**Transfusion Policy**

**Brief Summary of Document:**
Addresses all aspects of transfusion with blood and blood components

**To be read in conjunction with:**
Policy for Consent to Examination and Treatment, Guideline for Irradiated and CMV negative blood, Guideline on the use of Prothrombin Complex Concentrate, Guideline on the Management of Massive Haemorrhage, Guidance on Incident Investigation

**Classification:**
Clinical

**Category:**
Policy

**Freedom Of Information Status:**
Closed

**Policy Number:**
278

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<th>Reviewer Name</th>
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**Authorised by:**
Sue Fish

**Job Title:**
Medical Director

**Signature:**
[Signature]
### Transfusion Policy

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#### Contact Details:

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<tr>
<th>Staff Group</th>
<th>Administrative/Estates</th>
<th>Allied Health Professionals</th>
<th>Ancillary</th>
<th>Maintenance</th>
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### Scope

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<th>DEPARTMENT ONLY</th>
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### Staff Group

- Administrative/Estates
- Allied Health Professionals
- Ancillary
- Maintenance
- Medical & Dental
- Nursing
- Scientific & Professional
- Other

### CONSULTATION

Please indicate the name of the individual(s)/group(s) or committee(s) involved in the consultation process and state date agreement obtained.

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<th>Committee(s)</th>
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### RATIFYING AUTHORITY

(in accordance with the Schedule of Delegation)

<table>
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<tr>
<th>NAME OF COMMITTEE</th>
<th>KEY</th>
<th>COMMENTS/POINTS TO NOTE</th>
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<tr>
<td>Clinical Policy Review Group</td>
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#### RATIFYING AUTHORITY

- **Name of Committee:** Clinical Policy Review Group
- **Key:** A

#### Date Equality Impact Assessment Undertaken

- **Date:** 18/8/2011
- **Group completing Equality impact assessment:** Rhian Fuge, Jackie Hooper, Liz Park, Huw Davies

### Comments/Points to Note

Please enter any keywords to be used in the policy search system to enable staff to locate this policy:

- Blood transfusion, platelets, FFP, transfusion reactions
### Transfusion Policy

#### Document Implementation Plan

| How Will This Policy Be Implemented? | This policy will be available in all clinical and laboratory areas via the Hywel Dda Intranet. A global email will be sent to all directorate leads, general managers, medical and nursing staff when this policy is approved. The BTC and HTT’s will work to raise awareness within each site. Hard copies of this document will be provided to sites outside of the Hywel Dda Health Board supplied by Bronglais Hospital blood bank. |
| Who Should Use The Document? | This policy applies to all staff involved in the transfusion process, covering the path from decision to transfuse, to collection, administration and documentation. It also applies to those in senior management roles with overall responsibility for ensuring compliance with Blood Safety and Quality Regulations (BSQR) 2005 (Statutory Instruments (SI) 2005/50, 2005/1098 and 2006/2013) |
| What (if any) Training/Financial Implications are Associated with this document? | Everyone involved in the blood transfusion process in any way needs to be provided with “timely, relevant & regularly updated training” in line with BSQR 2005(SI 2005/50,2005/1098 and 2006/2013) Training and competency assessment arrangements will vary with site, but it is the responsibility of each individual to ensure he/she is up-to-date with all requirements. Local information can be obtained from the relevant Transfusion Practitioner. |

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<th>Action</th>
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<tr>
<td>Global email to all directorate leads, general managers, medical and nursing staff advising of policy on intranet</td>
<td>Dr Fuge</td>
<td>Once approved</td>
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<td>Hard copies to sites outside of HDHB supplied by Bronglais blood bank</td>
<td>John Markham</td>
<td>Sept 2012</td>
</tr>
<tr>
<td>Training programmes for relevant staff</td>
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1. INTRODUCTION
This document replaces previous Carmarthenshire NHS Trust, Ceredigion & Mid Wales NHS Trust and Pembrokeshire & Derwen NHS Trust Hospital Transfusion Policies. It addresses the management of all aspects of transfusion with blood and blood components.

1.1. Key Contact Details
BLOOD BANK CORE OPENING HOURS- 09:00 to 17:00 Monday-Friday
EMERGENCY OUT OF HOURS SERVICE is provided by an on call State Registered Biomedical Scientist (BMS) for urgent requests outside of core opening hours. Clinical support is provided by a Consultant Haematologist contactable through switchboard at all times.

BRONGLAIS GENERAL HOSPITAL, ABERYSTWYTH
Blood Bank       Tel 01970 63 5945
Transfusion Practitioner     Tel 01970 62 8893

PRINCE PHILIP HOSPITAL, LLANELLI
Blood Bank       Tel 01554 78 3057
Transfusion Practitioner     Tel 01554 78 3065

GLANGWILI GENERAL HOSPITAL, CARMARTHEN
Blood Bank       Tel 01267 77 2459
Transfusion Practitioner       Tel 01554 78 3065

WITHYBUSH HOSPITAL, HAVERFORDWEST
Blood Bank       Tel 01437 773230
Transfusion Practitioner     Tel 01437 772428

A transfusion consists of the administration of blood or any of its components to correct or treat a clinical abnormality. A significant number of errors still occur in the process of administering blood and blood components as detailed in the Annual Serious Hazards of Transfusion (SHOT) reports 1998-2010. Some of these result in significant patient morbidity or mortality. Many of these errors occur because of human error in the preparation, collection or administration of blood and blood products. Each Health Board needs a comprehensive policy to cover all aspects of the blood transfusion process, relevant to all staff involved.

2. POLICY STATEMENT
It is the policy of Hywel Dda Health Board that patients requiring transfusions of blood and blood components receive them in a safe and timely manner, safeguarded from potential hazards by scrupulous attention to the procedures laid down in this document.

3. SCOPE
This policy applies to ALL staff involved in the transfusion process, covering the pathway from decision to transfuse to administration and documentation. It highlights best practice, drawing on informed local experience, national guidelines and review of published SHOT reports. It ensures compliance with Blood Safety and Quality Regulations (BSQR) 2005 (Statutory Instruments (SI) 2005/50, 2005/1098 and 2006/2013)
3.1. The process of transfusion involves:-
- The decision to transfuse
- Communication with the patient
- Completion of a written order to administer
- Collection and labelling of pre-transfusion samples
- Requesting appropriate blood or blood component
- Collection of the blood or component from the blood bank issue fridge
- Correctly completed bedside check
- Administration of blood or component to the patient
- Monitoring of the transfused patient
- Management and reporting of adverse events
- Correct completion of documentation

Each person involved in the process must ensure that they are competent and familiar with the procedure they are undertaking and that the procedure is relevant to their grade and job description.

4. AIMS
To provide a single reference document that describes the fundamental principles of transfusion practice across the organisation and develop a harmonious approach based upon agreed and evidence based best practice.

5. OBJECTIVES
To continue to examine the application of the fundamental principles of the transfusion process and to endeavour to develop further consensus.

6. RESPONSIBILITIES
6.1. Chief Executive Officer
To ensure that all appropriate health care professionals are informed of, and follow, the organisation’s policies on blood transfusion which ensure compliance with BSQR 2005 (SI 2005/50, 2005/1098 and 2006/2013)

6.2. Director of Therapies and Health Science
To ensure that all appropriate health care professionals are informed of, and follow, the organisation’s policies on blood transfusion which ensure compliance with BSQR 2005 (SI 2005/50, 2005/1098 and 2006/2013)

6.3. Associate Medical Directors
To ensure that staff involved in the transfusion process, within the scope of their responsibility, have undertaken appropriate training and competency assessments ie BCSH Standards for pre-transfusion sampling and administration of blood for safe transfusion practice and can comply with BSQR 2005 (SI 2005/50, 2005/1098 and 2006/2013).

6.4. Blood Transfusion Committee
To promote safe and appropriate blood transfusion practice through local protocols based on national guidelines
- Communication and impact assessment of national guidance and legislation
- Develop and implement local guidance
- Continuous improvement processes in relation to safe blood transfusion practice
To audit the practice of blood transfusion against the blood transfusion policy and national guidelines, focusing on critical points for patient safety and the appropriate use of blood

- Review and monitoring of adverse events
- Develop action plans for critical incidents

Lead multi-professional audit of the use of blood within the organisation, focusing on specialities where demand is high, including medical as well as surgical specialities, and the use of platelets, plasma, and other blood components as well as red cells.

- Development of an annual audit schedule responsive to the needs of the service

Regularly review and take appropriate action on data on blood stock management, wastage and blood utilisation provided by the Blood Stocks Management Scheme (BSMS) and other sources

- Review and audit blood stock management
- Respond to service needs and national constraints

Provide feedback on audit of transfusion practice and the use of blood to all staff involved in blood transfusion within the organisation.

- Review National Comparative Audits and All Wales Audits in Transfusion Practice and implement recommendations to promote best practice
- Benchmark best practice within the organisation and across Wales
- Review and implement Serious Hazards Of Transfusion (SHOT) recommendations

Develop and implement a strategy for the education and training for all clinical, laboratory and support staff involved in blood transfusion

- Provision of comprehensive training programmes including induction and orientation of staff
- Staff to include- medical, nursing, laboratory, phlebotomy and portering staff
- Review and monitor competency based training programmes
- Review e-learning training packages to ensure fitness for purpose.

Promote patient education and information on blood transfusion including the risks of transfusion, blood avoidance strategies and the need for the patient to be correctly identified at all stages in the transfusion process

- Dissemination of patient education leaflets regarding safe blood transfusion, transfusion alternatives and cell salvage.
- Promote awareness of emerging transfusion issues within the organisation i.e. transfusion awareness raising events
- Participate in national transfusion awareness events

Modify and improve blood transfusion protocols and clinical practice based on new guidance and evidence

- Monitor and review blood transfusion related policy and procedures
- Compliance with Medicine in Healthcare Regulatory Authority (MHRA) and Clinical Pathology Accreditation (CPA) quality standards.
- Implementation of Serious Hazards Of Transfusion (SHOT) recommendations
HYWEL DDA LOCAL HEALTH BOARD

Be a focus for local contingency planning for and management of blood shortages
- Respond to Welsh Blood Service Strategy / Planning as requested
- Participate in national and regional surveys of the implementation of the action plan in Better Blood Transfusion

Contribute as required to the Clinical Advisory Group, and through them, to the Blood Implementation Group (BIG) and Blood Policy Group and provide representation as appropriate to the Welsh Implementation Group (WIG)

Contribute to the development of clinical governance
- Continuously improve the safety of the blood transfusion process, taking advantage of developments in technology
- Continuous quality improvement
- Research & Effectiveness
- Risk Management
- Clinical Audit
- Public and patient involvement

Implementation and development of effective clinical infrastructure promoting good transfusion practice with the establishment of local Hospital Transfusion Teams (HTT) within each county of Hywel Dda LHB.
- Support and maintain HTT resources
- Develop an annual work plan for HTT
- Monitor and review HTT outcomes

6.5. County Hospital Transfusion Teams (HTT)
- Implement decisions made by the Hywel Dda Blood Transfusion Committee (BTC). Encourage incident reporting and respond promptly to adverse events, and to identify causative factors through root cause analysis. Identify corrective and preventative actions. Provide incident reporting feedback through the analysis of tracking and trending information. Organise the arrangements for staff training and updating in transfusion.

Instigate and encourage participation in transfusion related audits (e.g. National Comparative Audits)

6.6. Hospital Blood Bank Managers
To ensure blood bank processes, procedures and equipment meet current EU Directives. To date, 2002/98/EC and 2004/33/EC have been transposed into UK law through the BSQR 2005 (SI 2005/50, 2005/1098 and 2006/2013).
To be a member of the appropriate county Hospital Transfusion Team.

6.7. Blood Bank Biomedical Scientists
To maintain competence and practice within the scope of Good Manufacturing Practice and the laboratory Standard Operating Procedures (available within each blood bank)

To monitor the practice of safe and appropriate blood and blood component use throughout the organisation.
HYWEL DDA LOCAL HEALTH BOARD

To provide advice and guidance on aspects of Blood Transfusion Science that lie within the scope of their HPC registration and competence.

To identify, investigate, report and document Blood Transfusion Quality Incidents and enable and encourage the haemovigilance process.

6.8. **Transfusion Practitioners**
- To be a member of the appropriate county Hospital Transfusion Team.
- To facilitate the implementation of changes in transfusion practice on behalf of the Blood Transfusion Committee.
- To manage the delivery of transfusion training within the organisation.
- To facilitate multidisciplinary audit within the organisation.
- To promote transfusion incident reporting.
- To liaise with other national and local bodies involved in promoting good transfusion practice.

6.9. **County Lead Consultant Haematologist for Transfusion**
To be a member of the HTT within their county and work with other HTT members to facilitate delivery of high quality transfusion practice in accordance with national guidelines.

6.10. **Consultant Haematologists**
- To encourage the practice of safe and appropriate blood and blood component use throughout the organisation.
- To provide advice on all aspects of the transfusion process as laid out in this document and to participate / contribute to HTT/ BTC within their county as required.

6.11. **Medical Staff Involved in the Blood Transfusion Process**
- To be able to assess the clinical appropriateness of blood transfusion or request advice from senior team members.
- To be aware of the potential risks and complications of transfusion and to be able to discuss these with the patient.
- To be able to take pre-transfusion blood samples safely with appropriate identity checks.
- To prescribe blood and blood components in appropriate quantities and at suitable rates to meet the needs of individual patients.
- To record the indication for transfusion and administration of the blood, blood components & blood products in the patients’ records.
- To be aware of their individual hospital’s requirements for recording traceability of blood, blood components and blood products and complete the necessary documentation.
- To be aware of the cause of transfusion reactions, and to be capable of appropriate management of adverse reactions. (See appendix 10.1)
- To be aware of local reporting procedures: Hywel Dda Health Board policy “Guidance on Incident Investigation” (HD/QISU/006) and DATIX incident reporting. [link?]

6.12. **Senior Nurses**
To ensure that staff within their scope of responsibility, involved in the transfusion process, receive appropriate training and competency assessments in safe transfusion practice and are aware of their requirement to comply with the BSQR 2005 (SI 2005/50, 2005/1098 and 2006/2013).
6.13. **Nursing, Midwifery and ODP Staff**
- To be able to administer blood transfusions safely and ensure correct bedside checking of identity in accordance with blood administration competency. (See Section 7.12)
- To be aware of the requirements for patient monitoring and appropriate action in the event of a transfusion reaction. (See section 7.13 and appendix 10.1)
- To be aware of local requirements for traceability of blood, blood components & blood products and complete the necessary documentation.
- Where appropriate, to be aware of the storage requirements of blood and blood components in their clinical areas. (E.g. satellite fridges) and ensure that when the cold chain is breached appropriate steps are taken.
- To be aware of local adverse reaction and incident reporting processes.

6.14. **Portering, ODA, Volunteer & Other Competency Assessed and Authorised Staff**
- To be aware of requirements for traceability of blood, blood components & blood products and be able to complete the necessary documentation.
- To be aware that in general no more than one unit of blood must be removed at any one time, unless prior arrangement has been made with the blood bank staff or the clinical situation dictates a demand for multiple units.
- To be able to collect blood safely with appropriate identity checks and record keeping. (See Section 7.9)

7. **GUIDELINES FOR THE TRANSFUSION PROCESS**

7.1. **The Decision to Transfuse**

The decision to transfuse must be made by a doctor or alternatively a midwife or qualified nurse working to an agreed protocol. Although it is accepted that clinical judgment plays an essential part in the decision to transfuse, the following recommendations adapted from Guidelines for the clinical use of red cell transfusion. British Committee for Standards in Haematology (2001) will serve to help clinicians decide when blood transfusion is appropriate, and to minimize unnecessary patient exposure to donor blood. The reason for transfusion must be entered into the patient’s notes with additional documentation on whether the desired outcomes were achieved and detailing the occurrence and management of any adverse event.

7.1.1. **Indications for red cell transfusion**

Each indication has been assigned a number, which may be used by clinicians when requesting blood, or for purposes of audit.

7.1.1.1. **R1. Acute blood loss**

Objective: to maintain circulating blood volume and haemoglobin (Hb) concentration > 7 g/dl in otherwise fit patients, and > 8g/dl in elderly patients and those with known cardiovascular disease.

- 15-30% loss of blood volume (800-1500ml in an adult): transfuse crystalloids or synthetic colloids. Red cell transfusion is unlikely to be necessary.
- 30-40% loss of blood volume (1500-2000ml in an adult): rapid volume replacement is required with crystalloids or synthetic colloids. Red cell transfusion will probably be required to maintain recommended Hb levels.
- >40% loss of blood volume (>2000ml in an adult): rapid volume replacement including red cell transfusion is required.

7.1.1.2. **R2. Hb concentration below 7g/dl.**
7.1.1.3. R3. Hb concentration below 8g/dl
in a patient with known cardiovascular disease or significant risk factors for cardiovascular
disease (e.g. elderly patients and those with hypertension, diabetes mellitus, peripheral
vascular disease).

7.1.1.4. R4 Critical Care
Transfuse to maintain Hb above 7g/dl.

7.1.1.5. R5 Post-chemotherapy
There is no evidence-base to guide practice. A transfusion threshold of 8 or 9g/dl is suggested.

7.1.1.6. R6 Radiotherapy
Transfuse to maintain Hb above 10g/dl.

7.1.1.7. R7 Chronic anaemia
Transfuse to maintain the Hb just above the lowest concentration not associated with
symptoms of anaemia. Many patients with chronic anaemia may be asymptomatic with Hb
above 8g/dl.

7.2. Consent to Transfuse
Formal signed consent from a patient for blood transfusion is not a legal requirement; however
it is good clinical practice to discuss treatment options with the patient before reaching a
decision to prescribe blood or blood components. The bi-lingual information leaflets “Will I
need a blood transfusion?” and “Iron in Your Diet” are available from transfusion practitioners
for use on wards, day units and pre-assessment clinics to support this discussion.

7.3. The Written Order to Administer Blood or Blood Components
Blood and blood components require a written order to administer which must be completed by
a doctor. The order to administer (“prescription”) should be written on the transfusion record
sheet (Bronglais and Withybush Hospitals) or the All Wales prescription chart on the
intravenous section (Carmarthenshire) or other locally approved documentation such as
anaesthetic record. An All Wales Transfusion Record is in preparation which will replace all
other documents and be used across all sites.

The written order must specify:-

- the blood component to be administered
- the infusion rate (usually 2-3 hours per unit for red cells and 30 minutes per unit for
  platelets)
- any specific requirements – e.g. irradiated or CMV negative
- any concomitant medication to be given
- a separate entry must be made for each unit
- use of blood warmer if applicable (Cold Haemaglutinin disease or large volume
  transfusion in patients susceptible to hypothermia)

7.4. The Timing of Pre-Transfusion Samples
When a transfusion has been given more than 72 hours earlier but within the last 3 months the
following timings should be followed in order to minimise the risk of transfusion reactions due
to alloantibody formation.
Patient transfused within: Sample to be taken not more than:

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<tr>
<td>3-14 days</td>
<td>24 hours before transfusion</td>
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<tr>
<td>15-28 days</td>
<td>72 hours before transfusion</td>
</tr>
<tr>
<td>29 days to 3 months</td>
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In situations where patients are being repeatedly transfused, a daily sample is not a requirement. These patients should be screened for the development of irregular antibodies at least every 72 hours.

7.5. **The All Wales Transfusion Request Form**

On the advice of the All Wales Clinical Advisory Group a zero tolerance policy operates for samples from known patients which do not comply with the following requirements. Samples will not be processed and the patient must be rebled.

The All Wales blood transfusion request form must be completed by a doctor or on his/her behalf by a Registered Nurse, Registered Midwife or Operating Department Practitioner who must also give the name of the prescribing doctor. Addressograph labels may be used to provide the patient identity details. The following information must be completed:

- first name
- last name
- date of birth
- first line of address
- NHS number or hospital number
- collector’s signature
- confirmation of positive identification of patient

In the unknown patient, the request form should contain the following information although a strict zero tolerance policy will not be applied:

- unique patient identification number (A&E or hospital number)
- gender
- approximate age of patient eg child/young adult/elderly adult
- time of admission
- collector’s signature
- confirmation of positive identification of patient

The request form should also contain the following handwritten information:

- test or blood component required
- any special requirements – e.g. irradiated or CMV Negative
- the number of units required
- the date and time required, including the degree of urgency
- the patient’s location (ward or department)
- the form must be signed and dated
- the patient’s diagnosis
- the reason for the request or planned procedure
- the requestor’s name clearly printed & bleep number or extension
- the name of the consultant responsible for the patient
In the case of patients who have received a stem cell or solid organ transplant, this should be noted on the form.

7.6. Maximum Surgical Blood Ordering Schedule (MSBOS)
The MSBOS provides recommendations on the maximum number of units to order for common elective procedures. Its aim is to minimise wastage in elective surgery by correlating as closely as possible the amount of blood crossmatched to the amount of blood transfused. The system is not rigid and allows for flexibility. It may be necessary to vary from the recommended requirements in certain circumstances. In these instances, the request must be discussed with the laboratory. Crossmatched blood is usually reserved for 48 hours from the proposed date of surgery. In the event of the surgery being cancelled or postponed, the laboratory must be informed. The reservation period may be extended if practicable.

7.7. Pre-Transfusion Sampling
Pre-transfusion samples must be taken by a member of staff able to take blood who has been trained and competency assessed specifically in the taking of pre-transfusion samples and locally approved to do so (BCSH Standards 2009). All patients who are to receive a transfusion of blood or blood components must wear a patient identification wristband, including day case patients. Only one patient must be sampled at a time.

7.7.1. Positive patient identification is essential
• Ask the patient to state their first name, last name, date of birth and first line of address as minimum. If the patient is unconscious or otherwise unable to provide verbal identification eg neonates, children, confused etc the wristband must be checked and (wherever possible) a relative/carer or responsible person is asked to verify ID.
• Read the patient’s identity wristband.
• Confirm that the patient’s details correspond, and are identical to those on the completed request form.

If any discrepancies are noted in the patient details recorded on the request form, patient’s wrist band or those given verbally by the patient, please bring to the attention of the appropriate nursing or medical staff.

7.7.2. Sample tube labelling
The sample must be taken into the appropriate sample tube. This must be labelled at the patient’s bedside immediately after the tube has been filled.
• The label must be hand written – the use of addressograph labels is NOT permitted.
• Complete patient’s first name and last name, date of birth, NHS number / hospital number and the first line of the address.
• All details must be accurate and legible!
• The person who took the blood must complete, sign, time and date the label.
• Sample tubes must not be pre-labelled.
• In the case of an unidentified casualty in an emergency situation, the acceptable minimum is the hospital number or A&E number, gender, date and time of admission and location, signed and dated by the person who took the sample.
• For infants less than 4 months old, a sample must be taken from the mother as well as the child if transfusion is required.
7.8. **Provision of Blood from the Hospital Blood Bank**

7.8.1. **Electronic Issue**
Electronic issue (EI) will allow blood to be available (usually within minutes) providing all the following criteria are fulfilled:
- There must be a historical blood group and negative antibody screen result in the hospital computer record (not notes).
- A second sample which must be available in the laboratory and confirms the previous blood group and negative antibody screen result.
- The second sample complies with the timing requirements stated in section 7.4.
- It is the responsibility of the clinician managing the patient to ensure and confirm the availability of blood or it may be delegated to a member of his team.
- Electronic Issue is currently NOT available at Bronglais Hospital.

7.8.2. **Serological Crossmatch**
A serological crossmatch is performed for all patients requiring transfusions at Bronglais Hospital. It is also performed at Withybush, Glangwili and Prince Philip Hospitals when a patient is unsuitable for EI. A crossmatch can be performed and blood issued within 45 minutes of receipt of a sample. However, samples from patients with a positive antibody screen will take longer to process. Where routine non-urgent transfusion is required and serological crossmatching is indicated because of the non suitability for EI due to a single transfusion record, then a second sample may be requested by blood bank. Once processed, Electronic Issue will be available with the added reassurance of correct ABO determination.

7.8.3. **Emergency Uncrossmatched Units**

*WHEN BLOOD IS REQUIRED IN AN EMERGENCY, THE DEGREE OF URGENCY SHOULD BE DISCUSSED WITH BLOOD BANK STAFF BY TELEPHONE.*

Uncrossmatched, group specific blood can be issued within 10 minutes of sample receipt, at the responsibility of the requesting doctor.

In a life-threatening emergency, when blood is required immediately, there are **2 units of emergency group O Rhesus negative blood** available in the Issue Bank in Bronglais, Withybush and Prince Philip hospitals. This is for issue at the responsibility of the prescribing doctor, and can be collected by any member of staff authorised to do so. Notify blood bank staff immediately that the emergency uncrossmatched units have been collected. In Glangwili hospital the emergency O negative blood is kept in the blood bank fridge and issued by blood bank staff. This blood is Group O, CDE negative, Kell negative. As with any uncrossmatched blood, it carries a small risk of a transfusion reaction in patients with unknown antibody status.

7.9. **The Collection of Blood and Blood Components from Controlled Storage**
Removal of blood and blood components from temperature controlled storage within blood bank has been identified as a major source of error in SHOT Annual Reports.

7.9.1. **Staff responsible for this procedure**
Any staff group who have been suitably trained and competency assessed (BCSH Standards, 2009) in the collection process can collect blood or blood components from the blood bank temperature controlled storage facility.

In exceptional and life threatening circumstances untrained staff can transport blood or blood components from blood bank to the patient.
HYWEL DDA LOCAL HEALTH BOARD

Before the blood or blood component is collected from the laboratory, there are a number of preparatory checks which can be carried out for a safe transfusion and also to prevent wastage of blood:

- Is the patient informed of the procedure and has informed verbal consent been obtained?
- Is there a correctly completed prescription for the blood or blood component to be transfused?
- Does the patient have patent venous access? The blood or blood component SHOULD NOT be collected until this has been established.
- Are patient’s vital signs stable for transfusion?
- Are all the necessary pieces of equipment to hand – pump (if used) and correct blood or platelet giving set?
- Is there sufficient competent staff to monitor the patient during transfusion, and to act if any adverse events or reactions occur?
- Where patients are for transfer to any other ward or other department for investigations, it should first be confirmed that they are able to accommodate blood transfusion.
- Blood should not be collected if the administration of IV medications or other clinical intervention prevents immediate infusion and significant delay.

7.9.2. Suitable locations for blood storage

Blood must only be stored in designated blood storage refrigerators. Ward or domestic refrigerators must not be used for storage of blood and blood components even for a very short time. Platelets must be stored at 20-24 °C and administered immediately upon receipt. FFP and cryoprecipitate are stored frozen, defrosted in blood bank before issue and should be used as soon as possible. In case of unavoidable delay in administration, FFP may be stored at 4 °C in an approved blood storage refrigerator providing the infusion is completed within 24 hours of thawing. If delay in transfusing cryoprecipitate is unavoidable, the component should be stored at ambient temperature to avoid reprecipitation and used within 4 hours.

7.9.3. Transport of blood and components

Within the hospital environment, blood and blood components must only be transported in appropriate boxes or bags provided by the blood bank. These must only be used to transport blood between the blood bank, designated storage refrigerators and clinical areas and NEVER used for storage.

Off-site transfer of blood and components may occur for the following reasons:

1. Transfer of crossmatched blood or blood component for a specific patient, for transfusion at a community or peripheral hospital site, or in an out-of-hospital setting by the Acute Response Team (ART), such as the patient’s home or nursing home.
2. Transfer of a patient. Transfer of blood and components with a patient is required in exceptional circumstances only, and should be reserved for patients who will need transfusing during the journey. Two units of blood should be sufficient.

All blood and components which are transferred off-site require appropriate packing and documentation. Blood should never be transferred off-site without the knowledge of blood bank staff.

Blood and components will be packed in validated transport boxes by blood bank staff to maintain the cold chain. Documentation will also be issued to ensure a full audit trail of the transferred component. Each box will contain blood for only one patient. Separate boxes will
be used if more than one patient at any site requires transfusion. At sites which receive multiple units in any transport box, if any unit is removed from the box, this should be done as quickly as possible and the box resealed without disturbing any of the lower layers so as to maintain the correct temperature.

A maximum of 2 units can be stored in this way for a maximum of 6 hours; the transfusion must be completed within a maximum of 4 hours of it being taken out of the transport box.

If blood is stored in the transport box for more than 6 hours it must not be transfused, blood bank staff must be informed and the blood returned to the appropriate blood bank for disposal.

7.9.4. **Quantity of blood and blood components to be removed from the storage facility**

Only one unit of blood should be removed from the blood bank refrigerator at a time for each patient unless extremely rapid transfusion of large quantities of blood is needed. Platelets are issued in single units for immediate use. FFP is usually issued in multiple units and cryoprecipitate is pooled and may be issued in multiple pooled units.

Where appropriate, multiple units can be removed together if they are to be transferred to another designated blood storage facility (e.g. satellite fridge) with a fully auditable register available.

7.9.5. **Patient and blood or blood component identification check**

Staff removing blood from a designated storage facility must bring with them a blood collection form or collection slip or administration record containing the following patient information:

- first name
- last name
- date of birth
- first line of address
- NHS number or hospital number

The patient details must be checked against the blood bank register and the label attached to the blood unit. ANY discrepancy must be brought to the attention of blood bank staff IMMEDIATELY. (Out of hours, contact on call Biomedical Scientist for Haematology via switchboard).

The blood unit donation number and blood group on the bag and on the compatibility tag must be checked against the blood bank register.

7.9.6. **Documenting the removal of a blood unit from a storage facility**

The blood bank register is a legal document and accurate records must be maintained. The blood bank register must be signed legibly to confirm removal of the appropriate unit. This entry must be dated and timed. All entries must be written in permanent black ink. If a mistake is made, the error should be struck through with a single line and rewritten. Use of correction fluid is not permitted.

Some blood products and components are collected from the blood bank directly and blood bank staff will check the patient identification and sign out the component or product.

7.9.7. **Collection of blood by untrained staff**

In exceptional life threatening circumstances untrained staff may be asked to collect blood. There is evidence from SHOT Reports that transfusion errors are more likely to happen in
HYWEL DDA LOCAL HEALTH BOARD

these emergency situations and therefore it is essential that deviation from standard practice is minimised.

The person collecting blood must bring written confirmation of the patient’s identification in the normal manner. The laboratory staff, whenever possible, should be warned in advance that an untrained person will be collecting blood. The laboratory staff, whenever possible, will ensure the unit of blood which matches the written identification is dispensed and the blood bank register completed in the normal manner. Receipt of the blood must recorded by a trained member of staff in the clinical area and the correct identification of the unit checked against the documentation as instructed above.

7.10. **The Arrival of Blood or Blood Component in the Clinical Area**
When a unit arrives in the clinical area, an appropriately trained and competent member of staff must check and sign the collection slip in Carmarthenshire and Bronglais or the blood transfusion administration report in Withybush to acknowledge receipt of the correct unit. The patient details on the accompanying documentation must match those on the blood, blood component or blood product. The date and time of receipt, as well as the donation number must be documented on the accompanying documentation. The member of staff receiving the blood will retain the accompanying documentation which should be returned to blood bank. Units of blood, blood components or blood products must never be left unattended in a clinical area.

7.11. **The Return of Un-Transfused Units**
The transfusion of the blood must commence as soon as reasonably possible and should begin within 30 minutes of it being delivered to the clinical area. If there is a delay the blood may still be transfused on condition that the transfusion will be completed within 4 hours from the removal from refrigeration.

If there is a delay of more than 30 minutes and the transfusion cannot go ahead for whatever reason blood bank staff must be informed and the unit returned to the blood bank for disposal. The unit **must not** be placed back in the refrigerator. The return must be recorded as discarded in the blood bank register. Document on the traceability tag the reason for return of the unit, the time and the name of the member of staff returning unit. The fully completed compatibility /traceability tag must be available for audit purposes.

If a delay is anticipated, but the unit of blood was collected less than 30 minutes previously the unit must be immediately be returned to blood bank and handed to blood bank staff and details documented in the blood bank register. This unit is still available for transfusion and can be withdrawn later.

**However the total time from removal from the refrigerator until completion of transfusion must not exceed 4 hours.**

Any blood components (other than red cells) which are returned to the Laboratory MUST NOT be placed in the refrigerator – they must be handed to a member of laboratory staff.

7.11.1. **Discarding punctured or partially transfused blood or blood components bags**
Bags which have been accidentally punctured when the giving set is inserted, or units of blood that have not been fully transfused within 4 hours of removal from the blood bank fridge.
If any blood has been transfused to the patient documentation must be completed as if the transfusion was completed normally. If no blood was given to the patient then the compatibility/traceability tag should be returned with the word “discarded” written on the tag and a brief note as to why. These bags can be disposed of at ward level except in Withybush where the bag should be disposed of in nominated bins outside blood bank.

7.11.2. Returning blood products because of a possible transfusion reaction where the blood transfusion has been stopped
Place the unit of blood with giving set attached in a sealed bag and return to blood bank with a transfusion request completed with the patient’s details and the clinical details “possible transfusion reaction” or a transfusion investigation form where available. Phone blood bank to discuss the case and they will advise on any additional samples needed.

7.11.3. Disposal of used packs at end of transfusion
In Pembrokeshire and Ceredigion, the packs are to be returned to the supplying blood bank in a suitable transport bag or box. In Carmarthenshire, the blood packs are disposed of in clinical waste containers at the site of transfusion.

7.12. The Administration of Blood and Blood Components
Errors at the time of administration of blood or blood components are the most frequently documented source of error culminating in the transfusion of the wrong blood.

7.12.1. Staff able to administer blood and blood components
Blood and blood components can only be administered by a doctor, or a nurse holding current registration of the NMC Professional Register as a Registered General Nurse (RGN), Registered Sick Children’s Nurse (RSCN) or Registered Midwife (RM), or a qualified Operating Department Practitioner (ODP). Staff should be appropriately trained and competency assessed to the All Wales Transfusion Package standards produced by the Better Blood Transfusion Team at Welsh Blood Service.

7.12.2. Inspection of the blood or blood component
On arrival of the blood in the clinical area, the blood bag should be gently agitated and inspected for expiry date, leakage, haemolysis, abnormal discolouration and large blood clots, by a member of qualified staff, before administration.

If there is evidence of any of the above the unit must not be used and must be returned to the blood bank with details of the defect on the traceability tag, or an accompanying note. The unit must not be returned to the blood bank refrigerator but should be handed to blood bank staff.

7.12.3. Identity check of the patient and blood unit
The bedside check is a vital step in preventing transfusion error, and staff must be vigilant in checking that the patient’s identification details exactly match those on the blood traceability label.

The bedside check should be carried out by one member of qualified staff who takes responsibility for the check and signs the appropriate documentation. If the check is done by two people it should be done independently with one person taking overall responsibility.
The bedside check should follow these steps:

- The patient must be positively identified by asking the patient to state his/her first name, last name, date of birth and first line of address. Where this is not possible the patient should be identified by a member of staff working in the clinical area.
- The details given must be checked against the identity wrist band.
- The patient identification details listed above which are provided verbally if possible, and which appear on the wristband must be identical with those on the compatibility/traceability tag and the written order to transfuse.
- The blood group and unit donation number on the blood unit label and the compatibility/traceability tag must be checked and found to be identical.
- The unit of blood must be checked for compliance with any special requirements as indicated on the written order e.g. irradiated or CMV negative.
- The blood component must be checked to ensure that it has not passed its expiry date or expiry time in the case of a product with a short shelf life. Transfusion should be completed by 12 midnight on the date of expiry.
- The blood transfusion written order must be signed by the member of staff responsible for the bedside identity check and the date and time of commencement of transfusion of each unit noted. This must be provided even if the transfusion is only partially completed.
- The compatibility/traceability tag must be completed at the bedside and returned to blood bank in accordance with local procedure.

If any discrepancies are found during the bedside identity checks which are not covered by a specific comment on the traceability tag, then the unit must not be transfused, but returned to blood bank. Blood bank staff should be contacted for advice.

7.13. The care and monitoring of the transfused patient

The majority of transfusion reactions are self limiting events. However, ABO incompatible reactions can be life threatening and occur usually within the first 15 minutes from the commencement of transfusion of a unit of blood. However, any patient may react at any time during and even after a transfusion.

7.13.1. Best location and scheduling for transfusion

Because visual observation of the patient is often the best way of assessing patients undergoing blood transfusion, they should only be carried out in clinical areas where the patient can be readily observed by clinical staff. Transfusion whenever possible should be scheduled for daytime working hours. Night time transfusions should be avoided unless clinically indicated.

7.13.2. Documenting of time of transfusion

The start and finish times of the transfusion of each unit should be clearly indicated on the observation charts, traceability tags and all associated documents.

7.13.3. Vital signs

The patient’s temperature, pulse, blood pressure and respiratory rate should be measured and recorded before the start of each unit. The temperature, pulse, blood pressure and respiratory rate should be measured and recorded again 15 minutes after the commencement of each unit. This 15 minute check is vital to help detect an immediate transfusion reaction. Additional
checks may be required during the transfusion as dictated by the clinical condition of the patient. All vital signs must be measured and recorded again at the end of each unit.

Unconscious or anaesthetised patients are more difficult to monitor for signs of a transfusion reaction. Hypotension, uncontrolled bleeding due to disseminated intravascular coagulation, haemoglobinuria or oliguria may be the first indications of an acute haemolytic transfusion reaction in these patients.

7.13.4. Management of transfusion reactions
When there is any suspicion that a patient is reacting to a unit of blood, blood component or blood product, the transfusion must be stopped immediately. The patient’s vital signs should be checked and recorded. At this stage, the patient identity check must be repeated, to ensure that the correct patient is receiving the correct transfusion. If any discrepancies are found during this check, blood bank must be contacted immediately – another patient may be at risk of being given incompatible blood.

Any suspected transfusion reaction where the transfusion is discontinued must be reported to staff of the relevant blood bank at the earliest opportunity. A document describing blood transfusion reactions and their management is available in this document and should be readily accessible in all clinical areas. (Appendix 10.1)

7.14. Reporting of Adverse Events and Incidents
Reporting of adverse events and “near miss” events is a mandatory requirement. BSQR 2005 (SI 2005/50, 2005/1098 and 2006/2013)

7.14.1. Staff responsible for reporting adverse events
Staff involved in the transfusion process need to report any adverse events or incidents to the nurse in charge of the clinical area and the medical practitioner responsible for the patient. The nurse in charge of the patient’s care is responsible for completing a Hywel Dda Health Board electronic DATIX or other incident form (see Health Board Policy on Adverse Incident Reporting)

The medical officer to whom a transfusion related adverse event has been reported is responsible for reporting it to the blood bank and for complying with requests for samples, investigations and documentation required for further investigation. Discussion must take place regarding the necessity and urgency of any further transfusion.

The HTT will fully investigate any transfusion related quality incidents and transfusion reactions and assess each individually for escalation to mandatory reporting. Designated members of the HTT are responsible for reporting serious adverse events to SABRE (Serious Adverse Blood Reactions and Events).

8. TRANSFUSION TRAINING
Everyone involved in the blood transfusion process in any way needs to be:

- Competency assessed by trained assessors using the All Wales Transfusion Competency Assessment Package in those tasks relevant to their role.
  1. **Pre-transfusion Sampling**: assessment required once every 3 years
  2. **Collection of Blood and Blood Components**: assessment required bi-annually
3. **Administering Blood and Blood Components**: assessment required once every 3 years

Training and competency assessment arrangements will vary with site, but it is the responsibility of each individual to ensure he/she is up-to-date with all requirements. Local information can be obtained from the relevant transfusion practitioner.

9. **MONITORING AND REVIEW**
The county HTT’s will monitor incidents relating to transfusion including root cause analysis, tracking and trending incidents and reporting to necessary bodies for further action. Training of all personnel involved in the transfusion process will be overseen by the transfusion practitioners and the HTT’s and records of competency assessments will be kept. Each acute hospital site within Hywel Dda Health Board will participate in National Comparative audits relating to transfusion where relevant and results will be presented in hospital audit meetings. The Hywel Dda Blood Transfusion Committee is responsible for reviewing and auditing this policy. This policy will be reviewed after 3 years.
10. APPENDIX 1 - RECOGNITION AND MANAGEMENT OF ACUTE TRANSFUSION REACTIONS

Acute complications of transfusion
These are: acute haemolytic transfusion reaction; reaction to infusion of a bacterially contaminated unit; transfusion-related acute-lung injury (TRALI); acute fluid overload and severe allergic reaction or anaphylaxis. Serious or life-threatening acute reactions are rare but new symptoms or signs that appear while a patient is being transfused must be taken seriously as they may be the first warnings of a serious reaction. It can be difficult to determine the type of reaction in the early stages.

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**Figure 1 - Acute transfusion reactions**

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(Flowchart showing acute transfusion reactions and actions to take based on symptoms/signs.)

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*Figure 1 - Acute transfusion reactions [Figure 1 resources: View large format, download as gif, pdf or Word™ document]*
10.1 **Acute haemolytic reaction**  
Incompatible transfused red cells react with the patient’s own anti A or anti B antibodies and cause an acute severe clinical reaction (see ABO blood groups). Infusion of ABO-incompatible blood is most commonly due to errors in taking or labelling the sample, collecting the wrong blood from the fridge, or failure to carry out the required checks immediately before transfusion of the pack is started.

If red cells are mistakenly administered to the ‘wrong’ patient, the chance of ABO incompatibility is about one in three. The reaction is usually most severe if group A red cells are infused to a group O patient. Even a few millilitres of ABO incompatible blood may cause symptoms within a few minutes that will be noticed by a conscious patient. However, if the patient is unconscious or cannot communicate, the first signs of the reaction may be bleeding, tachycardia, hypotension or hypertension. Acute haemolysis may also occur following infusion of plasma-rich components, usually platelets or FFP, containing high-titre anti-red-cell antibodies, usually anti A or B.

Management: Stop the transfusion. Maintain venous access. Resuscitate with crystalloid fluid. Consider inotrope support if hypotension is prolonged. Inform the blood bank and return intact bag of blood and any other unused units. Seek urgent critical care and haematology advice. Admit to ICU if appropriate.

10.2 **Infusion of blood or platelets contaminated by bacteria**  
Likely to cause a very severe acute reaction with rapid onset of hyper- or hypotension, rigors and collapse. The signs and symptoms may be similar to acute haemolytic transfusion reactions or severe acute allergic reactions. Bacterial contamination of blood components is rare but is more often reported with platelet concentrates (stored at 22°C) than with red cells (stored at 4–6°C).

Examination of the pack (discolouration, smell and gram stain) may rapidly confirm the diagnosis. Organisms possibly associated with contamination of blood and platelets include Staphylococcus epidermidis, Staphylococcus aureus, Bacillus cereus, Group B streptococci, E. coli, Pseudomonas species and other gram-negative organisms.

Management: As for acute haemolytic reaction, and administer a combination of antibiotics that will be active against the range of bacteria that may be involved. In the absence of expert microbiology advice it would generally be appropriate to follow the local protocol for antibiotic management of sepsis in neutropenic patients. Blood bank will send the component pack to microbiology for further investigations if bacterial contamination is suspected.

10.3 **Transfusion-related acute-lung injury (TRALI)**  
Typically within six hours of a transfusion, the patient develops breathlessness and non-productive cough. The chest X-ray characteristically shows bilateral nodular infiltrates in a batwing pattern, typical of acute respiratory distress syndrome. Loss of circulating volume and hypotension are common. The patient may or may not have fever or chills. Monocytopenia or neutropenia may be seen.

Differential diagnosis: It may be very difficult to distinguish TRALI from other non-cardiogenic pulmonary oedema or cardiac failure.
Management: Seek urgent critical care and haematology advice. Admit to ICU if possible. Treatment is that of adult respiratory distress syndrome from any cause. Diuretics should be avoided. Steroids are of uncertain benefit.

It is often found that plasma of one of the donors contains antibodies that react strongly with the patient’s leucocytes. The implicated donors are almost always parous women. It is important to report any case of TRALI to the blood service so that an implicated donor can be contacted and, if appropriate, taken off the donor panel.

**10.4 Transfusion-associated circulatory overload (TACO)**

When too much fluid is transfused or the transfusion is too rapid, acute left ventricular failure (LVF) may occur with dyspnoea, tachypnoea, non-productive cough, raised JVP, basal lung crackles, frothy pink sputum, hypertension and tachycardia.

Management: The transfusion should be stopped and standard medical treatment, including diuretic and oxygen, given.

Note: Patients with chronic anaemia are usually normovolaemic or hypervolaemic, and may have signs of cardiac failure before any fluid is infused. If such a patient must be transfused, each unit should be given at a slower rate (providing the unit is still completed within 4 hours of removal from blood bank fridge) with diuretic cover (e.g. furosemide 20–40 mg), and the patient closely observed. Restricting transfusion to one unit of RCC in each 12-hour period should reduce the risk of LVF. Volume overload is a special risk with 20% albumin solutions.

**10.5 Allergic reactions**

**Anaphylaxis**

A rare but life-threatening complication usually occurring in the early part of a transfusion. Rapid infusion of plasma is one cause. Signs consist of hypotension, bronchospasm, periorbital and laryngeal oedema, vomiting, erythema, urticaria and conjunctivitis. Symptoms include dyspnoea, chest pain, abdominal pain and nausea.

Anaphylaxis occurs when a patient who is pre-sensitised to an allergen producing IgE antibodies is re-exposed to the particular antigen.

IgG antibodies to infused allergens can also cause severe reactions.

A few patients with severe IgA deficiency develop antibodies to IgA and may have severe anaphylaxis if exposed to IgA by transfusion. If the patient who has had a reaction has to have further transfusion, it is essential to seek advice from the blood bank as there is a real risk of a repeat reaction unless blood components are specially selected.

**Less severe allergic reactions**

Urticaria and/or itching within minutes of starting a transfusion are quite common, particularly with components including large volumes of plasma, e.g. platelet concentrates and FFP. Symptoms usually subside if the transfusion is slowed and antihistamine is given (e.g. chlorpheniramine 10 mg, by slow intravenous injection or intramuscular injection in patients who are not thrombocytopenic).

Management: The transfusion may be continued if there is no progression of symptoms after 30 minutes. Chlorpheniramine should be given before transfusion if the patient has previously
experienced repeated allergic reactions. If signs and symptoms fail to respond to this, seek advice from haematologist. Saline-washed blood components should be considered.

10.6 Febrile non-haemolytic transfusion reactions (FNHTR)
Fever or rigors during red cell or platelet transfusion affect 1–2% of recipients, mainly multi-transfused or previously pregnant patients. These reactions are probably less frequent with leucodepleted components. Features are fever (> 1.5°C above baseline), usually with shivering and general discomfort occurring towards the end of the transfusion or up to two hours after it has been completed.

Management: Most febrile reactions can be managed by slowing or stopping the transfusion and giving an antipyretic, e.g. paracetamol (not aspirin). These reactions are unpleasant but not life-threatening, but it is important to remember that the fever or rigors could be the first warning of a severe acute reaction.
**APPENDIX 2 - GUIDELINE FOR USE OF PLATELET TRANSFUSIONS**

A haematology consultant should normally be contacted for advice if platelet transfusion is requested for adult patients. For paediatric patients the request for platelets should be discussed with a consultant paediatrician. For urgent platelet transfusion for the following indications platelet requests should not be delayed by blood bank if a haematology consultant is unavailable.

**INDICATIONS**

**Massive transfusion**

See massive transfusion guideline

**Thrombocytopenia due to marrow failure (as a result of disease or following chemotherapy)**

Platelet transfusion is indicated:

- In a patient with active bleeding and a platelet count < 50 \(x\) 10^9/l.
- Prophylactic transfusion to maintain a platelet count >10 \(x\) 10^9/l.

Note: A higher threshold (e.g. 20 \(x\) 10^9/l) may be appropriate if there are other abnormalities of haemostasis, the patient is septic or the patient is particularly haemorrhagic.

But note: Patients with chronic stable thrombocytopenia e.g. due to MDS or AA should be managed on an individual basis. Provided they are not haemorrhagic it is reasonable to withhold platelet transfusion even if the platelet count is <10 \(x\) 10^9/l.

**Inherited platelet function defects (with or without thrombocytopenia)**

Platelet transfusion is indicated in patients with active bleeding or prior to invasive procedures. In all such cases a consultant haematologist will advise in liaison with the haemophilia centre. Where time allows HLA matched platelets should be used.

**Disseminated Intravascular Coagulation**

Platelet transfusion is indicated if the platelet count is < 50 \(x\) 10^9/l and the patient is bleeding or requires an invasive procedure or is in the immediate post operative period. In other cases platelets should not be given ‘unless it is perceived that there is a high risk of bleeding’.

**Thrombocytopenia due to chronic liver disease with hypersplenism**

Platelet transfusion is indicated if the platelet count is < 50 \(x\) 10^9/l and the patient is bleeding or requires an invasive procedure or is in the immediate postoperative period. The response to platelets is generally poor.

**ITP (Immune thrombocytopenia)**

Platelet transfusion is reserved for patients with immediately life threatening (e.g. CNS) bleeding. Other therapies e.g. intravenous immunoglobulin (ivIg) and high dose steroids must also be given.

**Post transfusion Purpura**

The mainstay of treatment is ivIg. Platelet transfusion is indicated only if the patient is bleeding severely. Response is generally poor so several doses may need to be given. There is no evidence that platelet transfusion exacerbates the disorder.

Note: These patients do not require a special product. ‘Random donor’ platelets should be used.
Neonatal Alloimmune thrombocytopenia
Platelet transfusion should be arranged urgently if this diagnosis is suspected. In all cases a consultant haematologist will liaise with the paediatric team and WBS. Ivlg is generally given as well.
Note: a special product is required for these patients. WBS must be informed of the (suspected) diagnosis. They will endeavour to supply: HPA1a / HPA5b negative platelets suitable for neonatal use.

Other Paediatric Use

<table>
<thead>
<tr>
<th>Indication</th>
<th>Platelet threshold for transfusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well post chemotherapy</td>
<td>&lt;10 x 10^9/l</td>
</tr>
<tr>
<td>Unwell or septic</td>
<td>&lt;20 x 10^9/l</td>
</tr>
<tr>
<td>Brain tumour or recent neurosurgery</td>
<td>&lt;30 x 10^9/l</td>
</tr>
<tr>
<td>Clotting abnormality</td>
<td>patient specific</td>
</tr>
<tr>
<td>On clexane or other anticoagulation</td>
<td>&lt;50 x 10^9/l unless otherwise stated</td>
</tr>
<tr>
<td>Prior to LP (well, no previous problem)</td>
<td>&lt;20 x 10^9/l</td>
</tr>
<tr>
<td>Prior to LP (new patient or unwell)</td>
<td>&lt;50 x 10^9/l</td>
</tr>
<tr>
<td>Pre surgery (check FBC post infusion)</td>
<td>&lt;100 x 10^9/l</td>
</tr>
</tbody>
</table>

IM PegAsparaginase can be given without checking platelet count

Invasive Procedures
The platelet count required depends on the procedure. A platelet count > 50 x 10^9/l is required for most surgical operations and a count > 100 x 10^9/l is required for operations at a critical site eg neurosurgery. Management depends on the underlying cause. A safe platelet count is not always achievable.
The advice of a consultant haematologist should be sought prior to the procedure.

Patients with ITP should be managed with ivlg and/or steroids.
Patients with marrow failure will normally require platelet transfusion.
Patients with chronic liver disease may require a combination of platelets, FFP, cryoprecipitate (or fibrinogen) and vitamin K

Conditions in which Platelet Transfusion is Contraindicated
- Thrombotic thrombocytopenic Purpura (TTP)
- Heparin Induced Thrombocytopenia (HIT)

In these conditions platelet transfusion is relatively contraindicated. Bleeding is rare even when the platelet count is < 10 x 10^9/l and clinical deterioration is common following platelet transfusion.

Platelet Selection
ABO Group
Platelets of the same ABO group as the patient are the component of choice and should always be requested; however ABO non identical platelet transfusion is permissible in order to optimise platelet usage.

Group O platelets may cause haemolysis if transfused to non group O patients, even when the component has tested negative for high titre haemolysins. This is particularly likely in children. However in the context of an emergency eg massive haemorrhage the risk is negligible.

Group O platelets (High Titre Haemolysin negative) should be avoided for non group O children.
Group O platelets (High Titre Haemolysin) should only be transfused to non group O patients in an emergency, and following discussion with a consultant haematologist.

**Rhesus Group**

Rhesus D negative platelets are the component of choice for Rhesus D negative patients.

If Rhesus D positive platelets are transfused to Rhesus D negative women of child bearing age 250iu of prophylactic anti-D should be given subcutaneously. A single dose of 250iu anti-D should be sufficient to cover up to 5 doses of Rhesus D positive platelets given over up to 6 weeks.

Rhesus D positive platelets may be transfused to other Rhesus D negative patients in order to optimise platelet usage and no anti-D is necessary.

**Special requirements**

**Irradiated products**

All platelets are now irradiated.

**CMV negative platelets**

The indications for CMV negative platelets are:
- Pregnant women (unless in labour / delivery imminent) *
- Allogeneic BMT recipients *
- Patients in whom Allogeneic BMT is planned *
- HIV positive patients
- Premature infants**

*unless known to be CMV antibody positive
**unless mother known to be CMV antibody positive

However: since the introduction of leukodepletion the risk of CMV transmission by non CMV negative components has been greatly reduced. In an emergency non CMV negative components can be used for these patients.

**Children**

Patients under 16 years of age should receive apheresis platelets. The following component is supplied specifically for neonates use:
PRD-018 Platelet apheresis, leucodepleted for neonatal use. $40 \times 10^9/l$ (40-70ml volume) CMV negative (5 days shelf life).

**Availability and Storage**

Platelets are not kept as stock on any Hywel Dda site. Platelets may be available on site for emergency use if they have been ordered for another patient but not yet transfused. If no platelets are available on site they must be transported from WBS (East Glamorgan). Clinical teams must try to anticipate the need for platelets and in an emergency situation contact blood bank without delay.

Platelets have a shelf life of 5 days (this may be extended to 7 days by WBS at their discretion). Platelets are kept in blood bank in an agitator at 20-24 °C. Platelets must not be placed in a refrigerator.
DOSE

Adults:
Prophylactic platelet transfusion: 1 platelet concentrate.
Patients requiring invasive procedures: 1 or 2 platelet concentrates should be given depending on the increment required and the response checked prior to the procedure.
Bleeding patients: 1 platelet concentrate should be given and the response and subsequent behaviour of the platelet count monitored closely. Refer to massive transfusion guideline for relevant patients.

Children:
In small children (< 12kg) give 10-15 ml/kg over 30 minutes. In older children an adult dose of platelets should be transfused over 15-30 minutes.

The volume of a platelet concentrate is variable, pooled platelets have a volume of 310+/−30ml, apheresis platelets have a volume of 215+/−50ml.

The expected platelet increment after administration of 1 platelet concentrate to an average sized adult is 20-40 x 10^9/l.

Persistent failure to obtain adequate responses to platelet transfusion is called platelet refractoriness. The following causes should be considered first: sepsis, DIC and hypersplenism. Additionally, patients with ongoing heavy bleeding are likely to show poor increments. If these have been ruled out further investigation for immune causes e.g. HLA antibody testing is indicated. This requires the involvement of a consultant haematologist who will liaise with WBS.

Administration
Platelet concentrates should be given through either a platelet administration set or a standard blood giving set. However platelets should not be given through a set that has already been used for blood.

If platelets are given via syringe for a neonatal transfusion, a screen filter should be used.

Platelet should normally be given over 30 minutes (in a paediatric setting this approximates to 20-30ml/kg/hr).

The patient should be observed visually throughout the transfusion. Observations (pulse, blood pressure and temperature) should be performed at baseline, 15 minutes into the transfusion and at the end of the transfusion.

Adverse Reactions
Bacterial septicaemia due to contamination of product. This will result in an immediate severe reaction which may be difficult to distinguish from an allergic reaction. Treatment is with broad spectrum antibiotics (e.g. as per regimen for neutropenic sepsis) and resuscitation.

Allergic reactions in the form of urticaria/febrile transfusion reactions/anaphylaxis.

Risk of haemolysis if ABO incompatible plasma is given (especially Group O and especially to children).
Transfusion transmitted infection, low risk of transmission of HIV, Hepatitis A, B and C and parvovirus B19.

Transmission of variant CJD – any risk currently is unquantifiable.

Alloimmunisation leading to platelet refractoriness.

See guideline for management of adverse transfusion reactions. All serious reactions (including all cases where transfusion abandoned) must be reported to Blood Transfusion staff.

**Jehovah’s Witnesses** may or may not accept platelets. See appendix 10.5.
12. APPENDIX 3 - GUIDELINES FOR THE USE OF FRESH FROZEN PLASMA (FFP)

Indications

Massive blood transfusion – see guidelines for massive blood transfusion.

Liver disease with elevated PT/APTT and either bleeding or prior to an invasive procedure. The coagulopathy of liver disease is complex and associated with both bleeding and thrombosis. The coagulation screen should be checked but is of limited value. Therapy should be guided by clinical assessment, Coagulation Screen and FBC results. Complete correction of clotting times is rarely possible.

Disseminated intravascular coagulation, with elevated PT/APTT and either bleeding or immediately post-op or needing an invasive procedure.

Replacement therapy in patients with single factor deficiencies Consultant Haematologist will advise. Non UK sourced, pathogen reduced plasma (PRP) is the product of choice.

Thrombotic Thrombocytopenic Purpura: Plasma exchange with non UK sourced plasma is indicated. The patient will need to be transferred to a specialist centre for this.

Reversal of Warfarin (and other coumarin anticoagulants)
In patients suffering life threatening bleeding Prothrombin Complex Concentrate is the product of choice. See guideline.
In patients with no or only minor bleeding Vitamin K is indicated, not FFP. It is effective within six to twelve hours.

Non UK sourced, Pathogen Reduced Plasma
Since 2005 children under the age of 16 years must receive non UK sourced, pathogen reduced plasma (PRP) in order to minimise the risk of prion exposure. Octaplas and Methylene Blue FFP are the two commonly available products of choice. Packs are available for neonatal or paediatric use depending on the volume required. Any recipients of non UK sourced PRP should continue to receive this product into adulthood. Consideration should also be given to using non UK sourced PRP in obstetric patients as these are young patients usually receiving FFP on a single occasion.

Haemorrhagic disease of the newborn – when bleeding is due to HDN, Octaplas or Methylene Blue FFP 10-20ml/kg is indicated as well as intravenous Vitamin K.

Neonates with coagulopathy and bleeding or at risk of bleeding from an invasive procedure should receive approximately 15ml/kg of Octaplas or Methylene Blue FFP as well as a dose of Vitamin K. Coagulation tests should be repeated post infusion.

DOSE
The appropriate dosage in massive transfusion is described in that guideline.

For other indications the ‘standard dosage’ is: 12-15ml/kg
Each unit = 273 ml (average) Standard Therapeutic adult dose is 4 units.
For adults < 50kg and in all children the dosage must be accurately calculated.
Where volume overload is a concern, caution should be exercised, give 2 units and re-assess.
Re-assess clinically after completion of the dose and repeat clotting screen.
Blood Group Compatibility
The first choice is FFP of the same ABO group as the patient.
Group O FFP must only be given to group O patients, this is especially important in children.

<table>
<thead>
<tr>
<th>Recipient Group</th>
<th>O</th>
<th>A</th>
<th>B</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Choice</td>
<td>O</td>
<td>A</td>
<td>B</td>
<td>AB</td>
</tr>
<tr>
<td>2nd Choice</td>
<td>A</td>
<td>AB</td>
<td>AB</td>
<td>-</td>
</tr>
<tr>
<td>3rd Choice</td>
<td>B</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4th Choice</td>
<td>AB</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

FFP is not considered as antigenic for RhD, RhD Positive FFP can be safely given to either RhD Pos or RhD Neg recipients.

Availability
Fresh frozen plasma is kept in blood bank.
FFP has to be thawed under controlled conditions prior to issue from blood bank. This takes approx 25-30 minutes. After thawing in the laboratory, FFP should ideally be used immediately, however FFP can be stored at 4°C in an approved blood storage refrigerator provided the infusion is completed within twenty-four hours of thawing.

Administration
FFP is administered through a standard blood giving set. In a massive transfusion situation FFP can be given by rapid IV infusion, though the risk of adverse reactions is increased when FFP is given in this way. In other situations each unit should be infused over 30 minutes.

Side-effects/Risks
- Fluid overload.
- Risk of haemolysis if ABO incompatible plasma is given.
- Transfusion related acute lung injury (TRALI). TRALI manifests as Acute Respiratory Distress Syndrome (ARDS). It usually manifests within 4 hours of transfusion. Initial diagnosis is on clinical grounds. Treatment is supportive and ventilation may be required. Confirmatory testing is complex and requires co-ordination with WBS – Blood Transfusion / Haematology Consultant staff will advise.
- Allergic reactions in the form of urticaria/ febrile transfusion reactions/anaphylaxis.
- For patients with proven sensitivity to IgA, IgA deficient plasma should be requested (Not routinely stocked within trust or WBS. Available from NBS. Haematology consultant input required prior to request being made).
- Transfusion transmitted infection, low risk of transmission of HIV, Hepatitis A, B and C and parvovirus B19.
- Transmission of variant CJD – any risk currently is unquantifiable but plasma is a major source of normal cellular prions.

See guideline for management of adverse transfusion reactions. (Appendix 10.1) All serious reactions (including all cases where transfusion abandoned) must be reported to blood bank staff.
13. APPENDIX 4 - PAEDIATRIC TRANSFUSION

Packed red blood cells should be used to correct a Hb <8g/dl for oncology patients on treatment. As a general rule, aim to increase the Hb to 12g/dl. In children who are receiving chemotherapy it is often possible to anticipate the fall in Hb and plan accordingly.

One unit of PRBC contains about 240ml. Use the following formula to calculate the amount of blood needed and round the volume up or down to the nearest whole unit to have exposure to the fewest number of donors possible. Giving part units should be avoided unless the child is very small (<12kg, when prescription of blood should be in mls). For babies quad packs can be made available.

\[
\text{mls of RBC required} = \text{body weight (kg)} \times 4 \times \text{desired increase in Hb}
\]

For well children receiving less than 20ml/kg of product, infusion can be given over 1-2 hours. It may need to be slower if >20ml/kg is required eg Hb<5g/dl.

In newly diagnosed patients who are well in spite of low Hb, or who have high WCC (>30 x 10^9/l) please discuss with paediatric oncology staff.

The following is adapted from the Handbook of Transfusion Medicine 4th Edition United Kingdom Blood Services (2007) and is intended as a guide only.

Transfusion of the newborn infant

Normal blood volume at birth varies with gestational age and the timing of clamping of the cord. In term infants the average blood volume is 80 ml/kg (range 50–100 ml/kg) and in pre-term infants it is higher at 106 ml/kg (range of 85–143 ml/kg).

Normal values for pre-term infants depend on gestational age. The normal values for Hb vary during infancy and childhood, with a nadir in Hb of 90 g/l at two months of age increasing to 100–110 g/l by six months of age.

### Normal haematological values in infants

<table>
<thead>
<tr>
<th></th>
<th>Term</th>
<th>Preterm</th>
<th>Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Haemoglobin g/l</strong></td>
<td>140–240</td>
<td>140–240</td>
<td>115–180</td>
</tr>
<tr>
<td><strong>Platelets x 10^9/l</strong></td>
<td>150–450</td>
<td>150–450</td>
<td>150–400</td>
</tr>
<tr>
<td><strong>PT (sec)</strong></td>
<td>10–16</td>
<td>11–22</td>
<td>11–14</td>
</tr>
<tr>
<td><strong>APTT (sec)</strong></td>
<td>31–55</td>
<td>28–101</td>
<td>27–40</td>
</tr>
<tr>
<td><strong>TT (sec)</strong></td>
<td>19–28</td>
<td>19–30</td>
<td>12–14</td>
</tr>
<tr>
<td><strong>Fibrinogen g/l</strong></td>
<td>1.7–4.0</td>
<td>1.5–3.7</td>
<td>1.5–4.0</td>
</tr>
</tbody>
</table>

**Blood components for neonatal transfusion**

A comprehensive guideline for neonatal and paediatric transfusion, together with a recent updating statement, is available at [BCSH Guidelines](#).

Minimise blood loss.
Most red cell transfusions are given to replace blood drawn for monitoring: micro-techniques, non-invasive monitoring and avoidance of unnecessary testing should be used to reduce transfusion needs.

Minimise donor exposure
Neonates who may require several red cell transfusions within a few weeks should be allocated to a ‘paedipak’ system, where one donation is divided into four to eight small packs that can be used for sequential transfusions over the shelf life of the red cells (five weeks). By this means, the number of donors whose blood is transfused to the neonate is minimised.

Close liaison between the neonatal intensive care unit and blood bank is essential to achieve optimal use of ‘paedipaks’ and ensure that all babies likely to receive more than one transfusion are identified.

### Blood components for neonatal transfusion

<table>
<thead>
<tr>
<th>Component</th>
<th>Volume</th>
<th>Infusion rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Red cell</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange transfusion</td>
<td>(Plasma-reduced whole blood in citrate phosphate dextrose, haematocrit 0.5–0.6, = 5 days old, irradiated (pg ref=56))</td>
<td>80–100 ml/kg (for anaemia) 160–200 ml/kg (for hyperbilirubinaemia)</td>
</tr>
<tr>
<td><strong>Top-up transfusion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Red cells suspended in saline-adrenaline glucose-mannitol haematocrit 0.5–0.7, = 35 days old, ‘paedipak’ if likely to need repeated small-volume transfusions, irradiated if neonate had intrauterine transfusion)</td>
<td>10–20 ml/kg</td>
<td>5 ml/kg/hr</td>
</tr>
<tr>
<td><strong>Emergency large-volume transfusion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Plasma-reduced red cells have been advised: BCSH guideline now suggests that red cells in additive solution should be considered)</td>
<td>10–20 ml/kg</td>
<td>Rapid infusion only for resuscitation</td>
</tr>
<tr>
<td><strong>Platelet concentrate</strong></td>
<td>10–20 ml/kg</td>
<td>10–20 ml/kg/hr</td>
</tr>
<tr>
<td>(Adult apheresis packs split into 50–75 ml)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FFP</strong></td>
<td>10–20 ml/kg</td>
<td>10–20 ml/kg/hr</td>
</tr>
<tr>
<td>(Pathogen reduced*)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cryoprecipitate</strong></td>
<td>5–10 ml/kg</td>
<td>10–20 ml/kg/hr</td>
</tr>
</tbody>
</table>

Notes:
Cellular components supplied for neonatal transfusion should be CMV negative.
* UK Departments of Health recommend that FFP given to neonates and children up to 16 years of age be obtained from an area free of BSE and subjected to pathogen-reduction procedures.
Blood components volumes and rates of administration for infants and children

<table>
<thead>
<tr>
<th>Component</th>
<th>Volume</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red cell concentrates</td>
<td>( \text{Vol (ml)} = \text{desired Hb rise (g/dl)} \times \text{wt (kg)} \times 3 )</td>
<td>5 ml/kg/hr (usual max. rate 150 ml/hr)</td>
</tr>
<tr>
<td>Platelet concentrates</td>
<td>Children &lt; 15 kg 10−20 ml/kg</td>
<td>10−20 ml/kg/hr</td>
</tr>
<tr>
<td></td>
<td>Children &gt; 15 kg single apheresis or concentrate (approx. 300 ml; actual volume on pack label)</td>
<td>10−20 ml/kg/hr</td>
</tr>
<tr>
<td>FFP</td>
<td>10–20 ml/kg</td>
<td>10–20 ml/kg/hr</td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td>5–10 ml/kg (usual max 10 units – approx 300 ml)</td>
<td>10–20 ml/kg/hr (i.e. over 30–60 mins)</td>
</tr>
</tbody>
</table>

Notes:
- Transfusion rates are based on current practice, are only for guidance, and will depend on the exact volume given and clinical status of the patient. For neonates and children, it is important to prescribe the exact volume and the time over which the transfusion should be given.

Indications for red cell transfusion in infants under four months of age

<table>
<thead>
<tr>
<th>Clinical situation</th>
<th>Transfuse at:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate receiving mechanical ventilation</td>
<td>Hb &lt; 120 g/l*</td>
</tr>
<tr>
<td>Acute blood loss</td>
<td>10% blood volume lost</td>
</tr>
<tr>
<td>Oxygen dependency (not ventilated)</td>
<td>Hb &lt; 80–100 g/l*</td>
</tr>
<tr>
<td>Late anaemia, stable patient (off oxygen)</td>
<td>Hb &lt; 70 g/l</td>
</tr>
</tbody>
</table>

* Some neonatologists use a Hb of < 110 g/l as a threshold for transfusing oxygen-dependent neonates, and since there is no good evidence to support a particular threshold value, each neonatal unit should produce a written policy of its own, based on the nature of the babies cared for by the unit.

Equipment for paediatric transfusion

As for adult transfusion, infusion devices must be tested and shown by the manufacturers to be suitable for the transfusion of blood components. Syringe drivers are suitable for neonatal transfusion. A suitable filter (170–200 micron) must be incorporated preferably situated between the bag and the syringe during syringe filling. For small-volume transfusions, specific paediatric giving sets with small priming volumes are recommended. Blood components can be safely transfused through small-gauge peripheral cannulas (e.g. 19 G) or central lines, including umbilical catheters.

Exchange transfusion

Exchange transfusion has a high incidence of adverse events. It should only be conducted under the supervision of experienced personnel.
- Exchange transfusion is generally performed for hyperbilirubinaemia and/or anaemia, usually due to haemolytic disease of the newborn (HDN) or to prematurity.
- For treating anaemia, a single volume (80–100 ml/kg) exchange is generally adequate.
- For management of hyperbilirubinaemia, a double volume exchange (160–200 ml/kg) is favoured.
- Plasma-reduced blood with a haematocrit (HCT) of 0.5–0.6 is recommended.
Blood for exchange transfusion should always be irradiated if the patient has already had intrauterine transfusion (IUT). Irradiated blood should also be used in other neonates unless delay in obtaining irradiated blood would cause clinically significant delay.

**Erythropoietin in neonates**

Meta-analysis of controlled clinical trials has shown that erythropoietin, when given with iron supplements, reduces red cell transfusion requirements in the anaemia of prematurity. Erythropoietin is licensed for this purpose. However, the effect is relatively modest, with no real benefit in the first two weeks of life when sick infants are undergoing frequent blood sampling and are therefore most likely to require transfusion.

Dose: A typical regime would be 300 mcg/kg three times per week for six weeks starting in the first week of life. Oral iron supplements (3–9 mg elemental iron/kg) should be used as soon as tolerated.

**Thrombocytopenia and platelet transfusion**

The risk of bleeding is increased in neonates with platelet counts < 50 x 10⁹/l. However, safe threshold platelet counts in term and pre-term infants have not yet been identified. The table below shows suggested guidelines for platelet transfusion in the newborn. Babies with neonatal alloimmune thrombocytopenia (see below) may bleed at higher platelet counts as the bound antibody may interfere with platelet function. Monitor platelet count closely and consider transfusing with HPA-compatible platelets if platelet count is falling or in the case of a previous affected sibling with a history of intracranial haemorrhage.

### Indications for platelet transfusion in term and pre-term neonates

<table>
<thead>
<tr>
<th>Platelet count</th>
<th>Indications</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30 x 10⁹/l</td>
<td>In otherwise well infants, including NAIT if no evidence of bleeding and no family history of ICH²</td>
<td>¹ Some neonatologists use a threshold for platelet transfusion of 20 x 10⁹/l in well, stable term and pre-term neonates (ref 6); at present there is no evidence to support choosing a platelet count of 20 x 10⁹/l over 30 x 10⁹/l and each neonatal unit should develop its own policy based on the nature of the babies that it cares for.</td>
</tr>
<tr>
<td>&lt; 50 x 10⁹/l</td>
<td>In infants with: clinical instability, concurrent coagulopathy, birth weight &lt; 1000g and age &lt; 1 week, previous major bleeding (e.g. GMH-IVH)², current minor bleeding (e.g. petechiae, venepuncture oozing), planned surgery or exchange transfusion, platelet count falling and likely to fall below 30, NAIT if previous affected sib with ICH</td>
<td></td>
</tr>
<tr>
<td>&lt; 100 x 10⁹/l</td>
<td>Consider platelet transfusion if there is major bleeding and platelet count is falling rapidly</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

¹ Some neonatologists use a threshold for platelet transfusion of 20 x 10⁹/l in well, stable term and pre-term neonates (ref 6); at present there is no evidence to support choosing a platelet count of 20 x 10⁹/l over 30 x 10⁹/l and each neonatal unit should develop its own policy based on the nature of the babies that it cares for.

Neonatal alloimmune thrombocytopenia

Neonatal alloimmune thrombocytopenia (NAIT) may be thought of as the platelet equivalent of haemolytic disease of the newborn. It affects about one in 1100 pregnancies. Maternal IgG alloantibodies are formed against a platelet-specific alloantigen on fetal platelets inherited from the father. The maternal antibodies cross the placenta and may destroy fetal platelets and cause bleeding. The commonest alloantibody causing NAIT is anti-HPA-1a (80% of cases). This occurs in a mother who is homozygous for the HPA-1b (2% of mothers are homozygous for HPA-1b but only around 10% make anti-HPA-1a). The second commonest antibody to cause NAIT is anti-HPA-5b (15% of cases), which in most cases causes only mild thrombocytopenia. Unlike haemolytic disease of the newborn, about 50% of cases occur in first pregnancies.

NAIT can cause life-threatening bleeding in utero or after birth. The most serious consequence is intracranial bleeding, which occurs in 10% of cases and may lead to death or long-term neurological deficits. The most common presentation of NAIT is unexplained severe thrombocytopenia in an otherwise well term baby or in a term baby with an intracranial haemorrhage. A useful practical point is that thrombocytopenia due to NAIT or secondary to pregnancy-related complications or infection resolves within weeks (sometimes up to eight weeks in NAIT), whereas thrombocytopenia secondary to bone marrow failure syndromes persists. Advice from a haematologist about the management of NAIT should be sought as soon as possible.

Treatment

The condition is self-limiting and usually resolves within two weeks. Occasionally thrombocytopenia persists for up to eight weeks. Several transfusions of compatible platelets may be needed. Rapid treatment is required if there is bleeding or a platelet count < 30 x 10^9/l and treatment should not be delayed while waiting for a laboratory confirmation of the diagnosis. Give platelets lacking the specific HPA antigen. Blood centres should be able to supply platelets, which should be HPA-1a and 5b negative. If these are not available, BCSH guidelines now recommend using platelets that are not selected for HPA status. Administration of high-dose IVIgG is effective in about 75% of cases. IVIgG treatment can also reduce the period of dependence on compatible donor platelets. Additional doses of IVIgG may be needed two to four weeks after the initial response due to recurrence of thrombocytopenia.

Use of fresh frozen plasma in neonates

The only indications for FFP in neonates recommended in the recent BCSH guidelines and supported by evidence are: DIC, vitamin-K-dependent bleeding and inherited deficiencies of coagulation factors. The conventional dose of FFP is from 10 to 20 ml/kg.

FFP should never be used as simple volume replacement for polycythaemia. It is not effective in preventing intraventricular haemorrhage in pre-term babies without evidence of coagulopathy. Since 2005 the UK Department of Health requires that children under 16 years of age requiring FFP should receive pathogen-reduced FFP of non-UK origin.
14. APPENDIX 5 - INFORMATION ON PATIENTS WHO DO NOT ACCEPT TRANSFUSION

Every individual with sufficient maturity and mental capacity has the right to choose whether or not to submit to medical treatments or surgical procedures. (See Section 6.15 – 6.26 of Hywel Dda Local Health Board Policy For Consent to Examination or Treatment - HD/QISU/005)

Decisions of this kind need to be made on the basis of accurate information concerning the risks and benefits involved in any such treatment or procedure. Patient information leaflets on blood transfusion such as the bilingual “Will I need a blood transfusion” leaflet available at all Hywel Dda Local Health Board sites provide an easily understood source of information for patients. If required, pdf information sheets in other languages can be downloaded from the National Blood Service Website at http://hospital.blood.co.uk/library/patient_information_leaflets/leaflets/.

Refusal to accept allogeneic blood transfusion is a position commonly associated with Jehovah’s Witnesses for whom such refusal is a deeply held core religious belief. For others refusal may be influenced by cultural factors (e.g. a refusal to accept blood from “a stranger”, but a willingness to accept blood from a close family member), an awareness of the dangers involved, especially the risk (however small) of contracting blood borne infections such as Hepatitis, HIV/AIDS or vCJD. Other patients may not be governed by culture or belief, but refuse blood and blood components due to a severe needle phobia. Please note that in the case of refusal due to severe needle phobia, an application to court may be required if such refusal is life threatening.

Every patient has a right to be treated with respect, and staff must be sensitive to their individual needs, acknowledging their values, beliefs and cultural background. No patient should be unfairly discriminated against because their personal beliefs are at odds with those of the Healthcare Professional(s) looking after them. To administer blood, blood components or blood products to an adult with the mental capacity to make a decision, who has refused to accept it may be unlawful, and could lead to those Health Professionals doing so being liable to criminal or civil proceedings for assault and trespass to the person - even if the Health Professional administered them believing such treatment necessary to sustain life. Whatever the motivation prompting the decision not to accept blood, the challenge is to find alternative approaches which successfully treat the patient while at the same time respecting their wishes.

Jehovah’s Witness Patients

Health Professionals’ must ensure that they clarify the position regarding an individual Jehovah’s Witness patient’s beliefs in relation to receiving blood or blood components. To the Jehovah’s Witness patient the following are unacceptable medical treatments:

- Transfusions of whole blood and its four primary components:
  - Red cells (erythrocytes)
  - White cells (granulocytes)
  - Platelets
  - Plasma
- Pre-operative autologous blood collection and storage for later reinfusion (pre-deposit)

Other blood components such as cryoprecipitate will be matters of individual patient choice. In addition, individual Jehovah’s Witnesses may accept treatment such as organ transplants, dialysis, cardiopulmonary bypass or the use of cell salvage techniques in which blood is not stored (intra-operative and post-operative cell salvage – please see later notes for full explanation). Acceptance of plasma derivatives such as Human Albumin solution (HAS) and Anti-D are other areas where individual Jehovah’s Witnesses may hold different opinions.
Health Professionals should not make assumptions about the decisions a Jehovah’s Witness patient might make about treatment with blood or blood products. For this reasons it is vitally important for every case of “blood refusal” in a Jehovah’s Witness patient to be discussed and treated individually. In the Hywel Dda Policy for Consent to Examination or Treatment, it is stated that:

In the case of an elective surgical patient or a pregnant woman, the responsible clinician must ensure that they clarify the position regarding the administration of blood or blood components with the patient before they are admitted for the procedure / delivery of the baby. Some Jehovah’s Witnesses accept blood salvage (intra and post-operative), haemodilution, haemodialysis, and heart bypass (pumps must be primed with non-blood fluids). Some also accept ‘fractions’ of plasma or cellular components (e.g., albumin, immunoglobulins and clotting factors). The views of each Jehovah’s Witness patient should be ascertained to find out which aspects of treatment are acceptable and which are not. Discussions with individual Jehovah’s Witness patients should be fully documented and their acceptance or rejection of treatments recorded and witnessed. On the basis of this discussion, the clinician must decide whether they are able to treat the patient while fully complying with the patient’s wishes. If they feel unable to comply with the wishes of the patient, then the patient should be referred for a further opinion.

To help in such a discussion, the patient may bring into their initial hospital appointment a completed and signed copy of the attached checklist (developed by the South & West Wales Hospital Liaison Committee for Jehovah’s Witnesses) or other similar document. Such a document is NOT an Advanced Decision, therefore there is still a requirement for consent form 5 (available in A&E and theatres in all acute hospitals within Hywel Dda Health Board) to be completed to ensure that the patient’s wishes are properly documented and recorded.

All adult Jehovah’s Witnesses are encouraged to carry a signed and witnessed advanced decision document at all times which clearly state their absolute refusal to accept blood transfusion and releasing doctors from any liability arising from this refusal. In the case of ante-natal patients, the woman is encouraged to use a standard care plan developed for women in labour refusing a blood transfusion. The woman is given two copies of this document by the elders of her Church and encouraged to present one copy to the obstetric team at the first ante-natal appointment rather than waiting until she presents in labour. Health Professionals should take note of such a care plan.

Below are a series of notes and flowcharts, to guide staff through the process of treating patients who refuse blood transfusion.

The attached notes refer specifically to the Jehovah’s Witness patient but the basic principles apply to all individuals refusing blood or blood products.

**When The Patient Is Conscious**

If the patient is able to indicate verbally that blood or primary blood products are unacceptable then this request must be respected and alternative treatments must be used. The patient should produce their Advance Medical Decision. This document must be in writing, signed, dated and witnessed. It must include the statement that blood and blood components will be refused “even if my life is at risk”. The refusal of blood and blood products should also be documented in the notes using Consent form 5 and be countersigned by the patient. The Consultant should be informed immediately. On the basis of discussion between patient and consultant, the clinician must decide whether they are able to treat the patient whilst fully
HYWEL DDA LOCAL HEALTH BOARD

complying with the patient’s wishes. If they feel unable to comply with the wishes of the patient, the patient should be referred for a further opinion.

**Adult patient requires elective surgery or obstetric delivery**

First Consultation
Patient requests non-blood management of case
Provides copies of Advance Decision to Refuse Specified Medical Treatment

Consultant Surgeon discusses risks and benefits with patient and decides whether to accept the case. Confers with Consultant Anaesthetist

Surgeon and Anaesthetist accept case?

Yes
Contacts and confirms acceptance with surgical team, anaesthetist & patient. Discussion of bloodless management strategies with patient.

No
Consultants willing to speak to HLC?*
Or seek advice from Consultant Haematologist

Yes

HLC provides list of acceptable alternatives and medical articles or arranges for Consultant to speak to fellow Professional

No

Patient requests referral to another Consultant

Referral possible

Yes
Consultant agrees to proceed

No
Consultant willing to seek names of other surgeons from HLC?

Yes
Consultant agrees to proceed

No
HLC provides appropriate list

Patient may choose to seek new referral with assistance of HLC

---

*HLC = Hospital Liaison Committee for Jehovah’s witnesses*
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Adult/Paediatric Patient Requires Emergency Surgery/Treatment

Is the patient conscious?

Yes

Doctor accepts case?

Yes

At patients/relatives request HLC* may be contacted for advice

Can transfer to another Doctor be arranged quickly?

Yes

Agrees to treat without using blood products

Contacts and confirms acceptance with surgical/medical team

Surgery/Treatment proceeds as agreed

No

No

Is patient carrying Advance Decision Document?

Yes

Doctor accepts case

Where possible, more time should be given for relatives to produce patient’s AD/R

Written evidence produced?

Yes

No

Doctor agrees to do best under these constraints?

At patients/relatives request HLC may be contacted for advice

No

Unless otherwise indicated Medical/Surgical team treat patient according to clinical need

No

Doctor explains risks to patient/relatives of undertaking procedure without blood products

Yes

No

Doctor accepts case?

Is patient carrying Advance Decision Document?

No

Written evidence produced?
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When The Attending Physician – Believes That The Situation May Require The Use Of Blood Products And The Surgeon and/or Anaesthetist Is Unwilling To Continue Treatment Without This Option.

It is accepted that any Doctor must use his or her clinical judgement in deciding whether to proceed or not under these circumstances. However, the patient (or next of kin) should be notified immediately of this decision and clearly informed as to the possible consequences. If specifically requested to do so, the Hospital Liaison Committee for Jehovah’s Witnesses may make contact with the medical staff, the patient or his/her relatives. If possible, arrangements may be made to transfer the patient to the care of another Consultant before the patient’s condition becomes serious.

When The Attending Physician Is Willing To Handle The Case (Elective Surgery and Obstetric Delivery).

The following information is taken from the Hywel Dda Policy For Consent to Examination or Treatment.

If the clinician is willing to proceed with treatment in accordance with the patient’s wishes, Consent Form 5 (Patient agreement to investigation or treatment for patients who refuse to accept blood / blood components, available in A&E and theatres in all acute hospitals within Hywel Dda Health Board) should be used. The implications of any refusal to accept blood or blood components should be discussed with the patient before a decision is taken to recommend a procedure, which might, in normal circumstances, require the use of blood or blood components. The content of these discussions should be recorded on the consent form.

In the case of a surgical procedure the surgeon must inform the Anaesthetic Department in advance in order to ensure that a consultant anaesthetist is prepared to oversee the management of the patient’s care. Consultant staff (anaesthetists and surgeons) should be directly involved throughout the care of Jehovah’s Witness patients wherever possible.

In the case of a pregnant woman the obstetrician must inform the Anaesthetic Department of the expected delivery date. It is also essential to inform the consultant obstetrician and anaesthetist when a Jehovah’s Witness is admitted in labour.

When the case is accepted, the following course of action is laid out in Appendix 3 of the Handbook of Transfusion Medicine (4th Edition).

At the time of referral
- Check Full Blood Count
- Correct any haematinic deficiency (B12, folate, iron)
- Arrange further appropriate investigations

If the procedure and patient’s condition are such that the clinician would normally request blood to be crossmatched, discuss with patient, parents or guardian which of the available and appropriate blood-sparing options or alternatives would be acceptable to them – e.g. cell salvage, acute normovolaemic haemodilution, erythropoietin, fibrin sealant or albumin.

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**Transfusion Policy**

**Six weeks preoperative**

**ADULTS**

Oral iron
- 1-5 years: sodium feredate sugar-free.
  - 2.5 ml tds elixir 27.5 mg Fe/5ml
- 6-12 years: sodium feredate sugar-free.
  - 5 ml tds elixir 27.5 mg Fe/5ml

**CHILDREN**

Oral iron
- 2.5 ml tds elixir 27.5 mg Fe/5ml
- 5 ml tds elixir 27.5 mg Fe/5ml

**10 days preoperative to 5 days post-operative**

Erythropoietin if the anticipated blood loss >15-20% blood volume.

**7 days preoperative**

Stop NSAID. Stop aspirin unless risk of doing so outweighs benefit.

**3 days preoperative**

Stop Warfarin if safe to do so (see policy on peri-operative management of anticoagulation).

**At operation**

Use blood conservation approaches which have been confirmed to be acceptable to the patient at the time of referral – e.g. optimise anaesthetic technique (hypotension, hypothermia). Maximise haemostasis: surgical, antifibrinolytics, fibrin sealant. Conserve blood use: ANH, intraoperative/post-operative cell salvage. (See below for details of intraoperative/post-operative cell salvage).

**When The Attending Physician Is Willing To Handle The Case (Medical/Oncology Cases)**

For patients anaemic due to a haematinic deficiency, the appropriate course of action is the correction of the deficiency.

The course of action outlined above for elective surgery will also be relevant to a patient requiring surgery due to the presence of a solid tumour. However, patients requiring chemotherapy or radiotherapy will also have a need for the correction of anaemia of malignancy:

- Correction of the anaemia of malignancy should begin as soon as possible in anticipation of surgery, chemotherapy or radiotherapy. In addition to standard haematinics, the use of erythropoietin and i.v. iron should be considered.
- Consideration should be given to the use of high dose chemotherapy or stem cell transplantation at an early stage before the patient becomes excessively debilitated or anaemic from ongoing courses of treatment.
- Localised radiotherapy should be used where appropriate to avoid or limit haemopoietic damage.
- If a patient does become severely anaemic during treatment, direct oxygen therapy support may be necessary if erythropoietin and i.v. iron are not stimulating sufficient red cells.
- Anti-emesis drugs are important in intensive chemotherapy/radiotherapy regimes to counteract nausea and vomiting which may lead to mucosal haemorrhage in the anaemic/thrombocytopenic patient.
- Thrombocytopenia is probably the biggest problem in the oncology patient who is refusing blood & blood components. There are currently no approved “thrombopoietic” agents in use in the UK; therefore it is necessary to treat the symptoms of the thrombocytopenia as they arise using antifibrinolytics such as Tranexamic Acid.
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- N.B. The use of other human blood derived haemostatic agents such as Prothrombin Complex Concentrates (eg Beriplex® or Octaplex®) or cryoprecipitate may be acceptable to individual patients.

When The Patient is Unconscious – e.g. Trauma
If an unconscious patient is admitted to the Hospital and is found to be carrying an Advance Medical Decision/Release card which specifically refuses consent to the use of blood or primary blood products, then this must be respected. To be valid, this document must be in writing, signed, dated and witnessed. It must include the statement that blood and blood components will be refused “even if my life is at risk”. Any treatment should be carried out as if the patient were conscious.

When The Patient Is Unconscious/Lacks Mental Capacity And Carries No Written Advance Medical Decision
If a patient is unconscious or is deemed lacking in mental capacity to make their own decisions, and carries nothing in writing to suggest a specific refusal of consent to the use of blood or primary blood products, guidance should be taken from section 6.20 of the Hywel Dda Local Health Board Policy For Consent to Examination and Treatment.

In the management of trauma, or when dealing with an unconscious patient whose status as a Jehovah’s Witness may be unknown, the Mental Capacity Act 2005 will apply to any decision taken by the health professional, who will be expected to provide care in the best interests of the patient. This may include the administration of a blood transfusion. If a relative or friend puts forward the opinion that the patient would not accept a blood transfusion even if that resulted in death, they must be asked to produce evidence of the patient's status as a Jehovah’s Witness.

and also the dictum of Lord Donaldson of Lymington sitting in the Court of Appeal concerning the case Re:T (1992): “If (the practitioner) learnt that the patient was a Jehovah’s Witness, but had no evidence of a refusal to accept blood transfusion, he would avoid or postpone any blood transfusion as long as possible” (Court of Appeal 3 W.L.R. 782 at 787G). The Doctor should ask those friends or relatives claiming that the patient is a Jehovah’s Witness to use the time, during which the transfusion can be postponed, to furnish documentary evidence of the patient's refusal of consent, if such exists. If an applicable and valid (i.e. signed, dated and witnessed) Advanced Decision Document which categorically refuses blood transfusion “even if my life is at risk” is produced, then this should be acted upon in accordance with the patient’s wishes. If the patient does not have capacity or if an applicable Advanced Decision cannot be produced, the clinical judgement of the Doctor should take precedence over the opinion of relatives or friends and the patient should be treated as if their status as a Jehovah’s Witness is unknown. (For further guidance please refer to Hywel Dda Policy on Advanced Decisions)

Children of Jehovah’s Witness Parents
The following are sections 6.22-6.25 of the Hywel Dda Local Health Board Policy For Consent to Examination and Treatment.

Children of Jehovah’s Witness Parents
Where a parent or parents are Jehovah’s Witnesses and intend to refuse transfusion of blood or blood products in the course of treatment of a child under the age of 16, staff must always seek legal advice (See Appendix C). The well-being of the child is overriding and, if the parents refuse to give permission for blood transfusion, it may be necessary to apply for a court order in order to legally administer the blood transfusion.
HYWEL DDA LOCAL HEALTH BOARD

Young people aged 16 and 17 have a statutory right to consent to procedures themselves. As explained in sections 6.8 – 6.14 of this policy, they are also able to refuse treatment. However, where a young person aged 16 or 17 refuses a blood transfusion on the basis that they are a Jehovah’s Witness health professionals should exercise extreme caution. In these circumstances, legal advice should be sought and, if necessary, the matter should be referred to the court.

The management of a child in an emergency situation, who is likely to die or suffer serious permanent harm without immediate administration of blood, is viewed in law in a different light. There may not even be time for emergency application to the court. If no alternative medical management approach can be found, senior clinicians could decide to transfuse without consulting the court. Parents of Jehovah’s Witness children may not prevent clinicians from administering blood or blood products to their children if their child's life or health is in imminent danger. Staff may rely on the support of the courts to endorse decisions that are taken in good faith and in the best interests of the child concerned. It is important, however that two doctors of consultant status should make an unambiguous, signed and dated entry in the medical record that blood transfusion is essential to save life or prevent serious permanent harm. The surgeon who stands by and allows a ‘minor’ patient to die in circumstances where blood might have avoided death may be vulnerable to criminal prosecution.

The courts have often commented that such a situation does not detract from the loving and responsible reputation of the parents involved, and they have stressed the need for parents to be fully informed of the clinical developments regarding their child and of the intended action by clinicians.

Details of discussions with the family should be recorded in detail in the case notes. The circumstances under which any blood product is administered must be documented clearly and precisely in the patients notes, indicating exactly why the decision was taken and by whom. A further record should be made of when the parents were informed, by whom, and the details of the explanation required.

Alternatives To Transfusion Available Within Hywel Dda Health Board

1 Intra-operative Cell Salvage
Available at all sites. This involves the collection of blood from the Operative site then washing it, filtering it and re-infusing it to the patient. Please refer to Page 27 of Handbook of Transfusion Medicine: [http://www.transfusionguidelines.org.uk/docs/pdfs/htm_edition-4_all-pages.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/htm_edition-4_all-pages.pdf)

2 Post operative Cell Salvage
Available at all sites. This involves the collection of blood post operatively, filtering it and then re-infusing it to the patient. Please refer to Page 27 of Handbook of Transfusion Medicine: [http://www.transfusionguidelines.org.uk/docs/pdfs/htm_edition-4_all-pages.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/htm_edition-4_all-pages.pdf)

3 Erythropoietin
This is available through the Consultant Haematologists and involves injections up to three times per week that stimulate the production of red cells in the bone marrow. Side effects include hypertension so BP should be monitored at each injection. Other complications may arise from a rapid rise in Hb which should therefore be closely monitored. Iron is often given either orally or parenterally in combination as the ferritin must be kept above 100 for the optimum effect. Erythropoietin should only be given on the advice of a haematologist for this indication.
Please contact a Consultant Haematologist regarding advice for patients who refuse blood and blood products.

**Hospital Liaison Committee for Jehovah’s Witnesses**
The local (South & West Wales) Hospital Liaison Committee for Jehovah’s Witnesses consists of numerous members to ensure someone from the team is available at all times. They are able to provide further support & assistance regarding alternative care and/or locating co-operative consultants in other hospitals.

**Names and contact numbers are listed below**

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Asher</td>
<td>01239 811624, 07979 000555</td>
</tr>
<tr>
<td>Wayne Bevan</td>
<td>01639 898843, 07854 033312</td>
</tr>
<tr>
<td>Peter Burgess</td>
<td>01792 817549, 07979 000557</td>
</tr>
<tr>
<td>Cyril Gray</td>
<td>01792 793880, 07823 538313</td>
</tr>
<tr>
<td>David Newman</td>
<td>02920 592568, 07860 794807</td>
</tr>
<tr>
<td>Matthew Coleman</td>
<td>01443 815117, 07967 192944</td>
</tr>
<tr>
<td>James Clark</td>
<td>02920 813414, 07846 223816</td>
</tr>
<tr>
<td>Terence Reed</td>
<td>02920 360639, 07815 646145</td>
</tr>
<tr>
<td>Curtis Wheatley</td>
<td>01633 889035, 07811 670776</td>
</tr>
<tr>
<td>Andrew Barstow</td>
<td>01437 769946, 07974 551563</td>
</tr>
</tbody>
</table>
15. REFERENCES
Care Plan for Surgery in Jehovah’s Witnesses.

Care Plan for Women in Labour Refusing a Blood Transfusion.


An Example of a Checklist for Patients who Refuse Blood Transfusions

This checklist is not an advanced decision. It is for the use of Jehovah’s Witnesses and other patients who wish to make a record of their wishes prior to admission to hospital. It can be used to inform discussions with the clinicians managing their case. Following discussion any decision on use of blood products should be recorded on Consent Form 5: Patient agreement to investigation or treatment for patients who refuse to accept blood / blood components.

<table>
<thead>
<tr>
<th>Patient (Full) Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Date of Birth</td>
<td></td>
</tr>
<tr>
<td>Hospital Number</td>
<td></td>
</tr>
<tr>
<td>Telephone Number(s)</td>
<td></td>
</tr>
<tr>
<td>Consultant Surgeon</td>
<td></td>
</tr>
<tr>
<td>Consultant Anaesthetist</td>
<td></td>
</tr>
</tbody>
</table>

Statement: I, the above-named patient, am prepared to accept the following, as part of my medical treatment – before, during or after my ~planned operation/ ~the delivery of my baby/ ~as part of the planned treatment regime for my condition (~delete as appropriate).

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>WILLING TO ACCEPT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recombinant Erythropoietin*</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Haematinics (e.g. Intravenous/Oral Iron, Folic Acid, Vitamin B12)#</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Recombinant Clotting Factors (e.g. Factor VIIa)#</td>
<td>Yes / No</td>
</tr>
<tr>
<td>DDAVP (Desmopressin), Tranexamic Acid (TXA)#</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Acute Normovolaemic Haemodilution*</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Intraoperative/Postoperative Cell Salvage*</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Prothrombin Complex Concentrate (PCC’s, e.g. Octaplex)*</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Fibrin Glues and Sealants (Human, e.g. Evicel and Non-Human)*</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Cryoprecipitate *</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Anti-D*</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Fresh Frozen Plasma α</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Plateletsα</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Packed Red Cellsα</td>
<td>Yes / No</td>
</tr>
</tbody>
</table>

Notes: Items marked # are not derived from blood products
Items marked * are matters of conscience or personal choice for Jehovah’s Witness patients
Items marked α are considered primary blood components

Signature of Patient: ________________________________ Date: ___/___/___
16. REFERENCES
Guideline for the administration of blood and blood components and the management of the transfused patient. British Committee for Standards in Haematology (2009)


Guideline for Diagnosis and Management of Disseminated Intravascular Coagulation (2009)


Welsh Health Circular 2005(63) New Blood Advisory Structures for Wales


Welsh Health Circular 2007 (42) Blood Transfusion Procedures

SHOT (2010) Annual Report, Serious Hazards of Transfusion Steering Group

Statutory Instruments 2005 No 50 The Blood Safety & Quality Regulations 2005

The risk of spinal haematoma following neuraxial anaesthesia or lumbar puncture in thrombocytopenic individuals. van Veen, Nokes and Makris. BJH Volume 148 Number 1 January I 2010
Advises on safe platelet count thresholds for these procedures

Advises on a safe platelet count for this procedure
17. RECOMMENDED WEBSITES
British Committee for Standards in Haematology www.bcshguidelines.org

Better Blood Transfusion Toolkit

National Blood Service www.blood.co.uk

British Blood Transfusion Society www.bbts.org.uk

HOWIS http://howis.wales.nhs.uk/

Better Blood Transfusion Continuing Education Programme www.learnbloodtransfusion.org.uk

Hospitals & Science http://hospital.blood.co.uk/

Medicines and Healthcare products Regulatory Agency www.mhra.gov.uk

National Patient Safety Agency www.npsa.nhs.uk

Royal College of Nursing www.rcn.org.uk

Serious Hazards of Transfusion www.shot-uk.org

UK Blood Transfusion and Tissue Transplantation Services www.transfusionguidelines.org.uk

Website of the Jehovah’s Witnesses www.watchtower.org

Welsh Blood Service www.welsh-blood.org.uk