9/l. Higher target levels should be maintained if extremely low birth weight or unwell/bleeding or intra-cranial haemorrhage suspected/confirmed.
### 37. FRESH FROZEN PLASMA, CRYOPRECIPITATE AND CRYOSUPERNATANT GUIDELINES

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37. FRESH FROZEN PLASMA, CRYOPRECIPITATE AND CRYOSUPERNATANT GUIDELINES

37.1. INTRODUCTION
The purpose of the guideline is to assist with clinical decisions and indications about the transfusion of FFP, Cryoprecipitate and Cryosupernatant. Unpredictable adverse effects can occur following transfusion of these blood products and the risks of transmission of infection are similar to those of other blood components unless pathogen-reduced plasma is used. Other risks include allergic reactions, anaphylaxis, transfusion related acute lung injury (TRALI), and haemolysis from transfused antibodies to blood group antigens, especially A and B. It also aims to ensure a standardised approach to the management of patients receiving these products, reflecting best practice, thereby reducing the possible risks associated with transfusions.

37.2. DEFINITIONS

37.2.1 FFP - FRESH FROZEN PLASMA:
Plasma separated from red cells and filtered to remove white blood cells. Only male donors are used to reduce the risk of Transfusion Related Acute Lung Injury (TRALI). Standard UK FFP is issued as single-donor packs which must be thawed before use.

Apart from standard FFP, there are also two types of pathogen-reduced (virally inactive) FFP available:
- Methylene blue light treated FFP (MB-FFP)
- Solvent detergent treated FFP (SD-FFP, “Octaplas”)

37.2.2 CRYOPRECIPITATE
Cryoprecipitate is produced after freezing, and then thawing, plasma to precipitate high molecular weight proteins such as Factor VIII, von Willibrand factor and Fibrinogen. Cryoprecipitate is available as single donor packs, or as pools of 5 donations. Cryoprecipitate made from MB-FFP is now also available for paediatric patients.

37.2.3 CRYOSUPERNATANT
Plasma from which the Cryoprecipitate has been removed. This therefore contains low levels of high molecular weight proteins.

37.3. CLINICAL INDICATIONS FOR THE USE OF FFP, CRYOPRECIPITATE AND CRYOSUPERNATANT
For those born after 01/01/96 only imported pathogen-reduced FFP should be used to limit the potential for exposure to variant Creutzfeldt-Jakob disease. Both MB-FFP and SD-FFP are available.

37.3.1 SINGLE COAGULATION FACTOR DEFICIENCIES
- FFP should only be used to replace single inherited clotting factor deficiencies, for which no virus-safe fractionated or recombinant product is available. This currently applies mainly to factor V deficiency.

37.3.2 MULTIPLE COAGULATION FACTOR DEFICIENCIES
- FFP can be used where there are demonstrable multi-factor deficiencies associated with severe bleeding and DIC.
- Cryoprecipitate is used in Dysfibrinogenaemia and the acquired Hypofibrinogenaemia seen in massive transfusion and DIC.
- Cryoprecipitate may be indicated if the Plasma Fibrinogen is less than 1g/l, however there is no clear threshold for clinically significant Hypofibrinogenaemia.

37.3.3 DISSEMINATED INTRAVASCULAR COAGULATION (DIC)
- FFP is not indicated in DIC with no evidence of bleeding.
- There is no evidence that prophylactic replacement regimens prevent DIC or reduce transfusion requirements.
37.3.4 THROMBOTIC THROMBOCYTOPENIC PURPURA (TTP)
- Adult patients with TTP should receive imported pathogen-reduced FFP, due to the fact they are likely to receive large volumes of FFP.
- Patient with TTP will (if appropriate) be referred to a TTP treatment centre for daily plasma exchange within 24 hours of presentation. However, prior to transfer a sample for ADAMTS-13 level will be taken and pathogen reduced FFP infusion or Cryosupernatant commenced under guidance of the haematologist.

37.3.5 REVERSAL OF (OVER-) ANTICOAGULATION
- PCC (Prothrombin Complex Concentrate) and/or Vitamin K can be considered for this group of patients. Please refer to section 43 Reversal of Over Anticoagulation guideline

37.3.6 LIVER DISEASE
- FFP is advocated in some specialist liver units for the prevention of bleeding in patients with severe liver disease and a prolonged prothrombin time (PT). However the response may be unpredictable and complete normalization of the haemostatic defect does not always occur.
- In the rare occasion that FFP is given, repeat coagulation tests post infusion should be done to guide decision making.
- There is no evidence to substantiate the practice in many liver units of undertaking liver biopsy only if the PT is within 4s of the control.

37.3.7 SURGICAL BLEEDING AND MASSIVE TRANSFUSION
- FFP should never be used as volume replacement in either adults or children.
- FFP should be used for treating a patient with massive blood loss when guided by timely coagulation tests. This can include near patient testing. Please refer to section 39 Massive haemorrhage guideline.

37.4. PAEDIATRIC USE OF FFP
- Children born after 01/01/96 should only receive imported pathogen-reduced FFP. Both MB-FFP and SD-FFP are available. Note is made that these patients are now reaching their later teenage years.
- Bleeding due to Haemorrhagic Disease of the Newborn (HDN)
  - FFP 10 – 20 ml/kg is indicated.
  - Intravenous Vitamin K is also indicated.
  - Prothrombin complex concentrate could also reverse the effect, however data on evidence and dosage is lacking.
- Neonates with coagulopathy who are bleeding or who are about to undergo an invasive procedure should receive FFP and Vitamin K.
- Shortening of prolonged clotting times is unpredictable and should be checked following administration.
- Routine administration of FFP to prevent periventricular haemorrhage in preterm infants is not indicated.
- FFP is not indicated in polycythaemia in infancy.
- There is no definitive data to support the use of FFP with low anti-T activity in neonates with T-activation.
37.5. CONTRAINDICATIONS
- FFP is not indicated in DIC without associated bleeding.
- When used for surgical or traumatic bleeding, FFP and Cryoprecipitate doses should always be guided by coagulation studies.
- FFP should never be used to reverse Warfarin anticoagulation in the absence of severe bleeding unless in a real emergency or when the patient needs urgent surgery.
- FFP has a very limited place in prophylaxis prior to liver biopsy.
- FFP is not indicated for the reversal of Vitamin K deficiency in neonates or patients in intensive care.
- FFP should not be used to correct prolonged clotting times due to Vitamin K deficiency in ITU patients; this should be managed with Vitamin K.

37.6. POSSIBLE ADVERSE EFFECTS ASSOCIATED WITH FFP

37.6.1 ALLERGY
- Allergy resulting in urticaria has been reported in 1 – 3 % of transfusions, whilst anaphylactoid reactions are rare.
- IgA deficient plasma is available on request for patients with proven sensitivity to IgA.
- (see also section 31 Acute Transfusion Reaction guideline)

37.6.2 TRANSFUSION RELATED ACUTE LUNG INJURY (TRALI)
- TRALI manifests itself clinically as severe respiratory distress post-transfusion with:
  - Hypoxia, Pulmonary oedema, Infiltrates or ‘white-out’ on chest x-ray, Hypotension, Fever
  - It usually develops within 6 hours of transfusion
  - It is difficult to distinguish TRALI clinically from adult respiratory distress syndrome, other forms of acute lung injury or fluid overload.
  - Symptoms usually improve after a few days, although signs can persist for at least 7 days
  - Aetiology of TRALI remains not fully resolved; if allo-antibodies are important in the development of TRALI, the incidence associated with plasma may be reduced by using FFP from male only donors.
- (see also section 31 Acute Transfusion Reaction guideline)

37.6.3 INFECTION
- Bacteria are inactivated by the freezing process.
- Bacterial contamination and growth, with endotoxin production, prior to freezing is unlikely and there have been no reported episodes in the UK in the past 5 years.
- The removal of cellular components removes cell associated bacteria, most protozoa and cell associated viruses.
- Transmission of malaria, cytomegalovirus (CMV) and human T-lymphotrophic virus (HTLV) have not been reported with FFP.
- Freezing however does not remove free viruses (non-cell associated viruses) such as hepatitis A, B and C, human immunodeficiency virus (HIV) 1 + 2, and parvovirus B19.
- The estimated risk of transmission of the above viruses in FFP are:
  - 1 in 10 million for HIV 1 + 2
  - 0.2 in 10 million for hepatitis C
  - 0.8 in 10 million for hepatitis B
- Despite the low risk, vaccination for hepatitis A and B should be considered for patients who are likely to receive frequent transfusions of FFP.
- (see also section 31 Acute Transfusion Reaction guideline)

37.6.4 T-CELL ASSOCIATED GRAFT VERSUS HOST DISEASE (TA-GVHD)
- There have been no reported cases of FFP related TA-GvHD due to the lack of cellular components in FFP.
- FFP does not need to be irradiated for the same reason.
- (see also section 31 Acute Transfusion Reaction guideline)
37.7 REPORTING OF ADVERSE EVENTS
- Any adverse events relating to FFP, Cryoprecipitate or Cryosupernatant infusion should be reported using the Trust incident reporting system, MHRA via SABRE and the SHOT scheme.
- For SD-FFP (Octaplas) reporting should also be done using the 'yellow card' system (drug reactions) of the Medicines Control Agency.
- For MB-FFP all problems should be discussed immediately with the supplying blood centre via the transfusion laboratory.

37.7 PRODUCT SELECTION
- FFP, whether prepared from units of whole blood or from plasmapheresis are therapeutically equivalent in terms of haemostasis and side effect profile.
- Whilst the risks of pathogen transmission are small the clinical benefits to be gained from administering FFP should be weighed against the sequelae of possible pathogen transmission.
- If patients are to receive large or repeated doses of FFP they may benefit from using products with a reduced risk of transmitting infection, for example pathogen reduced plasma. Such patients will include those with congenital factor deficiencies for whom recombinant/single factor concentrates are not available.
- TTP: See point 4.4

37.7.1 ABO COMPATIBILITY
- The table below shows the selection of FFP according to donor and recipient ABO blood group.
- It is noted that this is different to ABO compatibility for red cells.

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<td>b) HT negative units</td>
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<td>A</td>
<td>A</td>
</tr>
<tr>
<td>3rd choice</td>
<td>B</td>
<td>AB</td>
<td>AB</td>
<td>B</td>
</tr>
<tr>
<td>4th choice</td>
<td>AB</td>
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</table>
- Infants or neonates who are not blood group O may be particularly susceptible to haemolysis from group O FFP due to the high volumes required.

37.8. HANDLING OF FFP, CRYOPRECIPITATE AND CRYOSUPERNATANT
- When products are thawed the procedure used must avoid bacterial contamination of the unit.
- For this reason these products may only be thawed in a controlled temperature water bath within the blood bank.

After Thawing:
- It is recommended for all products to be used immediately.
- FFP and cryosupernatant may be stored at 4°C in an approved blood storage refrigerator before administration to the patient so long as the infusion is completed within 24 hours of thawing.
- Cryoprecipitate: If delay in transfusing is unavoidable than the component can be stored at ambient temperature but must be used within 4 hours.
- If FFP is given to replace coagulation factors (such as Factor V) then administration is required within 2-4 hours of thawing.
37.9. REQUEST OF PRODUCTS
- At ASPH and FPH these products can be requested directly by the clinician from blood bank.
- All requests at RSCH for FFP, Cryoprecipitate and Cryosupernatant should go through the Consultant Haematologist or Haematology SpR on-call, unless stated otherwise in the Massive Haemorrhage guidelines.
- The usual adult dose of FFP is 10-15 mls/kg. Paediatric dose is dependent on diagnosis and treatment required but is usually 10-20 mls/kg.
- Send a correctly completed request form to blood bank along with a blood sample.
- It is important to ensure that blood samples are collected from the correct patient, labelled at the bedside and match details on the request form as detailed in section 7.
- It takes 30 minutes to thaw FFP, Cryoprecipitate or Cryosupernatant.

37.10. ISSUE AND COLLECTION
- FFP, Cryoprecipitate or Cryosupernatant will be issued via blood bank.
- All units will be clearly labelled with the minimum dataset and the date and time of thawing.
- FFP and Cryosupernatant are issued via the blood issue fridge or blood bank and should be collected following the procedure as detailed in section 14. Cryoprecipitate should not be put into a fridge and must be collected from the blood bank as above.
- Collect all available units at once.

37.11. ADMINISTRATION
- When administering FFP, Cryoprecipitate or Cryosupernatant the same checking procedures should be made at the patient’s bedside as for transfusing red cells as detailed in section 17.
- If using a volumetric pump check it is licensed to give these products and check the correct giving set is used for that pump.
- FFP, Cryoprecipitate and Cryosupernatant should be administered through a blood administration set that contains a 170-200 micron filter.
- FFP should be administered at the rate of 30 minutes for each unit of 300 mls.
- Cryoprecipitate should be administered at the rate of 30-60 minutes for all (usual maximum of 10) bags.

37.12. MONITORING OF PATIENTS
- Observations of blood pressure, pulse, temperature, respiration rate and O₂ saturation levels and early warning scores as outlined in section 19. They should be recorded on all patients who receive FFP, Cryoprecipitate or Cryosupernatant.
- Observations should be recorded on a transfusion observation chart.
- If a patient develops any adverse effects during the transfusion it should be stopped immediately and medical advice sought. Further actions should be taken according to the as detailed in section 31: Acute transfusion reaction guideline.
- Vaccination against Hepatitis A and B should be considered for those patients likely to receive multiple units of FFP.

37.13 RESPONSE TO FFP TRANSFUSION
- Response to transfusion should be monitored clinically and via blood tests as the results will serve as a guide to further supportive care.
- If FFP is given to control haemorrhage then the clinical response may be the best indicator of the effectiveness of the transfusion.
- If FFP is given to correct abnormal coagulation parameters the degree of correction should be recorded in the case notes. Monitoring will be via laboratory techniques or near patient testing devices – the chosen method should be timely and suit the clinical situation.
### 38. IRRADIATED BLOOD COMPONENTS GUIDELINES (IN THE PREVENTION OF TRANSFUSION ASSOCIATED GRAFT VERSUS HOST DISEASE)

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38. IRRADIATED BLOOD COMPONENTS GUIDELINES

38.1. INTRODUCTION
Transfusion associated graft-versus-host disease (TAGvHD) is a rare, but usually fatal complication of transfusion due to the presence of viable alloreactive T lymphocytes in a transfusion. The risk associated with an individual transfusion depends upon the number and viability of donor lymphocytes, susceptibility of the patient’s immune system and the degree of immunological (HLA) disparity between the patient and donor. TAGvHD can be prevented by irradiating the donation to prevent division of lymphocytes. It is therefore important that patients at risk of developing TAGvHD are identified before transfusion and given irradiated blood.

38.2. IRRADIATED BLOOD IS REQUIRED FOR:

38.2.1 FAMILY DONATIONS
All transfusions from first or second degree blood relatives, irrespective of immune-competence of the patient.

38.2.2 HLA MATCHED TRANSFUSIONS
All HLA matched platelet transfusions.

38.2.3 PAEDIATRIC TRANSFUSIONS
• All blood for intrauterine transfusions
• Preferably in all neonatal exchange transfusions: essential if previous intrauterine transfusion has been given
• All granulocyte transfusions
• All transfusions in congenital immunodeficiency states (not necessary in HIV or AIDS)
• NOT required for neonatal platelet transfusion or routine red cell top-ups (unless previous intrauterine transfusion has been given).

38.2.4 LEUKAEMIA AND BONE MARROW TRANSPLANTATION IN CHILDREN AND ADULTS
• All allogeneic transplant recipients from time of conditioning prior to transplant until GvHD prophylaxis is withdrawn, or until lymphocyte count is >1.0x10^9/L. A longer period is recommended if chronic GvHD is present (e.g. up to 2 years). Confirmation by the patient’s transplant centre should be sought before reverting to non-irradiated blood for the first time.
• All allogeneic transplant donors prior to, and at time of harvest
• All autologous transplant recipients:
  o for 7 days prior to harvesting,
  o for three months from conditioning in case of chemotherapy conditioning,
  o for six months from radiation based conditioning, and until lymphocytes >1.0x10^9/L.
  (see section 38.2.6 on purine analogues if Fludarabine was included in conditioning).

38.2.5 LYMPHOMA
• All cases of Hodgkin lymphoma, irrespective of stage or remission status.
• NOT routinely necessary in non-Hodgkin lymphoma

38.2.6 DRUG TREATMENTS
All patients who have received any of the following drugs:
• Fludarabine
• Clofarabine
• Pentostatin
• Cladribine
• Bendamustine
• Alemtuzumab
• and any other drug for which the manufacturer has recommended that irradiated products are used
Irradiated products should be given irrespective of underlying diagnosis or how long ago the drug was given.

**38.2.7 APLASTIC ANAEMIA**
Current UK guidelines recommend irradiation of blood products before and after immunosuppressive treatments such as antilymphocyte globulin (ALG). These should continue until the lymphocyte count is > 1.0x10^9/L.

**38.3 PATIENTS NOT ROUTINELY REQUIRING IRRADIATED BLOOD INCLUDE:-**
- AIDS
- HIV
- Solid Tumours
- Solid organ transplant recipients

**38.4 WHICH COMPONENTS**
- Red cell, platelets and granulocytes should be irradiated.
- FFP and Cryoprecipitate do not require irradiation as they do not contain significant numbers of viable lymphocytes.

**38.5 IDENTIFICATION AND DOCUMENTATION OF PATIENTS REQUIRING IRRADIATED BLOOD**
- The need for irradiated blood should be considered and identified at the earliest opportunity by the Consultant, SpR or SHO based on these guidelines. This may occur at the time of initial diagnosis or following specific management decisions. Send a completed transfusion request form with this information to Blood Bank as a means of communicating the special requirement. The laboratory will flag the patient’s computer record to ensure that irradiated blood components are automatically requested for all subsequent transfusions.
- The need for irradiated blood should be considered at the time of each and every transfusion and clearly indicated on every transfusion request form, stating the reason.
- The prescription must clearly indicate that irradiated blood is required.
- The patient should be given:-
  - the NBS patient information sheet
  - a completed NBS alert card explaining the need for irradiated blood
  - The patient should be made aware of the need to carry and show their alert card prior to future transfusions especially when attending other hospitals.
- The alert sticker from the NBS patient information sheet should be completed and placed in the Alert Area of the patient’s case notes. A dated entry should be made into the journal section of patient’s case records stating the need for irradiated blood, the reason and the duration. A copy of this information should be sent to the GP as a letter (outpatients) or as part of the discharge letter (inpatients).
- The laboratory, patient and GP should be informed if irradiated blood is no longer required. The patient’s case notes alert should be cancelled with a single stroke and date. The reason for cancellation should be recorded in the journal section of the case notes.

**38.6 REQUESTING IRRADIATED BLOOD**
A standard blood transfusion request form should be used and state the need for irradiated blood. The laboratory does not hold routine stocks of irradiated blood. Irradiated blood has to be specially ordered from the NBS centre. One extra working day should be allowed for the blood to be made available except in emergencies.
If the transfusion laboratory receives a request for a patient whose laboratory record is already marked for irradiated products, irradiated products will be supplied whether requested or not.

38.7. HANDLING OF IRRADIATED PRODUCTS
Apart from the shorter shelf life, irradiated blood should be handled in exactly the same way as non-irradiated blood. Irradiated blood is not radio-active; neither the patient nor staff are exposed to any additional risks when coming in to contact with irradiated blood.

38.8. HAEMOVIGILANCE
All cases of TαGvHD should be reported to the national haemovigilance systems e.g. SHOT.
Do you understand your patient’s special requirements for blood components?

If the blood is CMV Negative it will be stated here

To show the blood component has been irradiated, the ‘NOT’ part of the label will have disappeared

• ASK the patient
• CHECK the notes
• CONTACT your transfusion laboratory

See over page for more information
CMV NEGATIVE
Up to March 2012 a generally adopted list of indications for CMV negative blood products in CMV negative haematology/haemato-oncology patients existed. However, a mission statement from SaBTo in March 2012 has given new guidance regarding this and it no longer supports this practise in this particular group of patients.

ORDER CMV NEGATIVE BLOOD FOR FOLLOWING PATIENTS: -
- Transfusions in Pregnancy
- Intrauterine Transfusions
- Premature and low birth weight (<1500gram) babies and all infants < 1 month old
- Paediatric patients in shared care should follow guidelines from the Tertiary Centre

IRRADIATED
ORDER IRRADIATED BLOOD FOR FOLLOWING PATIENTS:

Family donations – all transfusions from first or second degree blood relatives, irrespective of immuno-competence of the patient.

HLA matched transfusions – all HLA matched platelet transfusions

Paediatric transfusions
- All blood for intrauterine transfusions
- Preferably in all neonatal exchange transfusions: essential if previous intrauterine transfusion has been given
- All granulocyte transfusions
- All transfusions in congenital immunodeficiency states (not necessary in HIV or AIDS)
- NOT required for neonatal platelet transfusion or routine red cell top-ups (unless previous intrauterine transfusion has been given).

Leukaemia and Bone Marrow Transplantation in Children and Adults
- All allogeneic transplant recipients from time of conditioning prior to transplant until Graft V Host Disease (GVHD) prophylaxis is withdrawn, or until lymphocyte count is >1.0x10^9/L. A longer period is recommended if chronic GVHD is present (e.g. up to 2 years). Confirmation by the patient’s transplant centre should be sought before reverting to non-irradiated blood for the first time.
- All allogeneic transplant donors prior to, and at time of harvest
- All autologous transplant recipients:-
  - for 7 days prior to harvesting, for three months from conditioning in case of chemotherapy conditioning,
  - for six months from radiation based conditioning, and until lymphocytes >1.0x10^9/L. (see section 38.2.4 in guideline referenced below on purine analogues if Fludarabine was included in conditioning).

Lymphoma
- All cases of Hodgkin lymphoma, irrespective of stage or remission status.
- NOT routinely necessary in non-Hodgkin lymphoma

Drug treatments
All patients who have received any of the following drugs; and any other drug for which the manufacturer has recommended that irradiated products are used:

<table>
<thead>
<tr>
<th>Fludarabine</th>
<th>Clofarabine</th>
<th>Pentostatin</th>
<th>Cladribine</th>
<th>Bendamustine</th>
<th>Alemtuzumab</th>
</tr>
</thead>
</table>

Irradiated products should be given irrespective of underlying diagnosis or how long ago the drug was given.

Aplastic Anaemia
- Current UK guidelines recommend irradiation of blood products before and after immunosuppressive treatments such as antilymphocyte globulin (ALG). These should continue until the lymphocyte count is > 1.0x10^8/L.

Patients NOT routinely requiring irradiated blood include:- AIDS/HIV, Solid Tumours and Solid Organ Transplants.

Check with the responsible consultant if the indication or patient status is uncertain.

SEE SPS BLOOD TRANSFUSION POLICY AND RELATED GUIDELINES
## 39. MASSIVE HAEMORRHAGE GUIDELINE

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<td>Actions to be taken in the event of an amber or red blood, or platelet, shortage alert</td>
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<td>Massive Haemorrhage Flow Chart</td>
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<tr>
<td>39.10</td>
<td>Massive Haemorrhage communication sheet for blood bank staff</td>
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<tr>
<td>39.11</td>
<td>Use of Blood and Blood Products in Adults: a Summary</td>
</tr>
</tbody>
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39. MASSIVE HEMORRHAGE GUIDELINE

39.1 INTRODUCTION
The aim of this guideline is to improve the management of massive haemorrhage and the communication between services. Massive haemorrhage jeopardises the survival of patients in many clinical settings and is a challenge for haematological and blood transfusion services. Tensions may arise between those attempting to treat bleeding, those supplying blood and providing laboratory services. Discord can waste scarce time, or, worse, result in a poor outcome for the patient (British Committee for Standards in Haematology (BCSH) 2006). The speed with which massive haemorrhage can become life threatening emphasises the need for good communication between the Blood Bank and clinical areas. Massive blood loss usually occurs in the context of acute gastrointestinal, acute trauma or obstetric emergency.

All staff who will provide care for patients needing massive transfusions must read this document. All incidences of massive transfusion will be reviewed by the Hospital Transfusion Team and presented at the next appropriate Hospital Transfusion Committee.

39.2 DEFINITION OF MASSIVE HAEMORRHAGE

39.2.1 ADULTS
Massive haemorrhage may be defined as bleeding > 150mL/min or > 50% blood volume lost in < 3 hours. Where blood loss is difficult to estimate, use of clinical symptoms and signs (sweating, thirst, restlessness, pallor, tachycardia and fall in BP) may be more reliable.

39.2.2 CHILDREN
Size variation makes it difficult to be prescriptive about which volumes and rates of blood loss would trigger use of this guideline. Estimated blood volume losses should be interpreted considering that a child’s circulating volume is approximately 80 ml/kg. Use signs of shock (tachycardia, prolonged capillary refill time, cool peripheries etc) and lack of response to standard volume replacement as additional clinical guides.

39.2.3 OBSTETRIC CASES
Please also refer to Trust specific separate Ante Partum Haemorrhage and Post Partum Haemorrhage guidelines.

39.3 ACTIONS TO BE TAKEN
The following instructions relate to massive haemorrhage whatever the cause. Further considerations for cases of life/limb-threatening haemorrhage where INR is >1.5 due to oral anticoagulation are in section 39.7. Refer also to section 43 for the Reversal of oral over-anticoagulation guideline.

39.3.1 RECOGNISE AND ACTIVATE THE MASSIVE HAEMORRHAGE PROTOCOL
Call Switchboard on 2222 and state ‘Massive haemorrhage for (insert relevant ward/department)’. Switchboard will alert the appropriate senior members of staff. This group of professionals can vary depending on local practise. i.e. switchboard will alert the on call senior Anaesthetist, Haematologist (in normal working hours only), Transfusion Practitioner (in normal working hours only), and Blood Bank advising ‘Massive Haemorrhage – location’. The on-call anaesthetist would then be required to attend. Release of blood components/products is not dependent on the approval of a haematologist although they can be contacted for advice at any point.

39.3.2 ALLOCATE TEAM ROLES
- Team leader
- Clinical Communication Lead (CCL) role
- Sample taker / documenter
- Transporter of products/samples
39.4 ROLES

39.4.1 MASSIVE HAEMORRHAGE TEAM LEADER

Who: Senior Doctor with relevant authority, expertise and experience

Role: (the role indicated here is broadly defined only as it is outside of the remit of the Transfusion Team)
- Lead, manage, and coordinate all patient requirements
- Communicate with CCL to ensure he/she aware of transfusion needs
- Ensure other relevant staff/teams are present/communicated with
- Alert relevant clinical areas (ITU/Theatre etc)

39.4.2 MASSIVE HAEMORRHAGE CLINICAL COMMUNICATION LEAD (CCL) ROLE

Who: A critical role - Medical ST1 or above who can fully understand and communicate the clinical situation, requirements and progress. One of the most significant factors for ensuring blood components/products are ready as soon as possible is early identification of the need for massive transfusion and effective, timely, communication with blood bank. The role of the Clinical Communication Lead (CCL) is pivotal to effective resolution of the situation. In cases involving children a paediatrician would be an appropriate person to fulfil this role.

The role of the CCL encompasses ensuring that the samples sent are of sufficient quality to enable swift and accurate processing. This is a significant factor in ensuring blood products are ready as soon as possible; specifically ensuring the identification details are consistent and correct. It is recommended that if there is doubt about spellings of names/exact dates of birth then the patient should be treated as ‘unknown’ (see below) as traumatized relatives may not give consistent dates/spellings which can lead to sample rejection. Transfusion samples that are labelled incorrectly will NOT be used, as it is not legal to do so. If it is impossible to obtain a sample the Blood Bank will supply O Rh D negative/positive blood dependent on the age and gender of the patient.

Role: Critical role in communicating patient’s transfusion needs to blood bank
- Ring blood bank asap
- Tell them ‘I am the communication lead for the massive haemorrhage on – location –’
- Give them patient & clinical details
- Give them your details and contact numbers/bleeps
- Inform them of any emergency/flying squad/code red blood taken
- Inform blood bank when Pack A has been used and whether Pack B is required (see section 39.9)
- Maintain frequent/regular contact with blood bank re blood being ready / blood results
- Liaise with Team Leader re transfusion requirements
- Send staff to collect blood / blood components
- Ensure sample taker is aware of samples required and samples taken meet all criteria
  - Unknown patient’s minimum requirements: unique number / gender
- You do not need the approval of a Consultant Haematologist for release of blood product when the major haemorrhage is activated.
- Liaise with Consultant Haematologist if expert advice required
- NB release of Novo7 requires Consultant Haematologist approval
- If patient moves / bleeding resolves / patient dies
- Tell blood bank
- Hand role over if patient moves / as appropriate
39.4.3 MASSIVE HAEMORRHAGE SAMPLE TAKER/DOCUMENTER

Who: Registered professional: Nurse / Midwife /ODP / FY1/2 etc

Role:
- Ensure urgent cross match samples taken as per policy: positive patient ID / label at bedside
- Minimum ID requirements
  - A unique number: hospital / NHS / A+E / Major incident / Military /
  - First name and surname
  - Date of birth
  - Gender
  - Signature of person taking blood
  - Date and time blood taken
  - UNKNOWN patients: unique number (avoid temporary numbers where possible) and gender
- Ensure CCL has told Blood Bank that samples are on the way
- Send samples to blood bank urgently
- Document blood being used – drug chart / traceability tags / notes

39.4.4 MASSIVE HAEMORRHAGE TRANSPORTER

Who: Available personnel, can be a porter at ASPH / FPH (porters at RSCH not involved in collecting blood)

Role:
- Take samples to blood bank urgently
- Collect blood as requested as per policy
- Check ID of patient / product details on blood / blood label / patient ID document
- Document removal of blood from blood bank
- Return unused blood components/products to blood bank and document

39.4.5 BLOOD BANK ROLE

The BMS receiving the call from the CCL will
- Undertake the role of LCL or allocate it to a more appropriate BMS
- Document the details on the Massive Haemorrhage communication sheet (see section 39.10)
- Alert senior colleague OR out of hours consider whether need to call second on
- Prioritise workload
- Issue products as per protocol (see section 39.9)
- Full details of the blood bank response are outlined in ‘Guideline for the management of massive blood transfusion SOP’

39.4.6 TRANSFUSION PRACTITIONER (TP) ROLE

The TP role is to improve practice through the:
- Collation of audit information regarding communication between the blood bank and the clinical area using the communication and audit forms preferably in real time
- Provision of assistance to clinical/portering staff who come to collect blood components/products

On receiving the call the TP will attend the Blood bank (within hours) as soon as feasible within their current workload. An out of hours TP service is not available.
39.5 PROVISION OF RED CELLS
If blood is needed immediately, with no time for compatibility testing, O Rh D Negative emergency blood (‘Flying squad’ / ‘code red’) will be supplied.

- Rh D positive blood may be supplied in certain circumstances, namely male patients and for female patients aged 60 years and over.
- Group compatible blood will be supplied as soon as the patients group is known (~ 15 minutes from receipt of sample)
- Fully cross matched blood will be supplied as soon as possible (~ 45 minutes from receipt of sample)
- The blood bank can supply blood in a cool box which keeps blood at fridge temperature for up to 4 hours

39.5.1 O RH D NEGATIVE EMERGENCY BLOOD IS LOCATED
Emergency group O RhD negative blood is kept in the following locations:

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Number O RhD neg units available for immediate use</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASPH Ashford: Pathology issue fridge</td>
<td>4 adult units</td>
<td></td>
</tr>
<tr>
<td>SPH Main issue fridge</td>
<td>2 adult units</td>
<td></td>
</tr>
<tr>
<td>SPH Theatre issue fridge</td>
<td>2 adult units</td>
<td></td>
</tr>
<tr>
<td>SPH Labour ward issue fridge</td>
<td>2 adult units for Obstetric patients</td>
<td></td>
</tr>
<tr>
<td>FPH Main issue fridge</td>
<td>4 adult units</td>
<td></td>
</tr>
<tr>
<td>A+E Resus issue fridge</td>
<td>2 adult units</td>
<td></td>
</tr>
<tr>
<td>Theatre issue fridge</td>
<td>2 adult units suitable for Obstetric patients &amp; 1 paediatric unit</td>
<td></td>
</tr>
<tr>
<td>Spire Clare Park Hospital Out Patient Department</td>
<td>2 adult units</td>
<td></td>
</tr>
<tr>
<td>RSCH Main issue fridge</td>
<td>4 adult units</td>
<td></td>
</tr>
<tr>
<td>Delivery Suite issue fridge</td>
<td>2 adult units for Obstetric patients and 1 paediatric unit</td>
<td></td>
</tr>
</tbody>
</table>

39.6 ISSUE OF BLOOD PRODUCTS ACCORDING TO THE MASSIVE HAEMORRHAGE GUIDELINE (SEE ALSO SECTION 39.9)
Blood Bank will issue a combination of blood components/products at the first two stages of massive haemorrhage.

Pack A: 6U Red cells, 4U FFP and 1 pool of Platelets.
- Pack A will be issued when the massive haemorrhage trigger is activated and the CCL has spoken to the Laboratory Communication Lead.
- 1 pool of platelets will be in stock for the purpose of the massive haemorrhage protocol. This will NOT be used for other indications.
- Once used the platelets will be restocked; however delivery of stock comes from London so will not be immediate.
• In the event of a second Massive Haemorrhage happening shortly after or simultaneously then pack A will be issued WITHOUT platelets. In such an unlikely event further platelets will be ordered from the NBS transfusion centre and blue-lighted across.

Pack B: 6U Red Cells, 4U FFP and 2 Cryoprecipitate.
• Platelets are not issued in pack B. Due to a (national) shortage of platelets only limited stock are available. Pack A contains 1 pool of platelets. If further platelets are anticipated to be needed they should be ordered separately. In the event they are in stock they will be dispensed immediately. If not in stock further platelets will be ordered via ‘blue-light’ although this will have time delay/constraints.
• Once pack A and pack B have been used, further blood products have to be guided by the individual patients clinical situation (site of bleeding, aetiology, interventions planned). No standard packs at this point are appropriate or useful. General guidelines with regards to maintaining certain target values are helpful. See section 39.9.
• Novoseven (rVIIa): recombinant Factor 7: Can be of clinical value in patients after pack A and B have been used. Use should be appropriate and should be discussed with the consultant haematologist. If the consultant haematologist is not available, a consultant anaesthetist can authorise the use of Novoseven.
• Section 39.11 contains a summary of characteristics of blood products.

39.7 ADDITIONAL CONSIDERATIONS FOR SPECIFIC CASES

39.7.1 LIFE / LIMB THREATENING HAEMORRHAGE WHEN INR >1.5 DUE TO ORAL ANTICOAGULATION
Beriplex (prothrombin concentrate) should be used as per the guidance in section 43.

39.7.2 SPIRE CLARE PARK HOSPITAL
Due to the geographical distance between Clare Park Hospital and FPH blood bank it is not possible to optimally manage a massive haemorrhage at Clare Park Hospital. The required actions are therefore to:
• Identify that a patient is having a massive haemorrhage
• Alert the emergency ambulance service by dialling 999
• Resuscitate the patient; transfuse emergency O Rh D negative blood if required
• Transfer the patient when feasible
• Alert FPH by asking switchboard to activate the massive haemorrhage protocol and inform the receiving department (A+E, Theatres/ICU)

39.9.3 BMI THE RUNNYMEDE HOSPITAL
This guideline should be followed in conjunction with the local BMI ‘Massive Haemorrhage Procedure’.

39.8 ACTIONS IN THE EVENT OF AN AMBER OR RED BLOOD, OR PLATELET SHORTAGE ALERT.
Emergency O Rh D positive blood, instead of emergency O Rh D negative blood, may be issued for male patients and for female patients aged over 60 years under the guidance of a Consultant Haematologist. A national shortage of platelets might lead to no platelets being available (if for instance just used in another massive haemorrhage). All possible will be done to have 1 pool of platelets in stock. If not platelets will be ordered via courier. If no platelets are in stock follow protocol on all other levels.
39.9 MASSIVE HAEMORRHAGE FLOWCHART

INITIAL STAGE (first 30-45 minutes)

CLINICAL TEAM

1. Call 2222 and state ‘MASSIVE HAEMORRHAGE’ in (insert location)

2. Clinical Communication Lead (CCL) chosen; ring blood bank and communicate throughout. ASPH x 6025

3. Take appropriate samples and send to lab: XM (pink top) plus FBC, Clotting, U&E and Calcium.

4. Avoid hypothermia (use fast flow fluid warmer early)

5. Transfuse emergency O RhD negative blood (O RhD positive blood can be given to men and women >60 yrs in emergencies) if not possible to wait and / or :
   - Group compatible (15 min)
   - Crossmatched (45 min)
   - FFP (30 min): defrosted: use within 24 hours.

6. For adult patients: consider 1g tranexamic acid in 100mL saline as IV bolus over 10 minutes.

LABORATORY

Pack A

1. Lab to issue / defrost once spoken to CCL:
   - 6 units of red cells (RBC)
   - 4 units of Fresh Frozen Plasma (FFP)
   - 1 pool of Platelets (PLT)

2. Other orders if indicated (led by clinical team).

3. Process blood tests

Pack B (if ongoing haemorrhage)

4. Lab to issue/defrost once spoken to CCL:
   - 6 units of Red cells (RBC)
   - 4 units of FFP
   - 2 pools of cryoprecipitate

5. Other orders if indicated (led by clinical team).

ONGOING UNCONTROLLED BLOOD LOSS

6. Adjust products according to results, aim to keep:
   - Hb> 80g/L
   - PT, APTT ratio <1.5
   - Fibrinogen >1.0g/L
   - Platelets> 50-75 x 10⁹/L

**Blood product requests at this stage are led by the clinical team – no standard combination of blood products will be issued.**

7. Consider recombinant factor VIIa (Novoseven) 90ug/kg. Ideally given after Platelets and cryoprecipitate have been given. Requires discussion with haematology consultant.

PLEASE INFORM THE LAB STRAIGHT AWAY IF THE PATIENT’S CIRCUMSTANCES CHANGE TO AVOID WASTAGE OF BLOOD PRODUCTS AND TO CONFIRM LAB STAND DOWN
### 39.10 MASSIVE HAEMORRHAGE COMMUNICATION SHEET FOR BLOOD BANK

<table>
<thead>
<tr>
<th>BMS Name:</th>
<th>Date:</th>
<th>Time 2222 BLEEP rec’d</th>
<th>AM / PM</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name of Clinical Communication Lead</th>
<th>Time CCL call rec’d</th>
<th>AM / PM</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Job Title of Clinical Communication Lead</th>
<th>Bleep number</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name of Consultant</th>
<th>N.B. the approval of a Consultant Haematologist is NOT required</th>
</tr>
</thead>
</table>

**Patient identification details**

<table>
<thead>
<tr>
<th>Surname</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>First name</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date of Birth</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Unique identification number</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Exact Patient Location</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Contact Telephone Extension</th>
</tr>
</thead>
</table>

**Clinical details**

**IMPORTANT**

<table>
<thead>
<tr>
<th>Clinical Communication lead ascertained</th>
<th>Y / N</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Lab Communication Lead defined</th>
<th>Y / N</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Group specific blood required</th>
<th>Y / N</th>
</tr>
</thead>
</table>

PTO
## COMMUNICATION EPISODES

### First Episode

IS BOTTOM COLUMN OF FIRST PAGE FILLED IN?

<table>
<thead>
<tr>
<th>Time</th>
<th>CCL / other (specify)</th>
<th>Reason / Request / Outcome / Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Lab Initiated Communications / Reasons

1. when products available  
4. For update on Clinical Progress

2. when results available  
5. Enquire if further products needed

3. New sample required / incorrect label  
6. Whether to stand down MH call
### 39.11 USE OF BLOOD & BLOOD PRODUCTS IN ADULTS: A SUMMARY

<table>
<thead>
<tr>
<th>Product</th>
<th>Indication</th>
<th>Unit</th>
<th>Volume per unit</th>
<th>Adult Dose</th>
<th>Infusion Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Cells*</td>
<td>Bleeding Anaemia</td>
<td>1 Unit</td>
<td>350mL</td>
<td>1-6 units</td>
<td>No more than 4 hours per unit</td>
</tr>
<tr>
<td>Platelets*</td>
<td>Active or risk of bleeding due to thrombocytopenia and/or platelet dysfunction.</td>
<td>1 Unit</td>
<td>200mL</td>
<td>1 unit</td>
<td>30 minutes per unit</td>
</tr>
<tr>
<td>Fresh Frozen Plasma*</td>
<td>Active or risk of bleeding due to coagulopathy for which a concentrate is not appropriate.</td>
<td>300mL – 600mL</td>
<td>300mL – 600mL</td>
<td>10-15mL / kg body wt</td>
<td>Typically 10mL / minute</td>
</tr>
<tr>
<td>Cryoprecipitate*</td>
<td>Active or risk of bleeding due to severe hypofibrinogenaemia (i.e. fibrinogen &lt;1g/L)</td>
<td>Pool of 5 donors</td>
<td>100mL</td>
<td>2 pools</td>
<td>15 minutes per pool</td>
</tr>
<tr>
<td>Beriplex ¶ (prothrombin concentrate)</td>
<td>Life, limb or sight threatening haemorrhage when INR &gt;1.5 due to oral anticoagulation. Vitamin K 5-10mg iv should also be given.</td>
<td>500iu FIX activity units per vial</td>
<td>20mL per vial</td>
<td>30iu/kg Dose to nearest 500iu Typical dose 2,500iu Maximum 5000iu</td>
<td>Not more than 3 IU/kg/min, max. 210 IU/min, approximately 8 ml/min, typically over 20 minutes</td>
</tr>
<tr>
<td>NovoSeven ¶</td>
<td>Life / organ threatening haemorrhage meeting massive transfusion guideline criteria*. Platelets should also be transfused if count &lt;50 or platelet dysfunction is present.</td>
<td>1, 2 &amp; 5mg vials</td>
<td>1-5mL per vial</td>
<td>90microg/kg repeated once after 4hrs if still bleeding. Platelets dysfunction : 90microg/kg every 2 hrs Typical dose 6mg</td>
<td>i.v bolus over 2-5 minutes</td>
</tr>
<tr>
<td>Haemate P ¶</td>
<td>Prevention and treatment of bleeding in von Willebrand’s disease</td>
<td>500 &amp; 1000 iu of FVIII:C</td>
<td>10mL-15mL per vial</td>
<td>20-40 IU/kg FVIII:C Typical dose 2,500iu</td>
<td>up to 4ml/min</td>
</tr>
<tr>
<td>Factor VIII conc. (Helixate ¶ recombinant)</td>
<td>Prevention and treatment of bleeding in factor VIII deficiency.</td>
<td>250, 500, 1000, 2000 iu vials</td>
<td>10mL per vial</td>
<td>= Body weight x desired factor rise x 0.5. Typical dose for severe def. = 2,500iu</td>
<td>up to 4ml/min</td>
</tr>
<tr>
<td>Factor IX conc. (Benefix ¶ recombinant)</td>
<td>Prevention and treatment of bleeding in factor IX deficiency.</td>
<td>250, 500, 1000, 2000 iu vials</td>
<td>10mL per vial</td>
<td>= Body weight x desired factor rise x 1.3. Typical dose for severe def. = 6,000</td>
<td>up to 4ml/min</td>
</tr>
</tbody>
</table>

## 40. PAEDIATRIC TRANSFUSION GUIDELINE

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
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<td>40.2 Special Situations</td>
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<td>40.3 Aim of transfusion in the Neonate</td>
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<td>98</td>
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<tr>
<td>40.5 Prevention of need for RBC transfusion</td>
<td>98</td>
</tr>
<tr>
<td>40.6 Selection of Blood &amp; Choice of ABO group</td>
<td>98</td>
</tr>
</tbody>
</table>
40. PAEDIATRIC TRANSFUSION GUIDELINE

40.1. INTRODUCTION
This guideline does not seek to replicate the guidelines by the British Committee for Standards in Haematology ‘Transfusion Guidelines for neonates and older children’ (please see http://www.bcshguidelines.com) which should be consulted for expert specific information on
- Blood and blood component specification
- Pre-transfusion testing for neonates and infants within the first 4 postnatal months
- Specifics of Neonatal transfusion i.e. exchange transfusion
- Transfusion support for haemoglobinopathies
- Transfusion support for haemopoietic Stem Cell Transplant, aplastic anaemia and malignancies
- Transfusion support for cardiac surgery, Extra Corporeal Membrane Oxygenation and acquired coagulopathies
- Autologous transfusion in children

It is important to note that
- Red Blood Cell (RBC) transfusions remains a necessary component in the care of high risk preterm and term infants
- RBC transfusion practices have rarely been subjected to randomised controlled trials
- Most transfusion practices remain opinion based rather than evidence based.
- While indications to transfuse RBCs in sick term infants have not changed during the past decade, clinical indications for RBCs transfusion in very low birth weight babies have become more restricted

Transfusion processes (consent, identification, administration, monitoring etc) as they differ with neo-nates and children are referenced throughout the Blood Transfusion Policy.

40.2. SPECIAL SITUATIONS
- T-cell activation and haemolysis in infants with necrotizing enterocolitis
- Discuss with Haematologist if unexpected haemolysis following RBCs transfusion, presentations include increasing jaundice, haemoglobinuria, falling Hb, falling platelets, rising creatinine and potassium levels
- Single volume and double volume Exchange transfusion (see BCSH guidelines)

40.3. AIM OF TRANSFUSION IN THE NEONATE
- To ensure adequate tissue oxygenation during intensive care periods
- To treat symptomatic anaemia after intensive care period
40.4 INDICATIONS

Table 1

<table>
<thead>
<tr>
<th>Infant characteristics</th>
<th>Haemoglobin g/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute blood loss &gt;10% with circulatory compromise</td>
<td></td>
</tr>
<tr>
<td>During 1st 24 hours of life in sick babies</td>
<td>120</td>
</tr>
<tr>
<td>Ventilated infants /needing intensive care</td>
<td>120</td>
</tr>
<tr>
<td>Infant in supplemental Oxygen/CPAP</td>
<td>100</td>
</tr>
<tr>
<td>Severe congenital heart disease</td>
<td>120</td>
</tr>
<tr>
<td>Cumulative blood loss &gt;10% in 1st week</td>
<td></td>
</tr>
<tr>
<td>In preterm with chronic O2 dependency</td>
<td>110</td>
</tr>
<tr>
<td>Symptomatic late anaemia (anaemia of prematurity)</td>
<td>80</td>
</tr>
<tr>
<td>Significant and frequent apnoeas on caffeine and no other medical explanations</td>
<td></td>
</tr>
<tr>
<td>Poor weight gain &lt; 10gm/kg for 4 days</td>
<td></td>
</tr>
<tr>
<td>Circulatory strain: HR &gt;180/min, R/R &gt;80/min and no medical explanation</td>
<td></td>
</tr>
<tr>
<td>Increased O2 need in oxygen dependent babies for which no other medical explanations</td>
<td></td>
</tr>
<tr>
<td>Asymptomatic anaemia of prematurity</td>
<td></td>
</tr>
<tr>
<td>Falling Hb/hct</td>
<td></td>
</tr>
<tr>
<td>Inappropriately low Retics count &lt; 150 (&lt;4%)</td>
<td>70</td>
</tr>
</tbody>
</table>

40.5. PREVENTION OF NEED FOR RBC TRANSFUSION IN NEONATES

40.5.1 MINIMISE IATROGENIC LOSSES:
- Micro-sampling
- Return of unused blood used to clear the line of fluid
- Minimising unnecessary investigations
- Use of non-invasive monitoring

40.5.2 DELAYED CORD CLAMPING: controlled trials failed to show any significant benefit

40.5.3 AUTOLOGOUS TRANSFUSIONS: not routinely practiced

40.5.4 ERYTHROPOETIN (RHEPO): currently not used

40.6. SELECTION OF BLOOD PRODUCTS AND CHOICE OF ABO GROUP
- Choice of ABO blood group for blood products administration to children (see table 2)
- Compatible with any ABO or atypical red cell antibody present in the maternal or neonatal plasma
- Small volume transfusions can be given repeatedly over the first four months of life without further serological testing, provided that
  - There are no atypical maternal red cell antibodies in maternal/infant serum
  - The infants DAT is negative when first tested. Infants rarely produce atypical red cell antibodies other than following repeated large volume transfusion.
  - If the antibody screen and/or DAT are positive, serological investigation or full compatibility testing will be necessary
  - After the post-natal age of four months, compatibility tests should be carried out in accordance with national guidance for adult pre-transfusion testing.
**Table 2: Choice of ABO Blood Group for Blood Products for Administration to Children**

<table>
<thead>
<tr>
<th>Patient’s ABO Group</th>
<th>Red Cells</th>
<th>Platelets</th>
<th>FFP</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>1(^{st}) Choice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2(^{nd}) Choice</td>
<td>Not applicable</td>
<td>A or B</td>
<td>A or B or AB</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>1(^{st}) Choice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2(^{nd}) Choice</td>
<td>O</td>
<td>B(\star)</td>
<td>AB</td>
</tr>
<tr>
<td>3(^{rd}) Choice</td>
<td>O(\star)</td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>1(^{st}) Choice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2(^{nd}) Choice</td>
<td>O</td>
<td>A(\star)</td>
<td>AB</td>
</tr>
<tr>
<td>3(^{rd}) Choice</td>
<td>O(\star)</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>AB</td>
<td>AB</td>
<td>AB(\star)</td>
<td>AB</td>
</tr>
<tr>
<td>1(^{st}) Choice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2(^{nd}) Choice</td>
<td>A or B</td>
<td>A(\star) or B(\star)</td>
<td>A(\star)</td>
</tr>
<tr>
<td>3(^{rd}) Choice</td>
<td>O(\star)</td>
<td></td>
<td>B(\star)</td>
</tr>
</tbody>
</table>

\(\star\) Group O FFP should only be given to patients of Group O. Although Group AB FFP can be given to people of any ABO blood group, supplies are usually limited. Components which test negatively for ‘high titre’ anti-A and/or anti-B should be selected. The use of group O platelets for non-O patients should be avoided as much as possible. Platelet concentrates of group B or AB may not be available.
## 41. PLATELET TRANSFUSION GUIDELINE

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<th>Section</th>
<th>Page</th>
</tr>
</thead>
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<td>41.2 Platelet transfusion overview</td>
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<td>41.3 Indications</td>
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<td>41.3.1 Bone marrow Failure</td>
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<td>105</td>
</tr>
<tr>
<td>41.11 Platelet transfusion flow chart</td>
<td>106</td>
</tr>
</tbody>
</table>
41. PLATELET TRANSFUSION GUIDELINE

41.1. INTRODUCTION
This guideline fully supports the recommendations for platelet transfusions published by the British Committee for Standards in Haematology. The purpose of the guideline is to ensure a standardised approach to the management of patients receiving platelet transfusions, reflecting best practice, thereby reducing the risks associated with transfusions.

41.2. PLATELET TRANSFUSION OVERVIEW
- Initial requests for any given patient should be discussed with a senior member of the team.
- Requesting can be either via a cross match or, if the doctor has already completed a group and save, via a telephone call to the blood bank.
- Platelets should ideally be ABO group compatible but a crossmatch procedure is not required.
- RhD positive products should not be given to a RhD negative female of childbearing age.
- Platelet transfusions are indicated for the prevention and treatment of haemorrhage in patients with thrombocytopenia and/or platelet function defects.
- The cause of thrombocytopenia should be established as platelet transfusion is contra-indicated in some instances.
- Any decision to transfuse platelets must be based on an assessment of risk versus benefit for the patient.
- Patients who have a history of severe allergic reaction to blood components require discussion with the haematology consultant as sometimes platelets have to be administered in Platelet Suspension Medium (PSM).
- Risks associated with platelet transfusion include alloimmunisation, transmission of infection, allergic reactions and transfusion related acute lung injury (TRALI).
- Benefits include reducing morbidity associated with minor haemorrhage and reducing morbidity/mortality resulting from major haemorrhage.

41.3. INDICATIONS
See section 41.11 for a summary chart.

41.3.1 BONE MARROW (BM) FAILURE
e.g. due to disease, cytotoxic chemotherapy and irradiation.

<table>
<thead>
<tr>
<th>Platelet Count (x10^9/l)</th>
<th>Transfusion Indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>Adult patients</td>
</tr>
<tr>
<td></td>
<td>In patients with chronic BM failure syndromes, such as aplastic anaemia and Myelodysplastic Syndrome (MDS), platelet transfusions are not indicated on the count alone, but are administered on the basis of the presence or absence of clinical symptoms.</td>
</tr>
<tr>
<td>&lt; 20</td>
<td>All paediatric oncology/haematology patients</td>
</tr>
<tr>
<td>&lt; 20</td>
<td>In the presence of active infection or fever. Platelets expected to fall to &lt; 10 before next count.</td>
</tr>
<tr>
<td>&lt; 30</td>
<td>Central Nervous System (CNS) Lesion/tumour</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>Mucosal bleeding, Coagulopathy, Prior to surgery or invasive procedures (see below)</td>
</tr>
<tr>
<td>&lt; 100</td>
<td>Prior to surgery of critical sites e.g. brain, spine, eye. Prior to major surgery with additional risk factors. Massive trauma.</td>
</tr>
</tbody>
</table>

These are guidelines. Individual patient circumstances need to be taken into account and discussed at senior level (e.g. patients with refractoriness, emergencies, patients with specific targets set (i.e. by tertiary centres))
41.3.2 PROPHYLAXIS FOR SURGERY OR PROCEDURES

There is a lack of evidence to guide therapeutic decisions regarding platelet transfusion to cover surgical procedures. The following guidance can be given;

<table>
<thead>
<tr>
<th>Surgery/procedure</th>
<th>Platelet Count (x10^9/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations in Critical areas e.g. Brain or Eye Surgery</td>
<td>platelets &gt;100</td>
</tr>
<tr>
<td>Liver biopsy (percutaneous)</td>
<td>Platelets &gt; 80</td>
</tr>
<tr>
<td>Central lines other than PICC lines</td>
<td>Platelets &gt; 50</td>
</tr>
<tr>
<td>Transbronchial Biopsy</td>
<td>Platelets &gt; 50</td>
</tr>
<tr>
<td>Laparotomy or similar procedure</td>
<td></td>
</tr>
<tr>
<td>Lumbar puncture</td>
<td></td>
</tr>
<tr>
<td>Epidural anaesthesia</td>
<td></td>
</tr>
<tr>
<td>Gastroscopy and biopsy</td>
<td></td>
</tr>
<tr>
<td>Insertion of Indwelling lines</td>
<td></td>
</tr>
<tr>
<td>Other biopsies and procedures</td>
<td></td>
</tr>
<tr>
<td>PICC line insertion (peripherally inserted central catheter)</td>
<td>Platelet count not relevant. (peripherally inserted therefore same as for venepuncture). Coagulation screen also not indicated.</td>
</tr>
<tr>
<td>Bone marrow aspiration and biopsy</td>
<td>Can be performed in patients with severe thrombocytopenia without platelet support providing adequate surface pressure is applied</td>
</tr>
</tbody>
</table>

It cannot be assumed that the platelet count will rise because of platelet transfusion and a preoperative platelet count should be checked to ensure that the above thresholds have been reached. However in minor invasive procedures a post-transfusion count is not always necessary. In some patients with certain conditions or a consumptive process, a documented count >50 is often unachievable. Platelet transfusion should then be given immediately prior to procedure.

These are guidelines. Individual patient circumstances need to be taken into account and discussed at senior level (e.g. patients with refractoriness, emergencies, patients with specific targets set (i.e. by tertiary centres))

41.3.3 MASSIVE BLOOD LOSS

Platelet transfusions play an important role in massive haemorrhage; see section 39. The general recommendations are as below. Of course platelet transfusion cannot replace surgical repair where needed.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Platelet Count (x10^9/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Bleeding</td>
<td>Aim to maintain Platelets &gt;50 x 10^9/l</td>
</tr>
<tr>
<td>Multiple trauma or Central Nervous System Injury</td>
<td>Target level of 100 x 10^9/l</td>
</tr>
</tbody>
</table>

41.3.4 PLATELET DYSFUNCTION

Patients with platelet function disorders rarely require platelet transfusions. However, in patients with platelet dysfunction bleeding can be exacerbated in situations of impaired haemostasis.

The following recommendations are for the management of bleeding or for prophylaxis before invasive procedures for patients with a known or suspected platelet function disorder, such as Glanzmann's thrombasthenia.

- Withdraw drugs known to have anti-platelet activity
- Correct any underlying conditions known to be associated with platelet dysfunction if possible
- Aim to correct the haematocrit to >0.30 in patients with renal failure.
- Consider the use of DDAVP (Desmopressin) in patients with inherited dysfunction defects
- Consider the use of DDAVP or cryoprecipitate in patients with uraemia
• Use platelet transfusion where the above methods are not appropriate or are ineffective in case of bleeding or pre-operatively.
• Human Leucocyte Antigen (HLA) matched platelet transfusions are recommended due to the possibility of HLA alloimmunisation in patients who are likely to require further transfusions in the future. Incidence of HLA-alloimmunisation however is very low in pre-storage leucocyte depleted components. Therefore in case of emergency random platelets can and should be used
• Recombinant factor VII (Novoseven): This can be used in case of extreme emergency and should be given together with platelet transfusion. Novoseven carries a thrombotic risk. Use in this indication should always be discussed with the consultant Haematologist on-call.
• Patients on anti-platelet agents such as clopidrel (anti-platelet-agent) have an acquired platelet dysfunction and should be given platelet transfusion in case of emergency as a reversing agent is not available.

41.3.5 DISSEMINATED INTRAVASCULAR COAGULATION (DIC)
Platelet transfusions are part of the management of Acute DIC, but only where there is bleeding associated with thrombocytopenia. The main treatment is the management of the underlying disorder.
Recommendations are;
• Frequent estimation of the platelet count and coagulation screening tests should be carried out
• Acute disseminated intravascular coagulation (DIC) in the presence of bleeding and severe thrombocytopenia: aim to maintain the platelet count >50 x10^9/L
• In chronic DIC, or in the absence of bleeding, platelet transfusions should not be given to correct a low platelet count

41.4. CONTRAINDICATIONS TO PLATELET TRANSFUSION
• ITP: Immune Thrombocytopaenic purpura: Platelet transfusions are a relative contra-indication as the transfused platelets have a very short half-life once infused. Platelet transfusions can be used in case of an emergency but other ways of treating the underlying cause should also be taken.
• Hyper-destructive states, such as Thrombotic thrombocytopenic purpura (TTP), except in extremis such as proven cerebral haemorrhage. Platelet transfusions have been associated with an exacerbation of the condition.
• Heparin induced thrombocytopenia (HIT) is a drug induced immune thrombocytopenia which is associated with possible severe thrombosis. Platelet transfusions can increase this risk.

41.5. SELECTION OF PLATELET CONCENTRATE
41.5.1 ABO COMPATIBILITY
Platelet concentrates should be ABO compatible with the patient where possible as shown in the following table:

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Donor Group</th>
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<tr>
<td></td>
<td>A</td>
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<tr>
<td>A</td>
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<tr>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>AB</td>
<td>1</td>
</tr>
<tr>
<td>O</td>
<td>2</td>
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KEY: 1 These are preferred; 2 May be used if first choice not available but may result in poor response; 3 Group O platelets should only be used for non-group O patients if platelets are labelled ‘negative for high titre anti-A & anti-B’.

41.5.2 RHESUS COMPATIBILITY
• RhD-negative platelet concentrates should be given, where possible, to RhD-negative patients, particularly to women who have not reached the menopause
• If RhD-positive platelets are transfused to an RhD-negative woman of childbearing age, it is recommended that anti-D is given. A dose of 250 i.u. Anti-D is sufficient to cover five adult therapeutic doses of RhD-positive platelets within a 6-week period, and should preferably be given via IV route in thrombocytopenic patients.
• It is not necessary to administer anti-D to RhD-negative men or women without childbearing potential who have haematological disorders and receive platelet concentrates from donors who are RhD positive.

41.5.3 GAMMA IRRADIATION
See section 38: irradiated blood component guideline

41.6. DOSAGE
• Patients who have a history of severe allergic reaction to blood components require platelets in Platelet Suspension Medium (PSM); 24 hours notice is required if this type of product is needed. In case of extreme emergency random platelets can be given with hydrocortisone and chlorpheniramine cover, but patients should be closely monitored.
• For prophylactic use only one adult therapeutic dose is given per occasion. This should normally increase the platelet level by at least 20-30 x 10^9/L.
• For bleeding or surgical indications increased doses may be required, especially in the presence of splenomegaly, fever, active bleeding or (known) platelet antibodies.
• Patients with persistent, severe thrombocytopenia might require transfusion approximately three times per week. HOWEVER: in patients with chronic BM failure syndromes, such as aplastic anaemia and MDS, platelet transfusions are not indicated on the count alone, but are administered on the basis of the presence or absence of clinical symptoms.
• See also sections 41.10 & 41.11

41.7. ADMINISTRATION
• See also section 17
• Transfuse one unit of platelets over 30 minutes
• Infusion pumps may be used if the pump is indicated for use with blood products
• Platelets should be administered using a new blood administration set (i.e. do not use a blood giving set that has already had blood transfused through it).
• In the setting of neonatal or foetal transfusions a screen filter is required when giving platelets via a syringe
• Routine pre-medication (with hydrocortisone and/or chlorpheniramine) is not necessary before platelet transfusion

41.8. PAEDIATRIC TRANSFUSION
• Apheresis platelets should be used for all children < 16 years where possible to reduce donor exposure
• The typical dose is calculated as follows:-
  • < 15kg: 10 – 20 ml/kg
  • > 15kg: single apheresis concentrate (approx 300mls: actual volume recorded on label)
• Typical administration rate 10 – 20ml/kg/hour

41.9. MONITORING DURING THE TRANSFUSION
• See also section 19
• If a suspected reaction occurs, STOP the Transfusion and contact medical staff for advice.
• See section 31 Acute Transfusion Reaction guideline for further management advice

41.10. RESPONSE TO PLATELET TRANSFUSION
• The response to transfusion should be monitored as the results will act as a guide to further treatment.
• If the platelets were given to reverse bleeding the clinical response is the most important indication of the effectiveness of the transfusion.
41.10.1. PATIENTS WITH POOR RESPONSE TO PLATELET TRANSFUSION

- If documented on multiple occasions and not explained by fever, consumption, bleeding or hypersplenism the patient should be investigated for HLA antibodies
- The patient should be discussed with the consultant haematologist
- Forms for testing are available in the transfusion laboratory. Testing will take some time and in case of emergency random but group specific platelets should continue to be used.

The following algorithm may be used to guide further management (see over).
41.10.1 PATIENTS WITH POOR RESPONSE TO PLATELET TRANSFUSION ALGORITHM

Modified from algorithm developed by Phekoo et al 1997.

- Poor responses to random donor selection on two or more occasions in the presence of no obvious clinical factors likely to cause non-immune platelet consumption

Test for HLA antibodies using screening tests for both cytotoxic & non-cytotoxic HLA antibodies

- HLA antibodies present
  - Good responses: Continue with HLA matched platelets
  - Poor responses: Consider:
    1) HLA incompatibility
    2) Non-immune consumption
    3) HPA antibodies
    4) ABO antibodies
    Retest for HLA antibodies after 3 months

- HLA antibodies not present
  - Are non-immune causes of refractoriness present e.g. sepsis, DIC, splenomegaly?
    - Yes: 1) Treat cause
      2) Consider further serological investigation
    - No: Test for HPA antibodies
      1) If positive, identify specificity of HPA antibodies and attempt to provide HPA compatible platelets
      2) If negative, consider trial of HLA matched platelets
41.11 PLATELET TRANSFUSION FLOW CHART

These guidelines are intended for patients with thrombocytopenia of non-immune or consumptive aetiology. In other indications or in doubt, the use of platelet transfusions should be discussed with the consultant haematologist.

- **Platelet count < 10x10^9/L (P1) in adults or < 20 in paediatric patients**: Transfuse, except in certain circumstances/contraindications (see text)

- **Platelet count < 20x10^9/L and any of the following: (P2)**
  - febrile or active infection
  - severe mucositis
  - platelets expected to fall to < 10 before next count
  - no contra-indications
  - Transfuse platelets

- **Platelet count < 30x10^9/L and any of the following: (P3)**
  - CNS lesion
  - extreme hyperleucocytosis
  - no contra-indications
  - Transfuse

- **Platelet count < 50x10^9/L and one of the following: (P4)**
  - mucosal bleeding
  - coagulopathy
  - prior to minor surgery*
  - Transfuse If DIC, consider giving twice daily to keep count above 50.

- **Platelet count <100x10^9/L and one of the following: (P4)**
  - prior to surgery of critical sites e.g. brain, spine, eye
  - prior to major surgery with additional risk factors
  - massive trauma
  - Transfuse

* e.g. LP, epidurals, gastroscopy and biopsy, CVC insertion (except PICC lines), transbronchial biopsy, liver biopsy, laparotomy or similar procedure.
Bone marrow aspiration and trephine, as well as PICC line insertion, can be performed with any platelet count, unless a specific clinical reason is present.
## 42. REFUSAL OF TRANSFUSIONS

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42. REFUSAL OF TRANSFUSIONS

42.1. INTRODUCTION
The main group of patients who refuse a blood transfusion are Jehovah’s Witnesses. However, there are other religious groups who may hold similar views. Apart from religious beliefs there may be individuals who refuse blood because they fear blood born infection or are not able to put the various transfusion risks into perspective.

The Jehovah Witness movement was founded 120 years ago in the USA. Their belief is based on their interpretation of various passages in the Bible (Genesis, Leviticus and Acts); they believe it describes the prohibition of the consumption of blood. The prohibition of blood transfusion is a deeply held core value and is a sign of respect for life. However, there are no absolute rules and some individual Witnesses may accept plasma protein fraction or components such as albumin, indeed some individuals might accept blood products or components in exceptional circumstances.

42.2. DEFINITIONS
The term 'blood components' includes blood (packed red cells), platelets, fresh frozen plasma and cryoprecipitate. The term 'blood products' should be reserved for manufactured, non-cellular blood derived items, such as albumin solutions and factor concentrates, as well as genetically engineered concentrates (i.e. recombinant Factor). Hereafter the term blood will be used to cover blood, blood products and blood components.

42.3. SPECIFIC CARE PLANS
- A care plan for women in labour refusing blood transfusion is available via the following link: http://www.transfusionguidelines.org.uk/docs/pdfs/bbt-04_care-plan-v2.pdf
- For management of children or adolescents consider referring to guidance produced by Great Ormond Street Hospital and available at: http://www.gosh.nhs.uk/health-professionals/clinical-guidelines/protocol-for-families-refusing-blood-and-blood-components-including-jehovahs-witnesses/

42.4. ADVANCE DECISIONS/DIRECTIVES AND PATIENT IDENTIFICATION
Competent adult patients have the right to refuse treatment and can make ‘Advance Decisions’ to specify treatment(s) they would refuse, and the circumstances that this refusal will apply to in the event that they lack capacity in the future.

Advance Decisions have to be written if life-sustaining treatment is being/will be refused and must be signed, witnessed, and include a clear statement that the decision applies even if life is put at risk as a result of refusal of treatment.

Most Jehovah’s Witnesses will carry an Advance Directive in the format specified in the Mental Capacity Act, 2005 to communicate their refusal of whole blood, packed red cells, white cells, platelets and plasma and their individual choice regarding acceptance or refusal of ‘fractions’ of plasma or cellular components. This document is entitled Advance Decision to Refuse Specified Medical Treatment.

Some Jehovah’s Witness patients may wish to wear their own ‘No Blood’ wristband. The NPSA (National Patient Safety Agency) Safer Practice Notice No.24 (3 July 2007) states: ‘Patients who wish to wear their own wristbands in hospital should be permitted to do so, but advised of the dangers of confusion for staff.’
For further guidance on advance decisions see [http://www.publicguardian.gov.uk/mca/code-of-practice.htm](http://www.publicguardian.gov.uk/mca/code-of-practice.htm) and the ‘Consent to Examination or Treatment Policy (FPH)’ and the ‘Consent to examination or treatment policy (RSCH)’.

A copy of the Advance Decision/Directive should ALWAYS be filed in the patients notes and all decisions and plans clearly documented.

To administer blood to a patient who has steadfastly refused to accept it either by the provision of an Advance Decision or by its exclusion in a consent form is unlawful, ethically unacceptable and may lead to criminal and/or civil proceedings.

### 42.5. ACCEPTABILITY OF BLOOD PRODUCTS AND COMPONENTS TO JEHOVAH’S WITNESSES.

The table is for reference only. Individual patients may make individual choices and include this in their advance directive.

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<th>May be acceptable (individual patient choice)</th>
<th>Acceptable</th>
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<td>Derivatives of the primary blood components</td>
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<td>Platelets</td>
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<td>Leukocytes</td>
<td>Vaccines</td>
<td>Dextran</td>
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<tr>
<td>Plasma (FFP)</td>
<td>Coagulation factors (non recombinant)</td>
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<td>Intraoperative cell salvage</td>
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<td>Organ transplantation</td>
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<td>Prothrombin Complex Concentrate</td>
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<td></td>
<td>Cryoprecipitate</td>
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### 42.6. PREPARATION

#### 42.6.1 ELECTIVE ADMISSIONS

This requires careful advance planning in which the patient actively confirms their JW status at an early stage. Clinicians should decide whether they are willing to accept limitations in patient management and if not the patient should be referred to a co-operative doctor or Trust before his/her condition deteriorates (Royal College of Surgeons 2002). Contact the local Hospital Liaison Committee of Jehovah’s Witnesses for cooperative consultants at other facilities to confer with regarding alternative care.

All patients who may need blood transfusion should be asked about their willingness to accept it. This includes:
- All booked admissions for surgery where blood loss is possible
- All antenatal bookings
- Any patients having any intervention that could lead to the need for blood or blood products.

“Would you accept a blood transfusion if required” should be asked as soon as hospital admission is planned. If the patient indicates that he/she does not want a blood transfusion and/or blood products then the consultant in charge of that patient’s care must have a structured discussion between the surgeon, anaesthetist, haematologist and patient prior to the proposed surgery. The patient may request the presence of a member of the local Hospital Liaison Committee.
i) Assess the patient, if they are 18 or over, in order to determine whether they have the necessary mental capacity to make this decision. If there is any doubt as to the patient’s capacity then it is essential to follow the ASPH Patient Consent guideline, FPH Consent to Examination or Treatment Policy or the RSCH Consent to Examination or Treatment Policy.

ii) Ensure that the patient is not under duress. It may be necessary to speak to the patient in private if the consultant feels that someone else is trying to exert pressure on the patient to refuse a blood transfusion and/or blood products.

iii) Explain in simple but full terms the operation or procedure and the risks for the particular patient of not having a blood transfusion and/or blood products. For example, the risk of the operation/treatment not having the intended outcome and the risk that a patient may die. The clinician should ensure that he/she is not placing the patient under duress but instead is giving them enough information to make an informed choice whether or not to consent to this treatment.

iv) Consider cell salvage and discuss with the patient if applicable. This differs according to each acute Trust. At ASPH & FPH cell salvage is used quite widely; at RSCH there is an arrangement with a cell salvage specialist company who attend when required. Should cell salvage be a viable option but not available for any reason then consideration should be given to offering the patient the opportunity to transfer to a centre that does offer cell salvage.

v) Establish which blood component and/or products the individual patient will accept (see table in section 42.5).

vi) Routine blood tests should be done including coagulation studies, FBC, biochemistry, haematinics (Vitamin B12, folate and iron studies). If pre-operative anaemia is diagnosed the patient should be discussed with the haematologist with regards to treatment options and timescales with both the patient and the surgeon. Section 42.12 gives a summary of possible Erythropoietin/iron treatment.

vii) The aim of the meeting is to formulate a plan for surgery that complies with their wishes and beliefs. No attempt should be made to frighten or place the patient under duress. They should be asked if they wish to consult the JW Liaison Committee and this should be documented.

Once the patient understands and fully appreciates the significance of their refusal to have a blood transfusion and/or blood products then this must be clearly documented in the patient’s notes together with details of all the points above.

42.7. EMERGENCY ADMISSIONS AND THE UNCONSCIOUS ADULT
When a patient is admitted as an emergency, either unconscious or unable to communicate, unless obvious (such as advance directive carried in wallet, information from relatives or information on bracelet) they will be treated in their best interests. If at a later stage it becomes obvious the patient refuses blood products the situation will be reviewed.

42.8. CHILDREN
Under the Mental Capacity Act 2005, Advance Decisions cannot be made by children less than 18 years of age. For full guidance on management of children or adolescents see also:


42.8.1. CHILDREN OVER 16 YEARS OLD
Patients who are 16 or 17 years old are deemed to have the necessary capacity in order to consent to medical treatment and they should be treated in the same way as an adult. If a 16 or 17 year old consents to receiving a blood transfusion or blood products then, regardless of the parent’s wishes, staff can provide them with this treatment although if there is time staff should discuss the issue with senior staff who may contact the Litigation Manager to seek further advice.
However, if a 16 or 17 year old refuses treatment this can be overridden either by a holder of parental responsibility for that child or the court. If staff are faced with a situation where the child is refusing a blood transfusion but the parents wish them to have a blood transfusion then, in an emergency situation, a blood transfusion should be given. However, if the situation is not an emergency, the staff should discuss the issue with senior staff who may then seek legal advice.

42.8.2. CHILDREN UNDER THE AGE OF 16 YEARS

Usually the consent of a holder of parental responsibility is required to treat a child under the age of 16. However, if the child is Gillick competent, i.e. the child has sufficient maturity and understanding to consider the treatment and weigh up the risks and benefits of that treatment, then they can consent to treatment themselves and this can be given regardless of the parents’ opposition.

If parents refuse to consent to a blood transfusion for their child and the child is either not Gillick competent or also refuses a blood transfusion, then staff should contact the Litigation/Legal Services Manager, as a Court order may be required (see the ‘Consent for examination and treatment policy’ for managing this including out of core hours guidance). If the child requires a blood transfusion in an emergency situation then clinicians should take steps to preserve the child’s life even if this means giving a blood transfusion against their wishes. As always staff should ensure that the patient’s notes clearly document the event and reasons for their actions.

42.9. BLOODLESS OBSTETRIC MANAGEMENT

For a full care plan for women in labour refusing blood transfusion see also: http://www.transfusionguidelines.org.uk/docs/pdfs/bbt-04_care-plan-v2.pdf

Removing administration of blood from the treatment of post partum haemorrhage without modifying practice has the potential of placing patients in grave danger.

Antenatal Preparation: The woman should be seen by the Consultant Obstetrician and the discussion should be had as per section 42.6. Outcome of this discussion must be clearly documented in the medical notes. Refer to haematology if appropriate or needed.

Intrapartum and Postnatal Management: Avoid all possible haemorrhage – active management of the third stage is strongly recommended. Ensure any perineal damage is promptly repaired.

Caesarean Section: If elective plan as per section 42.6

42.10. PRACTICAL ISSUES OF BLOODLESS SURGERY

The pre-operative clinical assessment
- Clinical History
- Drug history (NSAID’s, Aspirin, Clopidogrel, Warfarin, Dabigatran, Rivaroxaban)
- When taking samples for testing use paediatric bottles to minimise the amount of blood used for diagnostic purposes
- Treat anaemia if found: see section 42.12
- Accept a lower Hb concentration.
- General measures that may be considered to reduce blood loss during surgery include meticulous surgical haemostasis, enlarged surgical teams, staging of complex procedures, patient position to reduce venous congestion, use of tourniquet, skin infiltration with vasoconstrictors, topical haemostatics (Surgical, Oxycel, Gelfoam, Tuisseel etc) and regional anaesthesia.

42.11. ADDITIONAL LEGAL ISSUES

42.11.1 ADULTS: A competent adult has an absolute right to refuse any aspect of medical treatment. If the patient is treated against their will the Tort of Battery is committed. A written, signed declaration of refusal of blood products is legally binding and cannot be revoked by the court or a relative even if massive blood loss occurs whilst the patient is anaesthetised.
42.11.2 CHILDREN: Full discussion should take place between the surgeon, anaesthetist, parents and child if the child is considered to be ‘Gillick competent’. Further advice may be obtained from the Legal Services Department should there be conflict between parents, child and the treating clinicians. A Specific Issue Order may be applied for to legally transfuse the patient. Out of hours the duty manager can contact the Trust Solicitors for this type of assistance. Doctors may face criminal prosecution if a child has come to harm as a result of necessary treatment being withheld. Doctors can give life saving transfusions to a child despite parental refusal.

42.11.3 PATIENTS WITH A MENTAL HEALTH DISORDER
Patients with a mental health disorder are still capable of making competent decisions. They should be able to demonstrate they understand in broad terms and simple language what the medical treatment is and for what purpose. They should be able to understand the principal benefits, risks and alternatives. They should be able to understand the implications of refusing treatment, make a free choice without pressure, retain the information and make an effective decision. In cases of uncertainty contact the Legal Services Department.

42.12. RECOMMENDATIONS ON PRE-OPERATIVE USE OF ERYTHROPOIETIN (EPO) AND IRON FOR BLOOD CONSERVATION.
The guidance below is based on evidence in the pre-operative/preventative setting. No evidence exists in an emergency situation where patients have bled significantly post-operatively, post-procedure or post-spontaneous bleeding (in patients who refuse blood components and blood products). In such a situation a similar schedule can be used after senior review of the risks and benefits and after discussion with the haematology team.

42.12.1 ERYTHROPOIETIN (EPO)
EPO is an erythropoiesis-stimulating glycoprotein that is 90% made by the kidneys. EPO allows erythroid precursor cells in the bone marrow to mature and eventually become erythrocytes. This process takes over 1 week; erythrocytes have a normal survival time of 120 days.

In 2011, the Blood Conservation Clinical Practice Guidelines from the Society of Thoracic Surgeons and Society of Cardiovascular Anaesthesiologists provided specific recommendations for blood conservation during surgery including a short-course of erythropoietin, plus iron, preoperatively for patients undergoing cardiac surgery who were refusing blood transfusions. However, no dosing recommendations are included in the guidelines, and there is discussion regarding the risks associated with erythropoietin use. Erythropoietin has a boxed warning stating an increased risk of mortality, myocardial infarction, stroke, and thrombo-embolism.

According to the labelling for erythropoietin, targeting a higher haemoglobin (13 to 14 g/dL) compared to a lower range (9 to 11.3 g/dL) increased the risk of death, myocardial infarction, stroke, and thrombotic events in patients with CKD. Additionally, the manufacturer states that there is an increased incidence of deep venous thrombosis among patients receiving erythropoietin and undergoing surgery.

Concomitant iron supplementation should be given to maintain adequate iron stores necessary for the developing erythrocytes. Additionally, deep vein thrombosis prophylaxis is strongly recommended in all surgical patients receiving erythropoietin.

In patients receiving cardiac surgery or orthopaedic surgery, where the risks of bleeding and vascular complications are greater, erythropoietin with iron supplementation may have a role in anaemic patients who are at high risk. Due to the increased risk of cardiovascular complications associated with erythropoietin, the risks and benefits should be weighed in these patients who are already at risk for these complications.

42.12.2 IRON
No consensus exists on the right schedule for IV iron. Studies available have used anything from a 3-day schedule to a 21 day schedule. The dosing recommended below is guidance only but can be adjusted if required.
For surgical patients, there are 2 dosing recommendations:

EPO & IV Iron: Not to be given if Hb < 11 g/dL (110 g/L)

**SCHEDULE 1:**
EPO 300 units/kg per day subcutaneously (SC) for 14 days total, administered daily for 10 days before surgery, on the day of surgery, and for 4 days after surgery;
Venofer 200mg IV on alternating days pre-surgery to a total of 7 injections

**SCHEDULE 2:**
EPO 600 units/kg SC in 4 doses administered 21, 14, and 7 days before surgery and on the day of surgery.
Venofer 200mg IV on day 21, 17, 7 and the day before surgery

The guidance is based on evidence in the pre-operative/preventative setting. No evidence exists in an emergency situation where patients have bled significantly post-operatively, post-procedure or post-spontaneous bleeding (in patients who refuse blood components and blood products). In such a situation a schedule similar to schedule 1 can be used after senior review of the risks and benefits and after discussion with the haematology team.
### 43. REVERSAL OF ORAL OVER-ANTICOAGULATION (BERIPLEX)

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43. REVERSAL OF ORAL OVER-ANTICOAGULATION (BERIPLEX)

43.1. INTRODUCTION
The main adverse effect of all oral anticoagulants is haemorrhage. Checking the INR and omitting doses when appropriate is essential; if the anticoagulant is stopped but not reversed, the INR should be measured 2–3 days later to ensure that it is falling. The following recommendations (see section 43.8 for flow chart), which take into account the recommendations of the British Committee for Standards in Haematology, are based on the result of the INR and whether there is major or minor bleeding. The recommendations apply only to patients taking Warfarin and other Coumarin anticoagulants. This guideline has been constructed to promote compliance with the NHSLA Risk Management Standards (NHSLA).

43.2. PURPOSE
The purpose of the guideline is to ensure a standardised approach to patients who are receiving oral anticoagulation therapy and who need over anticoagulation management, whether with or without haemorrhage. This guideline aims to reflect best practice thereby reducing the risks.

43.3. WHO SHOULD READ THIS DOCUMENT
This document is aimed at all clinical staff involved in the management of patients requiring reversal of oral anticoagulants and those involved in the administration of Prothrombin Complex Concentrates such as Beriplex.

43.4. OVER ANTI COAGULATION GUIDANCE.

43.4.1 MAJOR BLEEDING, LIFE/LIMB/SIGHT THREATENING INCLUDING INTRA-CRANIAL HAEMORRHAGE
- Defined as life, limb or sight threatening bleeding requiring reversal within 6-8 hours.
- Also patients requiring major emergency surgery that cannot be delayed for 6-8 hours.

Reverse warfarin immediately with Prothrombin Complex Concentrate (Beriplex; factors II, VII, IX, X) and Phytomenadione (Vitamin K), as Beriplex has a short half-life. Beriplex is a pooled blood product, and will completely reverse Warfarin in 30 minutes.

If an intracranial bleed is suspected, do not await imaging or INR prior to reversing anticoagulation.

Fresh frozen plasma (FFP) provides suboptimal Warfarin reversal and should only be used if Beriplex is not available.

43.4.1.2 PROCEDURE
1. Activate the Massive Haemorrhage protocol if appropriate
2. Phone blood bank confirming that the patient is on warfarin and has a life threatening bleed or requires emergency surgery within 6-8 hours.
3. Give Prothrombin Complex Concentrate (Beriplex) (factors II, VII, IX, and X) **30 IU/kg** (maximum dose 5000 units)
4. Give Phytomenadione (Vitamin K) 5-10 mg by slow intravenous injection.
5. Repeat INR after administration of Beriplex.

43.4.1.3 CAUTIONS
Beriplex is highly pro-thrombotic. Use with caution in acute thrombosis (< 1 month), recent MI or others at high risk of thrombosis. Beriplex should not be used in DIC.

*Remember that if a patient has a life threatening bleed, always reverse anticoagulation immediately.*
3.4.2. NON LIFE-THREATENING BLEEDING
Defined as *not life, limb or sight threatening* and not requiring complete reversal within 6-8 hours.
- Manage with Vitamin K and dose reduction/interruption of anticoagulation.
- Significant correction of the INR is seen within 6-8 hours of IV vitamin K, oral works more slowly.

43.4.2.1 PROCEDURE
- Stop oral anticoagulants
- Give Phytomenadione (Vitamin K) 1-3mg by slow intravenous injection
- Recheck INR
- Investigate the cause of the elevated INR
- Patients bleeding at therapeutic levels of anticoagulation should be investigated for the source of bleeding.

43.4.3. ELEVATED INR IN NON-BLEEDING PATIENTS
43.4.3.1 INR < 8
- Withhold 1-2 doses of Warfarin and reduce maintenance dose
- Recheck INR next day
- Investigate the cause of the elevated INR

43.4.3.2 INR > 8
- 1-5mg Phytomenadione (Vitamin K) orally
- Recheck INR the next day
- Withhold Warfarin until INR < 5 and reduce maintenance dose
- Investigate cause of elevated INR

NB: When oral treatment of Phytomenadione (Vitamin K) is indicated the injection may be used as an oral solution.

43.5. UNEXPECTED BLEEDING AT THERAPEUTIC LEVELS
Always investigate possibility of underlying cause e.g. unsuspected renal or gastro-intestinal tract pathology.

43.6. BERIPLEX P/N (PROTHROMBIN COMPLEX CONCENTRATE - PCC)
Beriplex P/N is the trade name of a human Prothrombin Complex Concentrate containing coagulation factors II, VII, IX and X. in the following quantities (see table 1 below)

<table>
<thead>
<tr>
<th>Active ingredients</th>
<th>Content after reconstitution units/ml</th>
<th>½ life (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human coagulation factor II</td>
<td>20 – 48</td>
<td>59.7</td>
</tr>
<tr>
<td>Human coagulation factor VII</td>
<td>10 – 25</td>
<td>4.2</td>
</tr>
<tr>
<td>Human coagulation factor IX</td>
<td>20 – 31</td>
<td>16.7</td>
</tr>
<tr>
<td>Human coagulation factor X</td>
<td>22 – 60</td>
<td>30.7</td>
</tr>
<tr>
<td>Protein C</td>
<td>15 – 45</td>
<td></td>
</tr>
<tr>
<td>Protein S</td>
<td>13 - 26</td>
<td></td>
</tr>
</tbody>
</table>

The ½ lives for individual clotting factors are given above however it is useful for clinicians to be aware that the average ½ life for Beriplex is 8.5 hours.

Phytomenadione (Vitamin K1) should therefore always be given alongside Beriplex as it will last for over 24 hours.

43.6.1 INDICATIONS
- Active or potential for life/limb/CNS/sight threatening haemorrhage in a patient on oral anticoagulation.
- For rapid reversal of oral anticoagulants or other Vitamin K antagonist in 30 minutes.
- For rapid reversal of anticoagulant therapy if a patient requires an urgent procedure.
43.6.2 CONTRAINDICATIONS
- Known sensitivity to any of the components
- Risk of Thrombosis (relative contraindication), Angina Pectoris, recent Myocardial Infarction
- Disseminated intravascular coagulation (DIC)
- Caution in patients with recent history of Heparin induced Thrombocytopenia

43.6.3 SIDE EFFECTS
Beriplex can cause thrombosis in patients with existing thrombotic disease and therefore should only be used in situations of life, limb, CNS or sight threatening situations. Beriplex is produced from pooled plasma so there is a small risk of transmitted infection.

43.6.4 PRESCRIBING
Any use of Beriplex outside the setting of emergency warfarin reversal for life-threatening bleeding (see 5.1) must always take place under the guidance of the Consultant Haematologist on call.

43.6.5 PROCESS
- STOP ORAL ANTICOAGULANT
  - A standard dose of 30 iu per kg of body weight should be used unless otherwise advised by the Consultant Haematologist
- Phytomenadione (Vitamin K1) 5-10mg IV should always also be given alongside Beriplex unless Vit K1 allergic
- Beriplex should act in less than 30 minutes and will last for 6 – 8 hours The Phytomenadione (Vitamin K1) will act within 4 – 6 hours
- Repeat doses should rarely be required as concurrent administration of Phytomenadione (Vitamin K1) negates the need for second dose of Beriplex.
- Methods to prevent thrombosis in these patients should be adopted including the use of thrombo-embolic stockings and the use of Heparin or LMWH (Low Molecular Weight Heparin) when the bleeding risk is reduced.
- Beriplex is a blood product and therefore the processes for collection, administration, and traceability are as outlined in the Blood Transfusion Policy for Adult Patients.

43.6.6 PRESENTATION
- Beriplex presents as a powder in vials of 250 units or 500 units
- Once reconstituted with the accompanying solvent for solution for injections the resultant solution contains 250 units per 10ml for the 250 unit vial, or 500 units per 20 ml for the 500 unit vial.
- Beriplex is kept at room temperature and should never be stored above 25°C or frozen
- It should be kept inside the outer carton to protect it from light

43.6.7 ISSUE
- A request is made directly to blood bank
- Any request other than for life/limb/sight-threatening bleeding or emergency surgery in patients on warfarin requiring reversal within 6 - 8 hours must be discussed with the Consultant Haematologist
- The requester must have the patient’s full name, date of birth, hospital number, weight and location
- Blood bank will issue Beriplex on a named patient basis only
- When it is issued from blood bank it will be accompanied by guidelines on administration

43.6.8 ADMINISTRATION
This product can be administered by any registered nurse/midwife/ODP with an IV additives competency or by a medical practitioner. The product presents as a dry powder, which should be reconstituted with the solvent for solution for injections provided (see section 43.6.9).
- Following reconstitution the resultant solution should be clear and slightly opalescent. It should be examined visually for any discoloration or particle matter before administration.
• It is given as a slow bolus intravenous injection at the rate of 8.4mls per minute (not more than 3 units/kg/min, max. 210 units/min)

43.6.9 RECONSTITUTION GUIDELINES FOR BERIPLEX
This should be carried out under aseptic conditions (see section 43.6.9 below). The solution should be clear or slightly opalescent. After filtering/withdrawal reconstituted product should be inspected visually for particulate matter and discoloration prior to administration. Do not use solutions that are cloudy or have deposits.

Once reconstituted, Beriplex should ideally be used immediately and certainly no longer than 8 hours after reconstitution.

43.6.10 MONITORING
No formal monitoring process is required but local policy on the administration of Intravenous additives should be followed. The INR should be re taken 30 minutes following the administration of Beriplex.
43.7: Reconstitution guidelines for Beriplex

**Prepare the vials**
- Ensure product and diluents vial caps are removed, each top is cleaned with antiseptic wipe, and allowed to dry

**Blue for the water**
- Open the transfer device package by peeling back the lid without removing
- Stand the water vial on a flat surface
- Hold the water vial tight
- Snap the blue end of the transfer device onto the water stopper, whilst keeping the packaging on the transfer device

**Pull off the package**
- Carefully remove the package from the transfer device

**Snap again**
- Stand the Beriplex vial on a flat surface
- Invert the water vial with transfer device attached
- Snap the transparent end of the transfer device on to the Beriplex stopper

- The water should automatically transfer into the Beriplex vial
- Gently swirl the Beriplex until fully dissolved
Load the syringe

- Unscrew the transfer set in the middle by grasping both sides so that the transfer set is in two pieces

- Screw the syringe to the transfer set

- Draw back the Beriplex in to the syringe

- Unscrew the transfer set from the syringe
43.8. MANAGEMENT FLOW CHART

HAEMORRHAGE

Life/limb/sight threatening bleeding
Requiring reversal in < 6h

Stop anticoagulant.
Give IV Phytomenadione (vitamin K1)*
and Beriplex factor concentrate**

Check INR after Beriplex.

Other bleeding
Not requiring reversal in < 6h

Stop anticoagulant
Give Phytomenadione (Vitamin K1) *

Check INR at 24 hours or sooner if clinical situation demands it.

NO HAEMORRHAGE

INR ≥ 8.0

Stop anticoagulant and withhold until INR therapeutic
Phytomenadione (Vitamin K1) orally*

INR < 8.0

Stop anticoagulant for one or more days

Notes

* Oral Phytomenadione (Vitamin K1) 0.5-3mg. Intravenous Phytomenadione (Vitamin K1) 1-10mg. The IV preparation can be given as an oral solution.
** Beriplex 30 IU/kg. Max. Dose 5000 units. Beriplex is highly pro-thrombotic and should only be used in an emergency setting.

If an intracranial bleed is suspected, do not await imaging prior to reversing Warfarin.

Fresh frozen plasma (FFP) provides suboptimal Warfarin reversal and should only be used if Beriplex is not available.
FFP 15ml/kg over 90 mins.

In all cases, if bleeding occurs with INR < 4.5 the patient should be assessed for an underlying structural cause.
43.9. BERIPLEX – DOSAGE GUIDE

One standard dose of 30 iu/kg is used with a maximum dose of 5000 iu

Please round up/down the weight to the nearest listed weight.

<table>
<thead>
<tr>
<th>Weight</th>
<th>Calculated dose of Beriplex</th>
<th>Acute dose of Beriplex to be given</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>300</td>
<td>500</td>
</tr>
<tr>
<td>15</td>
<td>450</td>
<td>500</td>
</tr>
<tr>
<td>20</td>
<td>600</td>
<td>500</td>
</tr>
<tr>
<td>25</td>
<td>750</td>
<td>1000</td>
</tr>
<tr>
<td>30</td>
<td>900</td>
<td>1000</td>
</tr>
<tr>
<td>35</td>
<td>1050</td>
<td>1000</td>
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<tr>
<td>40</td>
<td>1200</td>
<td>1500</td>
</tr>
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<td>45</td>
<td>1350</td>
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<td>1500</td>
<td>1500</td>
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<tr>
<td>55</td>
<td>1650</td>
<td>1500</td>
</tr>
<tr>
<td>60</td>
<td>1800</td>
<td>2000</td>
</tr>
<tr>
<td>65</td>
<td>1950</td>
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<td>75</td>
<td>2250</td>
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<td>3300</td>
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<tr>
<td>115</td>
<td>3450</td>
<td>3500</td>
</tr>
<tr>
<td>120</td>
<td>3600</td>
<td>3500</td>
</tr>
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</table>
### 44. SURGICAL TRANSFUSION GUIDELINES

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44. SURGICAL TRANSFUSION GUIDELINE

44.1. INTRODUCTION
Transfusion is associated with a wide variety of potentially adverse outcomes and should be avoided where possible. This guideline aims to help peri-operative transfusion decisions and practice thus minimising the avoidable risks of transfusion. Where time allows, a patient’s haemoglobin and coagulation should be optimised before surgery. Steps should be taken to avoid, or minimise, blood loss and the need for transfusion both during, and after, surgery.

There is an increased acceptance of lower haemoglobin level thresholds for transfusion and the clinical need should be balanced against the associated risks.

The guidance is divided into the pre-assessment, pre-operative, intra-operative and post-operative phases.

This document is aimed at all clinical staff involved in the management of patients undergoing surgery who may require blood products.

44.2. PRE-ASSESSMENT CLINIC
All elective surgery patients who may require transfusion should attend a pre-assessment clinic in sufficient time to allow appropriate transfusion decisions to be taken and corrective measures to be completed.

The following actions should be considered:-

44.2.1 PRE-REFERRAL
All Pre-operative Assessment Clinics (POACs) should have a comprehensive written policy in place covering all aspects for the recognition, management, and treatment of anaemia.

GPs / referring physicians must consider the possibility of anaemia prior to referral for surgery and must investigate and treat those at risk. The referral letter should include all relevant clinical information.

44.3 PRE–OPERATIVE MANAGEMENT
All patients who are identified as at risk of requiring a blood transfusion (according to local Maximum Surgical Blood Ordering Schedule (MSBOS), should have a group & antibody screen (G+S) and a full blood count (FBC) assessed at POAC.

- Patients should be given information about the possibility of requiring a blood transfusion, and, when appropriate, alternatives to transfusion e.g. intra-operative cell salvage should be discussed.
- Patients’ current medication should be assessed for drugs which increase blood loss and the decision to stop them pre-operatively should be made as appropriate.
- Diagnose and treat other co-morbidities: This may reduce the risk of bleeding, help the patient tolerate anaemia better and avoid the need for transfusion.

44.3.1 MANAGEMENT OF RESULTS
- All results must be checked, acted upon, and fully documented in the patient’s clinical records
- Patients with clinically significant red cell antibodies will need a cross match sample sent at least 24 hours before surgery to allow time for blood bank to send the sample to the NHSBT and source compatible blood.
- Cause of anaemia must be determined/deduced and if necessary treated before elective surgery (see section 44.9).
- Coagulopathy should be diagnosed and treated if necessary prior to surgery
44.4. MANAGEMENT IN THE IMMEDIATE PRE-OPERATIVE PHASE

- If the patient will/may need blood during surgery send a cross match request to blood bank as early as possible on the day of surgery.
- Be explicit on the request form that this is for a patient having surgery that day and, if possible, state the time of surgery.
- Ensure you add contact details so that blood bank can call if there is any problem with the sample.

44.5. INTRA-OPERATIVE MANAGEMENT

- **Surgical technique** with meticulous attention to haemostasis should significantly reduce blood loss.
- **Correction of acidosis, hypothermia and hypoxia** will improve tissue perfusion and coagulation.
- **Haemostatic agents**: A number of different agents which are applicable in different surgical settings are available (see section 44.11).

44.5.1 INTRA-OPERATIVE CELL SALVAGE

Currently in the UK, intra-operative cell salvage is considered suitable for patients where estimated blood loss exceeds 1000ml. It should only be undertaken by trained operatives using equipment designed for the purpose of cell collection. Intra-operative cell salvage is only possible in ‘clean’ surgery such as orthopaedics; not in cancer- or bowel-surgery. Currently:

- ASPH uses intra-operative cell salvage for vascular, orthopaedic and obstetrics and gynaecology cases.
- FPH uses intra-operative cell salvage for vascular, orthopaedic and obstetrics and gynaecology cases.
- RSCH has the facility to hire an intra-operative cell salvage machine when needed.

44.6. POST-OPERATIVE MANAGEMENT

- **Anaemia (see section 44.9)**
- **Post-operative cell salvage**: Shed blood may be collected into specially designed postoperative drains in selected surgical procedures e.g. knee replacement surgery.

44.7. MASSIVE HAEMORRHAGE

The need for massive transfusion may arise during or following surgery. See section 39: Massive Haemorrhage Guideline.

44.8. MANAGEMENT OF PATIENTS WHO REFUSE BLOOD TRANSFUSION

Patients may refuse blood transfusion either because of fears about transmission of infection or for religious reasons (e.g. Jehovah’s Witnesses). Please see section 42: Refusal of Transfusions guideline for further guidance.
44.9. ANAEMIA MANAGEMENT PRE AND POST OPERATIVELY

44.9.1 DIAGNOSE AND TREAT ANAEMIA

- All FBC results should be reviewed within 2 working days.
- The diagnosis of anaemia should be based on WHO classifications (female <120g/l, male <130g/l). Abnormal results should be discussed with a member of the clinical teams and further investigated according to type of anaemia. Patients with anaemia of unknown cause should be referred in a timely manner before surgery. Patients with unexplained iron deficiency anaemia may require a gastroenterologist opinion. Patients with other types of anaemia may require a haematological opinion. Anaemia of chronic disease is very common in the elderly population and comparing to previous results and liaising with the patient’s GP can be helpful.
- Simple haematinic deficiency can be corrected with iron, B12 or folate replacement as appropriate.

44.9.2 PRE-OPERATIVE MANAGEMENT

Oral iron therapy should be considered/commenced:-

- All anaemic patients where MCV/MCH suggests iron deficiency anaemia (MCV <80 +/- MCH <27). Cause should be established before treatment is initiated unless clinically obvious (e.g. dietary)

* Patients with known chronic haematological conditions might need to be discussed with a haematologist if anaemic.

Intravenous iron (e.g. Ferinject) can be considered if oral iron is not tolerated or appropriate, but cause must be established first and patients must be medically managed

Erythropoietin is only used rarely in the pre-operative setting (e.g. patients who refuse blood products). It has no routine role in treating anaemia pre-operatively and is associated with an increased thrombotic risk.

44.9.3. POST-OPERATIVE MANAGEMENT

Once haemodynamically stable and euvoalaemic the decision to transfuse blood should be based upon the patient’s haemoglobin level and co-morbidity factors. The following ‘Hb trigger’ levels can be used though are a clinical guideline, and individual patient factors might lead to different triggers being used.

<table>
<thead>
<tr>
<th>HB trigger levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with known or suspected cardiovascular disease or respiratory disease</td>
</tr>
<tr>
<td>Post op major surgery</td>
</tr>
<tr>
<td>Otherwise fit patients</td>
</tr>
<tr>
<td>Intensive Care Unit (ICU) patients</td>
</tr>
</tbody>
</table>
44.10 COAGULOPATHY MANAGEMENT

44.10.1 PRE-OPERATIVELY: DIAGNOSE AND TREAT COAGULOPATHY
This will help to reduce surgical bleeding and avoid unnecessary exposure to blood and plasma products. Examples of how various coagulopathies should be handled are shown in the following table.

<table>
<thead>
<tr>
<th>Coagulopathy</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congenital e.g. haemophilia</td>
<td>Request a management plan from patient’s registered Haemophilia Centre. Major elective surgery should be performed at a registered haemophilia centre.</td>
</tr>
<tr>
<td>Abnormal coagulation screen</td>
<td>Postpone surgery until cause identified</td>
</tr>
<tr>
<td>Low platelet count, cause already known</td>
<td>Discuss with haematologist. Should be &gt; 50 for minor procedures ;Should be &gt;100 for critical site surgery; See separate platelet transfusion guideline.</td>
</tr>
<tr>
<td>Low platelet count, cause unknown</td>
<td>Consider referral to or discuss with haematologist</td>
</tr>
<tr>
<td>Warfarin</td>
<td>Refer to local guidelines. Bridging with UFH/LMWH might be required.</td>
</tr>
<tr>
<td>Unfractionated heparin infusion</td>
<td>Stop infusion for 4-6 hrs before surgery</td>
</tr>
<tr>
<td>Low molecular weight heparins</td>
<td>Prophylaxis dose allow 12 hrs; full dose allow 24hrs</td>
</tr>
<tr>
<td>Antiplatelet Agents: Clopidogrel, Aspirin, Dipyridamole, &amp; NSAIDs</td>
<td>Single agents often ok (with possible exception of clopidogrel); combinations should be stopped before surgery; Consider platelet transfusion if excessive bleeding.</td>
</tr>
<tr>
<td>New anticoagulant medication: Rivaroxaban, Dabigatran</td>
<td>Must be discontinued prior to surgery. Consult medication SPC.</td>
</tr>
</tbody>
</table>

Discontinuing oral anticoagulants must be done in a risk-assessed manner. Some patient (e.g. patients with metallic mitral valves) might require heparin bridging.

44.11 HAEMOSTATIC AGENTS
A number of different agents which are applicable in different surgical settings are available. These include:

(a) Antifibrinolytic agents are useful in cardiothoracic surgery or where hyperfibrinolytic syndrome is likely to occur (e.g. major cancer surgery)
   - Tranexamic acid 1g IV QDS.

(b) Heparin reversal
   - Protamine - 1mg per 100units heparin. The dose should be reduced by 50% for every hour passed since the heparin was given. It should be noted that Protamine only reverses up to 50% of low molecular weight heparins.

(c) Desmopressin (DDAVP) releases Von Willebrand factor & FVIII from stores. This can be useful in mild factor VIII deficiency and certain types of Von Willebrand’s disease. Management MUST be discussed with a haematologist.

(d) Topical procoagulants / antifibrinolytics
   - Topical thrombin
   - Spongestan swabs
   - Topical Tranexamic acid – mucosal application

(e) Wound Matrix
   - Applied fibrin – e.g. Tisseeal
   - Spray on albumin/glutaraldehyde – e.g. Biogluve
### ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC</td>
<td>Airway, Breathing, Circulation</td>
</tr>
<tr>
<td>A+E</td>
<td>Accident &amp; Emergency</td>
</tr>
<tr>
<td>AHTR</td>
<td>Acute Haemolytic Transfusion Reaction</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immune-Deficiency Syndrome</td>
</tr>
<tr>
<td>A-P</td>
<td>Anterior - Posterior</td>
</tr>
<tr>
<td>APPT</td>
<td>Activated Partial Thromboplastin Time</td>
</tr>
<tr>
<td>ARDS</td>
<td>Adult Respiratory Distress Syndrome</td>
</tr>
<tr>
<td>ASA</td>
<td>American Society of Anaesthesiologists</td>
</tr>
<tr>
<td>ASAP</td>
<td>As Soon As Possible</td>
</tr>
<tr>
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<td>DAT/DCT</td>
<td>Direct Antiglobulin/Coombes Test</td>
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<td>Duty Consultant Haematologist: during routine hours this means the consultant haematologist with lead responsibility for transfusion; outside routine hours this means the on call consultant haematologist.</td>
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<td>DDAVP</td>
<td>Desmopressin: a synthetic hormone used to stimulate the release of clotting factors into the blood, mainly used in von Willebrand's disease and mild haemophilia A.</td>
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<td>Disseminated Intravascular Coagulation</td>
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<td>Cross match blood test</td>
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Ashford & St Peters NHS Foundation Trust: Consent Policy

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Ashford & St Peters NHS Foundation Trust: Incident Reporting Policy

Ashford & St Peters NHS Foundation Trust: Learning, Education & Development Policy

Ashford & St Peters NHS Foundation Trust: Obstetric Haemorrhage

Ashford & St Peters NHS Foundation Trust: Management of Ante-partum Haemorrhage


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CMO’s National Blood Transfusion Committee 06/09/2006 document ‘Contingency Planning for Blood Shortages’ (gateway reference 6514)


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Dr V. James, Dr C. Taylor, “Alternatives to the Use of Donor Blood In Surgical Patients”. National Blood Service 2002

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The Blood Safety and Quality Regulations 2005 No. 50 and The Blood Safety and Quality (Amendment) (No.2) Regulations 2005 No. 2898


The Royal College of Surgeon’s of England “Code of Practice for the Surgical Management of Jehovah’s Witnesses” 2002


APPENDIX 1 Equality Impact Assessment Summary

Name of Authors:
- Dr John de Vos (Chair of Surrey Pathology Services Joint Hospital Transfusion Team/RSCH Consultant Haematologist)
- Nicola McVeagh (Lead Transfusion Practitioner, Surrey Pathology Services)

Policy: Blood Transfusion Policy and related guidelines

<table>
<thead>
<tr>
<th>Background</th>
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<tbody>
<tr>
<td>• Description of the aims of the policy</td>
</tr>
<tr>
<td>• Context in which the policy operates</td>
</tr>
<tr>
<td>• Who was involved in the Equality Impact Assessment</td>
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This policy fully supports the recommendations for clinical practice and training in transfusion medicine published by the British Committee Standards for Haematology (BCSH), National Patient Safety Agency (NPSA), Serious Hazards of Transfusion (SHOT) scheme and other national and local guidelines as referenced. This policy applies to all hospitals supplied by Surrey Pathology Services; namely Ashford & St Peters NHS Foundation Trust, Frimley Park Hospital NHS Foundation Trust and the Royal Surrey County Hospital NHS Foundation Trust and all satellite hospitals that use blood components/products supplied by those blood banks:

- BMI The Runnymede Hospital
- Walton Community Hospital
- Woking Hospice
- Woking Community Hospital
- Farnham Hospital and Renal Dialysis Unit
- Haslemere Hospital
- Milford Hospital
- Phyllis Tuckwell Hospice
- Sam Beare Hospice
- Spire Clare Park Hospital

The purpose of the policy is to assist all staff involved in any aspect of blood transfusion to ensure the right blood products/components are given to the right patient at the right time. It aims to ensure a standardised approach to the management of patients receiving blood products/components, reflecting best practice, thereby reducing the risks associated with transfusions. It also aims to ensure that any adverse events will be detected, treated and reported promptly. The policy includes guidelines for the use of specific components and products, and for the management of patients with specific needs (e.g. paediatric patients).

Those involved: Hospital Transfusion Committees (ASPH, FPH & RSCH); Joint SPS Hospital Transfusion Team; Clinical Lead for Transfusion; Transfusion Practitioner Team; Jehovah’s Witness Hospital Liaison Committee.

Methodology
- A brief account of how the likely effects of the policy was assessed (to include race and ethnic origin, disability, gender, culture, religion or belief, sexual orientation, age)
- The data sources and any other information used
- The consultation that was carried out (who, why and how?)

The aim of the policy and guidelines is to standardize practice relating to clinical need. The existing guidelines were reviewed by the Transfusion Practitioner Team to assess whether any patient groups would be impacted in terms of equality by the policy/guidelines. The document has also been sent for review to all members of the Hospital Transfusion Committees, the Joint Hospital Transfusion Team, to a representative of the Jehovah Witnesses and all of these committee members have been asked to forward it to any other interested parties. With regard to the Massive
Haemorrhage guideline this has been extensively commented on by Anaesthetists.

The Blood Transfusion Policy and related guidelines, and the activities of the Transfusion Practitioner Team are governed by the Department of Health, Care Quality Commission, the British Committee for Standards in Haematology, the Medicines and Health Care Regulatory Agency and the Serious Hazard of Transfusion Scheme. The policy and guidelines provide information in accordance with meeting the requirements of these bodies.

Patient suitability for the administration of blood is determined by clinical need and verbal consent to treatment is gained prior to transfusion. Any patient for whom blood products are not appropriate, or who declines transfusion, is offered alternative treatment or is counseled on the impact of declining treatment where the alternatives are not acceptable. Examples: Jehovah’s Witness patients or individuals refusing blood products may be offered iron supplementation, clotting factors, synthetic volume expanders, or other appropriate interventions.

Key Findings
- Describe the results of the assessment
- Identify if there is adverse or a potentially adverse impacts for any equalities groups

The policy and related guidelines are designed to standardise practice based on national evidence based guidance.
Race: no negative impact
Ethnic origin: no negative impact
Disability: no negative impact
Gender: Where treatments differ for men and women this is essential for the protection of unborn children and is based on national evidence based guidance.
Culture: no negative impact
Religion: the guideline for managing patients who refuse transfusion has been agreed with the Jehovah Witness Hospital Liaison.
Age: Paediatric considerations and consideration for female patients who are no longer of child bearing potential are evidence based and designed to protect the patient and the wider population in case of blood shortages.

Conclusion
- Provide a summary of the overall conclusions

The Trust has the required policy, guidelines and arrangements/services to meet individual needs in regards to Transfusion practice.

Recommendations
- State recommended changes to the proposed policy as a result of the impact assessment
- Where it has not been possible to amend the policy, provide the detail of any actions that have been identified
- Describe the plans for reviewing the assessment

No changes required.
The policy and equality impact assessment will be reviewed 3 yearly, as a minimum, and as practice and guidelines change.
### Guidance on Equalities Groups

<table>
<thead>
<tr>
<th><strong>Race and Ethnic origin</strong> (includes gypsies and travellers) (consider communication, access to information on services and employment, and ease of access to services and employment)</th>
<th><strong>Religion or belief</strong> (include dress, individual care needs, family relationships, dietary requirements and spiritual needs for consideration)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disability</strong> (consider communication issues, access to employment and services, whether individual care needs are being met and whether the policy promotes the involvement of disabled people)</td>
<td><strong>Sexual orientation including lesbian, gay and bisexual people</strong> (consider whether the policy/service promotes a culture of openness and takes account of individual needs)</td>
</tr>
<tr>
<td><strong>Gender</strong> (consider care needs and employment issues, identify and remove or justify terms which are gender specific)</td>
<td><strong>Age</strong> (consider any barriers to accessing services or employment, identify and remove or justify terms which could be ageist, for example, using titles of senior or junior)</td>
</tr>
<tr>
<td><strong>Culture</strong> (consider dietary requirements, family relationships and individual care needs)</td>
<td><strong>Social class</strong> (consider ability to access services and information, for example, is information provided in plain English?)</td>
</tr>
</tbody>
</table>