NHS FORTH VALLEY
BLOOD TRANSFUSION PROTOCOL

This protocol describes procedures common to transfusion practice for patients of ALL ages. For additional specific guidance on transfusion of neonates/children under 1 year, see also NHS Forth Valley Transfusion Guidelines for Neonates and Children
Amended February 2016

Approved
Version
Date of First Issue
Review Date
Date of Issue
EQIA
Author / Contact
Group / Committee – Final Approval

Hospital Transfusion Committee May 2016
2.4
01/10/2007
30/06/2018
01/05/2016
Yes
Caroline Izatt Transfusion Practitioner
Dr Hugh Edwards, Consultant Haematologist
NHS Forth Valley Hospital Transfusion Committee
### Change Record

<table>
<thead>
<tr>
<th>Date</th>
<th>Author</th>
<th>Nature of Change</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2011</td>
<td>C Brammer</td>
<td>All references to FDRI removed and replaced by FVRH.</td>
<td>Various</td>
</tr>
<tr>
<td></td>
<td>M Dawson</td>
<td>Table defining transfusion roles now included.</td>
<td>pgs6-7</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>HTT contact numbers updated.</td>
<td>pg8</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Added - Section 2.10 Sample Related Issues known to affect laboratory testing.</td>
<td>pg13</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>References to competency assessment for those collected blood components – per the Blood Safety and Quality Regulations 2005.</td>
<td>pgs16-18</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Added - more detailed guidance on the blood prescription.</td>
<td>pgs19-20</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Changes to bedside checking procedure – change to single person bedside check.</td>
<td>pgs20-21</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Additional schema detailing transfusion observations.</td>
<td>pg23</td>
</tr>
<tr>
<td></td>
<td>C Izatt</td>
<td>Appendix 2 updated to include more specific guidance for haematology patients.</td>
<td>pg39</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Appendix 4 updated MSBOS</td>
<td>pgs44-49</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Appendix 6 updated with reference to 2011 BCSH guidelines.</td>
<td>pg50</td>
</tr>
<tr>
<td>October 2011</td>
<td>C Izatt</td>
<td>Appendix 11 added to summarise training requirements.</td>
<td>pg67</td>
</tr>
<tr>
<td></td>
<td>M Dawson</td>
<td>References to Stirling Royal Infirmary removed.</td>
<td>Various</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Contact phone numbers amended.</td>
<td>Pg8</td>
</tr>
<tr>
<td></td>
<td>M Dawson</td>
<td>Change to information about role of porters.</td>
<td>pg17 &amp; pg55</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Removed any reference to satellite fridges.</td>
<td>Various</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Removal of reference and appendix referring to transfer of blood between hospital sites.</td>
<td>pg26</td>
</tr>
<tr>
<td>Date</td>
<td>Author(s)</td>
<td>Changes</td>
<td>Page(s)</td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td>-------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>May 2012</td>
<td>M Dawson</td>
<td>Added guidance on temperature control of platelets. Amended information on location of emergency 0 negative blood.</td>
<td>pg50</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Altered wording under “Transfusion Request Form” to remove reference to mandatory signature (to make compliant with laboratory SOP).</td>
<td>pg9</td>
</tr>
<tr>
<td></td>
<td>C Brammer</td>
<td>Rewording of Appendix 6 Special Requirements to include additional risk control measures and also to reflect 2012 changes to CMV guidance.</td>
<td>pgs51-53</td>
</tr>
<tr>
<td>April 2013</td>
<td>C Brammer</td>
<td>Section 2.9 reworded in line with 2012 BCSH guidelines.</td>
<td>pgs12-13</td>
</tr>
<tr>
<td>July 2014</td>
<td>C Brammer</td>
<td>Section 2.4 addition of guidance on sample labelling when person taking the sample is unable to label the sample. Section 3.4 addition of note about phenotyped blood. Section 5.1 clarification of guidance on prescription of diuretic with blood transfusion. Section 5.3 Addition of advice about observation of patients, particular those nursed in side rooms, and about mid-transfusion transfer. Section 5.4 Addition of information about the post-transfusion advice slip. Section 6 Blood Transfusion Reactions rewritten. Appendix 1 – change to guidance on transfusion in critical care. Appendix 6 – clarification of need for CMV negative components in pregnancy and for neonates.</td>
<td>pg10, pg16, pg21, pgs23-24, pg25, pgs29-34, pg42, pg57</td>
</tr>
<tr>
<td>January 2016</td>
<td>C.Izatt</td>
<td>Section 1.1 added ‘Generic or Paediatric Module 1 Safe Transfusion Practice Section 1.4 Update Lead Clinician contact details. Sections 2.2; 2.3; 2.4; 2.7; 2.8; 4.3; 4.5 and 5.2 removed Gender from minimum data required for patient identification on transfusion blood samples Section 2.2; 4.3; 8.1; 8.2 and 9 removed reference to NHS Quality Improvement</td>
<td>pg8, pg10, pgs11, 12, 14, 19, 20 &amp; 24, pg11, 19, 40, 41 &amp; 43</td>
</tr>
<tr>
<td>-------------</td>
<td>------------</td>
<td>---------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>C. Izatt M. Dawson</td>
<td>Section 2.3 revised procedure for emergency transfusion procedure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Izatt</td>
<td>Section 2.5; 2.8; 4.4 and 5.2 revised identity details required for Unknown patients</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Izatt</td>
<td>Section 3.5 &amp; 5.2 added information on Hepatitis E Negative (HEV)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M. Dawson</td>
<td>Section 4.1; 4.5; Appendix 7 &amp; 9 Revised blood collection procedure with introduction of Electronic Blood Track System</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M. Dawson</td>
<td>Section 4.2 Collection of blood added nursing/midwifery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M. Dawson</td>
<td>Section 4.7 Revised procedure for retuning blood to cold chain using Electronic BloodTrack System</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M. Dawson</td>
<td>Section 5 &amp; 5.1 Introduction revised to include information on Transfusion Document for recording transfusion events</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M. Dawson</td>
<td>Section 5.3 Added information on timing of transfusion observations and completion pre and post transfusion checklists in transfusion document</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M. Dawson</td>
<td>Section 5.5 Traceability Non-Compliance Protocol change to Transfusion Practitioner to follow up if label not returned after 30 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Izatt</td>
<td>Section 5.7 bullet 7 Revised information if blood bag bursts in issue fridge (room)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H. Edwards</td>
<td>Section 6.10 Changed from IR1 to electronic safeguard report</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H. Edwards</td>
<td>Section 7 Removed Plasma derived products and recombinant factor V11a, NovoSeven</td>
<td></td>
</tr>
</tbody>
</table>

pg12  
pg13, 14, 20 & 25  
pgs 18 & 25  
pgs19-21, 57 & 61  
pg19  
pg21  
pg22-23  
pgs 26-27  
pg25  
pg31  
pg37  
pg38
<p>| C.Izatt | Section 7.3 Table of Products Revised type of administration set used to transfuse Platelets | pg39 |
| H. Edwards | Section 7.3 Table of Products Removed Intravenous Immunoglobulin and Albumin from table | pg39 |
| C.Izatt | Section 8.3 Guidance revised to include transfusion document | pg41 |
| H. Edwards | Appendix 1 Green Guidelines for Red Cell Transfusion updated | pgs 44-45 |
| | Appendix 5 Special Requirements added information on Hepatitis E Negative Blood | pg54 |
| | Appendix 6 Maximum Surgical Blood Ordering Schedule removed as an appendix now a standalone policy | pg54 |
| C.Izatt | Appendix 10 Added - Acute Care, Emergency Department &amp; Acute Receiving Unit Transfusion Transfer Flow Chart | pg61 |</p>
<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Introduction</td>
<td>8</td>
</tr>
<tr>
<td>1.1 Who is this protocol for?</td>
<td>8</td>
</tr>
<tr>
<td>1.2 Why do we need a protocol?</td>
<td>9</td>
</tr>
<tr>
<td>1.3 The hospital blood transfusion service in NHS Forth Valley</td>
<td>10</td>
</tr>
<tr>
<td>1.4 Useful contact numbers</td>
<td>10</td>
</tr>
<tr>
<td><strong>2</strong> Requesting, Collecting and Labelling of Blood Samples for Transfusion</td>
<td>10</td>
</tr>
<tr>
<td>2.1 Requesting blood products</td>
<td>10</td>
</tr>
<tr>
<td>2.2 Minimum data required for patient identification</td>
<td>11</td>
</tr>
<tr>
<td>2.3 The blood transfusion request form</td>
<td>11</td>
</tr>
<tr>
<td>2.4 Collecting and labelling the blood transfusion specimen</td>
<td>12</td>
</tr>
<tr>
<td>2.5 Patients whose identity is unknown</td>
<td>13</td>
</tr>
<tr>
<td>2.6 Group and save versus cross match requests</td>
<td>13</td>
</tr>
<tr>
<td>2.7 Telephone requesting of blood and blood products</td>
<td>14</td>
</tr>
<tr>
<td>2.8 Mislabelled samples and request form</td>
<td>14</td>
</tr>
<tr>
<td>2.9 Timing of transfusion samples</td>
<td>15</td>
</tr>
<tr>
<td>2.10 Sample related issues known to affect laboratory testing</td>
<td>16</td>
</tr>
<tr>
<td><strong>3</strong> Red Cell Transfusion Requirements</td>
<td>16</td>
</tr>
<tr>
<td>3.1 Knowing when to transfuse</td>
<td>16</td>
</tr>
<tr>
<td>3.2 Maximum surgical blood order schedule (MSBOS)</td>
<td>17</td>
</tr>
<tr>
<td>3.3 Urgency of request</td>
<td>17</td>
</tr>
<tr>
<td>3.4 Special requirements</td>
<td>18</td>
</tr>
<tr>
<td>3.5 Autologous pre-deposit</td>
<td>18</td>
</tr>
<tr>
<td><strong>4</strong> Release, Collection &amp; Storage of Red Cells</td>
<td>19</td>
</tr>
<tr>
<td>4.1 Release of matched red cells</td>
<td>19</td>
</tr>
<tr>
<td>4.2 Collection of blood components</td>
<td>19</td>
</tr>
<tr>
<td>4.3 Minimum data set required</td>
<td>19</td>
</tr>
<tr>
<td>4.4 Patient whose identity is Unknown</td>
<td>19</td>
</tr>
<tr>
<td>4.5 Collection procedure</td>
<td>20</td>
</tr>
<tr>
<td>4.6 Porter’s Role</td>
<td>20</td>
</tr>
<tr>
<td>4.7 Ward/Area Staff Role</td>
<td>20</td>
</tr>
<tr>
<td><strong>5</strong> Administration of Blood Components</td>
<td>22</td>
</tr>
<tr>
<td>5.1 Prescription of blood</td>
<td>23</td>
</tr>
<tr>
<td>5.2 Bedside checking procedure</td>
<td>24</td>
</tr>
<tr>
<td>5.3 Observation of patient during transfusion</td>
<td>26</td>
</tr>
<tr>
<td>5.4 Post-transfusion observations</td>
<td>28</td>
</tr>
<tr>
<td>5.5 Confirming the transfusion – traceability</td>
<td>29</td>
</tr>
<tr>
<td>5.5 Forth Valley Non-Compliance Protocol</td>
<td>30</td>
</tr>
<tr>
<td>5.6 Completion of the transfusion</td>
<td>31</td>
</tr>
<tr>
<td>5.7 Blood Spillage</td>
<td>31</td>
</tr>
<tr>
<td>5.8 Blood arriving from another hospital</td>
<td>31</td>
</tr>
<tr>
<td><strong>6</strong> Blood Transfusion Reactions</td>
<td>32</td>
</tr>
<tr>
<td>6.1 Recognition of acute transfusion reactions (ATR)</td>
<td>32</td>
</tr>
<tr>
<td>6.2 Immediate management of ATR</td>
<td>33</td>
</tr>
<tr>
<td>6.3 Management of mild reactions</td>
<td>33</td>
</tr>
</tbody>
</table>
### 6.4 Management of moderate or severe reactions
- Page 34

### 6.5 Management of anaphylaxis
- Page 34

### 6.6 Laboratory investigations
- Page 34

### 6.7 IgA deficiency
- Page 35

### 6.8 Pulmonary complications of blood transfusion
- Page 35

### 6.9 Delayed complications of transfusion
- Page 37

### 6.10 Reporting complications of transfusion
- Page 37

### 7 Non-Red Cell Blood Products
- Page 38

#### 7.1 Ordering blood products
- Page 38

#### 7.2 Administration of blood products
- Page 39

#### 7.3 Table of products
- Page 39

### 8 Additional Information
- Page 40

#### 8.1 Informed consent
- Page 40

#### 8.2 Professional accountability
- Page 40

#### 8.3 Record keeping
- Page 41

#### 8.4 Infusion devices
- Page 41

### 9 Further Information on Transfusion Practice (Bibliography)
- Page 42

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green Guidelines for the Clinical Use of Red Cell Transfusion</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td>Guideline for Platelet Transfusion</td>
<td>46</td>
</tr>
<tr>
<td>3</td>
<td>Guideline for Plasma Transfusion</td>
<td>48</td>
</tr>
<tr>
<td>4</td>
<td>Location of Uncross-matched Group ‘O’ negative blood</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>Special Requirements</td>
<td>51</td>
</tr>
<tr>
<td>6</td>
<td>Traceability label on bag of blood/blood component</td>
<td>56</td>
</tr>
<tr>
<td>7</td>
<td>Flow chart for the collection of blood/blood components</td>
<td>57</td>
</tr>
<tr>
<td>8</td>
<td>Flow chart for managing an acute transfusion reaction</td>
<td>58</td>
</tr>
<tr>
<td>9</td>
<td>Training and Competency Assessment</td>
<td>59</td>
</tr>
<tr>
<td>10</td>
<td>Flow Chart for Transferring Patient with Blood Transfusion</td>
<td>61</td>
</tr>
<tr>
<td>11</td>
<td>Transfusion Advice Sheet for Patients Discharged on day of Transfusion</td>
<td>62</td>
</tr>
</tbody>
</table>
## INTRODUCTION

### 1.1 Who is this protocol for?

This protocol is for staff responsible for requesting, sampling, prescribing, supplying, collecting and administering blood products. It is for all staff that have a role in:

### Getting the Right Blood to the Right Patient at the Right Time!

There are several defined steps in the transfusion process. All members of staff should understand their own role, and which part(s) of the process they are authorised to perform. Before taking on any transfusion task they must have completed either the Generic or Paediatric module 1 Safe Transfusion Practice of the Better Blood Transfusion continuing education programme within the last 2 years undergone adequate training for the particular process/procedure (see Appendix 9). This is summarised in the table below:

<table>
<thead>
<tr>
<th>Process/Procedure</th>
<th>Can be performed by</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-transfusion blood sampling</td>
<td>Phlebotomists, Clinical Support Workers, registered nursing/midwifery staff, operating department practitioner (ODP), medical staff</td>
<td>Only staff who have completed unit 1 (Haemovigilance) &amp; unit 4 (Sampling) of Module 1 Safe Transfusion Practice and have completed venepuncture competency training.</td>
</tr>
<tr>
<td>Requesting transfusion</td>
<td>Medical staff, registered nursing/midwifery staff who have undertaken specific training or when following an agreed protocol (such as the MSBOS)</td>
<td>Only staff who have adequate knowledge, skills, understanding and education in transfusion can request blood for transfusion</td>
</tr>
<tr>
<td>Prescribing blood components</td>
<td>Medical staff, registered nursing/midwifery staff who have undertaken specific training</td>
<td>Blood components are not designated as medicinal products under the Medicines Act. All blood for transfusion must be prescribed for patient and signed by member of staff requesting transfusion.</td>
</tr>
<tr>
<td>Collection of blood components for transport to the clinical area</td>
<td>Porters(^1), Clinical support nurses, registered nursing staff, midwives, ODPs</td>
<td>Only if they have received specific training AND been assessed as competent</td>
</tr>
</tbody>
</table>

\(^1\) Porters only collect blood components during activation of the Massive Haemorrhage Protocol, and only transport those components handed to them by a member of HTL staff.
### Final pre-administration check ("bedside check")

| Final pre-administration check ("bedside check") | Registered nursing staff, midwives, ODPs, medical staff | The independent check must only be carried out by one registered nurse/midwife, ODP or medical staff (not Nurse Bank/Agency staff unless they have certificate confirming they have current transfusion education, and never a student nurse/midwife) |

### Transfusion Observations

| Transfusion Observations | Registered nursing/midwifery staff, ODPs, Health Support Workers or Medical staff. Registered bank/agency nurses/midwives; Student nurse/midwife who have completed Module 1 in past two years | |

### Administration of blood components

| Administration of blood components | Registered nurse/midwifery staff, ODP or medical staff | One registered practitioner will carry out the administration process, unless the patient is unconscious, confused, on a child. When a double independent check is carried out by two registered practitioners |

#### 1.2 Why do we need a protocol?

Despite wide publicity, errors in requesting, sampling, supplying, collecting and administering blood and blood products continue to occur\(^1\). In the UK, 20-30% of ABO-incompatible transfusions cause some degree of morbidity, with 5–10% contributing or causing a patient’s death.

Transfusion errors most commonly occur because of:

- Errors in the collection or labelling of the pre-transfusion blood sample
- Failure of the final pre-transfusion checks
- Clerical laboratory error

The aim of this protocol is to reduce/eliminate the risk of transfusion errors by providing staff involved in the transfusion process with the information required to provide best practice. This, combined with continuing education of all hospital staff involved in the transfusion process, is crucial if the above errors are to be avoided.
It should be pointed out that unacceptable transfusion practice has consequences for the staff involved as well as the patient!

This protocol for NHS Forth Valley has been adapted, with local modifications, from published national guidelines, on behalf of the NHS Forth Valley Multidisciplinary Hospital Transfusion Committee.

1.3 The hospital blood transfusion service in NHS Forth Valley

The Laboratory blood transfusion service for the whole of NHS Forth Valley is provided by the Hospital Transfusion Laboratory (HTL or “Blood Bank”) located in the Laboratory Department in Forth Valley Royal Hospital.

Please remember that blood bank laboratory staff are highly trained and skilled practitioners who have considerable expertise. Early and courteous communication with them will result in prompt and high quality care for the patient.

Clinical and Laboratory transfusion practice is overseen by the Hospital Transfusion Committee. This is a multi-disciplinary group, with representatives of blood user specialties, whose existence is mandated by the Scottish Executive. It reports to the Chief Executive via the Clinical Governance Working Group, and has an important role in transfusion governance, and in improving transfusion practice.

Transfusion advice relating to technical matters is available from Biomedical Scientific (BMS) staff in the hospital blood bank, while clinical advice can be obtained from Consultant Haematologists (who can be contacted via switchboard) or the Hospital Transfusion Practitioner.

1.4 Useful Contact numbers

<table>
<thead>
<tr>
<th>Name</th>
<th>Telephone</th>
<th>Pager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Transfusion Laboratory</td>
<td>FVRH x66779 (24hours)</td>
<td>1777 (emergencies only)</td>
</tr>
<tr>
<td></td>
<td>01324 566779</td>
<td></td>
</tr>
<tr>
<td>Caroline Izatt (Practitioner)</td>
<td>FVRH x66762</td>
<td></td>
</tr>
<tr>
<td></td>
<td>01324 566762</td>
<td></td>
</tr>
<tr>
<td>Dr H. Edwards (Consultant Haematologist)</td>
<td>FVRH x66770</td>
<td>Hospital pager 1527</td>
</tr>
<tr>
<td></td>
<td>01324 566770</td>
<td></td>
</tr>
</tbody>
</table>

2 REQUESTING, COLLECTING AND LABELLING OF BLOOD SAMPLES

2.1 Requesting blood products

All requests for blood or blood products must be made by or on behalf of a registered medical practitioner. The following information must be documented in the case notes:

- The indication for transfusion
- An indication that verbal consent has been obtained from the patient (wherever possible).
Blood products may be requested by qualified nursing staff/midwife if they are following an established and agreed protocol (such as the NHS Forth Valley Maximum Blood Order Schedule) or the decision has been discussed with the requesting doctor, and the decision to transfuse documented as above or if he/she has undergone specific training.

Samples and forms are processed in the blood bank to identify/confirm ABO and RhD blood group and to exclude/identify irregular red cell antibodies (“compatibility testing”).

2.2 Minimum data required for patient identification

Blood can only be issued against adequately identified specimens and request forms as outlined below.

The Minimum Data Set required for every step of the Transfusion Process is:

- Surname
- Forename
- Date of Birth
- CHI number or other acceptable unique identifier*

The only exception to this is a patient who is unconscious and cannot be identified (see 2.5 below).

*ED or Major Incident number.

2.3 The Blood Transfusion Request Form

This should be completed and signed by appropriately trained medical or nursing/midwifery staff, and must contain full patient identification, including:

- Surname
- Forename
- Date of Birth
- CHI number or other acceptable unique identifier

The use of a pre-printed addressograph label is accepted on the form, but great care must be taken to ensure that the details on the label are current and those of the intended recipient.

Whenever possible, the form should clearly state:

- The blood transfusion requirements (product required, special requirements (see 3.4 below) and number of units)
- Whether request is for cross-matching or group, antibody screen and save (see below).
- The clinical diagnosis (+ indication for transfusion, if different) – the stated reason for transfusion must be clear and unambiguous.
- The date & time blood is required
- Patient’s ward/clinical area and consultant (plus location where blood required, if different)
Any relevant transfusion history
Details of pregnancy

It should be forwarded, along with the specimen, to the hospital blood bank. **Urgent requests should be despatched using tube system and the laboratory notified by phone.**

2.4 **Collecting and Labelling the Blood Transfusion Specimen**

The following procedure MUST be followed every time a blood sample is taken for compatibility testing:

- The request form should be completed BEFORE the blood sample is taken.
- The patient must be asked to positively identify him or herself by giving their full name (first and last name) and date of birth prior to being bled. Identity must not be assumed even for “familiar” patients who are regular attenders or long-standing in-patients. This must be checked against the details on the request form and, for in-patients, what is on the patient identification band. **All in-patients must wear a patient identification band or an alternative risk assessed identification device**.
- **See below for patients who are unable to identify themselves**.
- The full name and date of birth stated by the patient must EXACTLY MATCH the information on the patient’s identification band or equivalent, and the information on the request form. If there is any doubt, the patient should be asked to spell out their name to the requestor.
- The patients’ blood sample should be drawn into a 6ml EDTA cross match tube (pink top). Once blood has been drawn, label the tube **by hand** with the minimum identifiers:
  - Surname
  - Forename
  - Date of Birth
  - CHI number or other acceptable unique identifier
- Pre-labelling of tubes is extremely dangerous and must be avoided.
- Addressograph labels on the specimen tube will **NOT** be accepted – the specimen must be labelled by hand at the bedside **after** blood is drawn into the sample tube.
- Always label the specimen fully BEFORE moving on to take blood from another patient.
- The person taking the sample must sign the sample tube.
- The person taking the sample must be satisfied that the identity of the patient matches the information on the request form, and the sample, and (for in-patients) the patient identification band BEFORE signing the request form and sending the sample to the blood bank.
- There may be circumstances where the practitioner taking the sample is unable to label the sample tube him/herself – for example, sample taken from a long line by a practitioner operating in a sterile field. In this situation, the sample may be handed to a second practitioner to label and sign, but that practitioner MUST witness the sampling process (phlebotomy) and complete the sample label beside the patient immediately after it has been taken.

*If in doubt, discard the sample and bleed the patient again!*

*Acceptable risk-assessed alternatives to a patient identification band are described in the NHS Forth Valley Patient Identification Policy.*
**It is important to note that if the patient is unconscious or unable to positively identify him/herself for other reasons (for example, confusion, neonates and small children), then identity must be confirmed by rigorous inspection of the patient's identification band (or risk assessed alternative identification device). Verification of the patient's identification should be obtained from a carer, if present at the patient's bedside, and checked against the patient identification band. See 2.5 below for patients of unknown identity.**

### 2.5 Patients whose identity is unknown

If a patient is admitted unconscious and their identity is unknown, the following procedure must be followed if blood transfusion is necessary:

- The patient must be allocated a unique identification number.
- The minimum identifying dataset must include this number plus **Unknown male/female** (e.g. “Unknown Male A123456”).
- An identification wristband including this minimum data must be attached to the patient.
- This dataset must be used on samples and request forms for transfusion until additional identification details become available.
- When additional identification details become available, the hospital blood bank must be informed.

The use of such temporary identification numbers increases the risk of confusion and errors in patient identification and should only be used when absolutely necessary.

### 2.6 “Group and Save” versus “Cross-match” Requests

In all cases, transfusion blood samples undergo the following tests:

- Full ABO and RhD grouping, compared with historical patient grouping (if available)
- Screening for irregular red cell antibodies

This is commonly known as a “Group and Save”. Samples of plasma are then saved for a period of time (see 2.9 below). If red cells are required for transfusion, the plasma is then used to test compatibility with units of blood which may be issued for transfusion – this process is commonly referred to as the “cross-match” and if found to be compatible, these units are issued, and this process is completed for transfusion.

An uncomplicated full cross-match takes a minimum of 40 minutes from receipt of the sample to issue by the Hospital Transfusion Laboratory. This does not include time to transport the blood from the HTL to the clinical area.

Occasionally, particularly if a patient has been previously transfused or been pregnant, the antibody screen reveals “irregular” red cell antibodies. In this situation, a full cross-match takes considerably longer, and may require further samples from the patient.

*Please make an effort to understand the difference between a “G+S” and a “Cross-match”.*

### 2.7 Telephone requesting of blood and blood products
In certain circumstances, a new blood sample is not required by the hospital blood bank before they will issue blood/blood products:

- Conversion of group and save to a cross match (see 2.6).
- Additional units of blood requested when the blood bank has sufficient plasma left to cross match more units (but 2.8 see below for timing of samples).
- Requests for platelets or FFP/cryoprecipitate where the blood group is known (see 7.1 and Appendices 2 and 3)

In these circumstances, blood bank staff will accept telephone requests, but will require the following minimum information to be provided verbally:

- Surname
- Forename
- Date of Birth
- CHI number or other acceptable unique identifier
- Nature and quantity of product required and any special requirements (see 3.4)
- Location of patient/where blood is to be transfused
- Name and role of requesting practitioner
- Contact telephone or bleep number of requestor

The Transfusion Laboratory has a telephone request form which they complete at the time of request.

Where the request is urgent, even if a sample is required, blood bank staff should be informed by telephone - do not assume that a sample will be processed urgently if a phone call has not been made.

2.8 Mislabelled samples and request forms

Because of the risk to the patient of the “wrong blood transfused”, incorrectly labelled samples for transfusion, and any mismatch between the request form and the sample bottle, will result in sample rejection.

NOTE
NHS Forth Valley operates a ZERO TOLERANCE policy with regard to the acceptance of mislabelled samples for blood transfusion requests. This means that even minor errors or omissions in the identifiers on blood transfusion samples, or discrepancies between details on the sample and those on the request form, will result in rejection of the sample. Both sample and request form must contain the following minimum matching information, or the sample will be automatically rejected:

- Surname
- Forename
- Date of Birth
- CHI number or other acceptable unique identifier

(or a minimum of unique identifying number plus Unknown male/female if patient’s identity is unknown)

If the request is non-urgent, blood bank staff will ask for a repeat sample, correctly labelled.
Please note that, when they do so, they are following *national and local protocol*, and you are advised to accede to their request.

In a situation where a labelling error has occurred and blood is required urgently, uncross-match O RhD negative blood will be issued and blood bank staff will ask for a repeat sample. However, please note that this is not ideal, and it is always better to take care to ensure correct labelling of form and sample in the first place.

2.9 Timing of Transfusion samples

Transfusion or pregnancy may stimulate the production of unexpected antibodies against red cell antigens (so called “irregular antibodies”). Such antibodies are usually detected during pre transfusion testing in the HTL, but it is not possible to predict when or whether such antibodies might appear in relation to a potential stimulus (transfusion or pregnancy). It is therefore important to ensure that the sample used for pre-transfusion testing is representative of the patient's current immune status.

Recommendations for the timing of pre-transfusion sampling in relation to the planned transfusion are determined by the estimated risk associated with any potential stimulus\(^2\), and are as follows:

| Previous transfusion within the last 3 months, or the patient is pregnant | Sample to be taken not more than 72 hours before next transfusion |
| No transfusion within the last 3 months, and patient not pregnant | Sample to be taken not more than 3 months before transfusion |

Some local exceptions to this have been agreed by the Hospital Transfusion Committee, supported by risk assessment:

- Pregnant women to be admitted for a *planned* Caesarean Section and who have no detectable irregular antibodies in the pre-transfusion sample – sample to be taken not more than 96 hours before next transfusion;
- Pregnant women who are in-patients with placenta praevia and who have cross-matched blood available at all times, and have no detectable irregular antibodies – transfusion sample to be sent to the HTL for repeat testing at least every 7 days;
- Pregnant women who are attending for a planned termination of pregnancy at a date before 20 weeks of gestation, and have no detectable irregular antibodies – transfusion sample to be taken not more than 7 days prior to next transfusion;
- Chronically transfused adult patients without haemoglobinopathy who have been transfused at least 4 times, and have no detectable irregular antibodies – the 72 hour rule is the default, but this may, for practical reasons, be extended to 96 hours following an assessment of risk versus benefit. This must be carried out by the responsible consultant haematologist for each patient and for each episode, documented in the case record, and communicated to the HTL.

If, at any point, any patient in these groups develops an irregular antibody, the 72 hour rule must apply, without exception.

\(^2\) British Committee on Standards in Haematology – guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories 2012
In a situation where a patient is being repeatedly transfused, a daily sample is not required, but a screen for irregular antibodies should be repeated every 72 hours.

2.10 Sample related issues known to affect laboratory testing

There are some factors regarding sample quality or quantity that may affect the laboratory’s ability to perform the test or to accurately interpret test results:

- **Out of date vacutainer tube**
  Please ensure that the vacutainer you are using is in date. If it is out of date this may affect the anti-coagulant in the bottle which may result in the sample being clotted. The sample can then not be tested.

- **Insufficient sample**
  It is important to provide a full 6ml sample each time you request a group and save, cross-match or antenatal grouping. This will ensure that the lab have sufficient sample to perform the tests you require and to perform additional testing if indicated by the results obtained.

- **Sample storage**
  All samples should reach the transfusion laboratory the same day that they are taken. If they will not reach the lab the same day they must be refrigerated to ensure that any red cell antibodies present in the patient’s plasma remain detectable.

- **Haemolysis**
  If, when the sample is received in the lab, it is found to be haemolysed, the sample will be rejected and you will be asked for a repeat sample.

3 RED CELL TRANSFUSION REQUIREMENTS

3.1 Knowing when to transfuse

Blood and blood products are precious commodities and are frequently in short supply. It is therefore essential that excessive and unnecessary ordering be avoided.

Additionally, though blood products are potentially life-saving in many circumstances, and clearly appropriate in many others, there are situations where alternative treatments are available, effective and preferable. An example is nutritional anaemia (for example, chronic iron deficiency) where it is usually better to avoid transfusion in favour of iron replacement.

Also, though transfusion is generally safe, it is not without the potential to cause harm, so should be used with great care.

**A general rule is that if an effective alternative is available, transfusion should be avoided.**

Knowing when transfusion is and is not appropriate is a much under-recognised skill which is learned by experience. [Appendix 1](#) provides some guidance on when and when not to consider red cell transfusion and Appendices 2 and 3 provide guidance on platelet and
plasma transfusions. The Hospital Transfusion Practitioner and Consultant Haematologists are available to supplement these guidelines with advice.

3.2 **Maximum Surgical Blood Order Schedule**

For elective operations the likelihood of requiring blood is usually known for any particular procedure. There are two categories of procedure:

- Likelihood that transfusion will be required is low and a “Group & Save” request will suffice. In the unlikely event that a transfusion becomes necessary, this can be converted to a full cross-match in approximately 30-40 minutes (see 2.6 above and 3.3 below). For such patients, blood will only be cross-matched if an antibody is identified during the screening process, or at the request of the treating clinician
- Those where the likelihood is that cross-matched blood will be required. The number of units ordered for a proposed procedure is determined by audit of past procedures.

The number of units to be cross-matched for a given procedure is listed in the **Maximum Surgical Blood Order Schedule (MSBOS)**. Requests for blood pre-operatively for elective surgery should comply with the NHS Forth Valley MSBOS (see separate policy on Transfusion Laboratory page on intranet)

3.3 **Urgency of Request**

Requests for blood for elective surgery or non-urgent/routine transfusion should ideally be dispatched to the blood bank at least one day prior to the intended transfusion.

*Urgent requests for cross-matched red cells* should be notified to blood bank by telephone (see 2.7 above). Blood will normally be available for collection at blood bank within 40mins of receipt of the sample:

- the *minimum* time for full cross-matching and issuing from receipt of a *new* specimen is 40 minutes
- *minimum* time 30 minutes if specimen is already “grouped & saved” in the blood bank.

Please note that these are *minimum* timings and other factors may delay the availability of cross-matched blood. In addition, time to transport the blood from the HTL to the patient must be taken into account.

Ideally, only fully cross-matched blood should be issued, because of the potential presence of “irregular” (non-ABO/D) antibodies. Some anticipation of the need for transfusion, and early and good liaison with blood bank staff, with an indication of the degree of “urgency”, is therefore essential. It is possible for *group specific blood* to be issued before cross-matching is complete (see below), compatibility being confirmed soon after issue. This is preferable to using *Uncross-matched Group O Rhesus D negative blood* (see below).

*Very urgent requests* may be necessary when the clinical situation dictates that it may be unsafe to delay initiation of transfusion for more than 40 minutes. In such circumstances the use of unmatched blood must be considered, in which case there are two options:
• Blood bank may issue **uncross-matched group specific blood** if the blood group is known. This can be available at the blood bank within 10 – 15 minutes of receipt of a new specimen or sooner if there is a historical blood group record.

• **Uncross-matched Group O Rhesus D negative Kell negative blood** ("universal donor blood"). A small supply of suitable units is available for this purpose and can be collected at the Issue or Theatre fridge. This is only for IMMEDIATE use when blood bank has no transfusion sample – otherwise **uncross-matched group specific blood** is preferable. Please refer to [Appendix 4](#) for location of Emergency Group O negative uncross-matched blood. Blood bank MUST be informed immediately if any of these units are removed.

Please note that uncross-matched Group O Rhesus D negative blood may be incompatible and therefore unsuitable for patients with some irregular antibodies. Wherever time allows, fully cross-matched blood is always preferable to group specific or O negative blood. Transfusion reactions can still occur when O negative blood is given. Only use uncross-matched blood when a delay will result in harm to the patient.

There is a Massive Haemorrhage Protocol for Forth Valley Royal Hospital. It should be triggered during a massive haemorrhage situation.

### 3.4 Special requirements

It is the clear and unambiguous responsibility of the requesting doctor to ensure that any special requirements are communicated to the blood bank at the time of the request.

Generally, there are five categories of special requirement:

• **Irradiated blood products** – required for cellular products in some categories of patient (see [Appendix 6](#)). Never required for plasma products.

• **Blood components selected to be Hepatitis E (HEV) negative** - (see [Appendix 5](#))

• **Blood selected to be Cytomegalovirus negative** – (see [Appendix 5](#))

• **Additional requirements for neonates/young children** – there is a separate NHS Forth Valley policy for transfusion of neonates and young children.

• **Additional requirements for specific patient groups** – e.g. phenotyped blood for certain categories of patient, almost always under the care of a haematologist.

Note that all red cell and platelet products are now leucodepleted and so specific requests for leucodepletion, and the use of white cell filters, are now unnecessary.

### 3.5 Autologous pre deposit

This is now only available for a small number of patient groups, in particular those who have rare red cell allo-antibodies for whom the selection of donor blood is particularly difficult. Some patients who decline blood transfusion may also accept autologous pre-donation. Advice, referral forms, patient information leaflets and selection guidelines are available from the Transfusion Practitioner.
4.1 Release of matched red cells

When compatibility testing is complete and satisfactory, each matched unit has a Compatibility Label (Appendix 7) attached, stating:

- Identification of intended recipient (the patient)
- A description of the red cell unit (including special requirements)
- Date and time required

The introduction of the Electronic BloodTack System in December 2014 At Forth Valley Royal Hospital enables the transfusion laboratory to track every unit of blood taken out or put into the blood fridges. Only staff who have been trained in the use of the BloodTrack system are issued with a barcode, which enables them to access the fridges to collect blood.

4.2 Collection of blood/blood components

Blood Collection is the only part of the transfusion process in which it is mandatory for the member of staff collecting the blood to be competency assessed. This is a legal requirement as part of the Blood Safety & Quality Regulations 2005, which are monitored by the MHRA.

Within Forth Valley Royal Hospital various staff groups of nursing/midwifery staff are involved in the collection of blood and blood products. The following procedures must be followed:

4.3 Minimum Data Set Required

Blood can only be issued against a Blood Collection slip containing all the information, as outlined below.

The Minimum Data Set required for every step of the Transfusion Process is:

- Surname
- Forename
- Date of Birth
- CHI number or other acceptable unique identifier*

The only exception to this is a patient who is unconscious and cannot be identified

*ED or Major Incident number.

4.4 Patient whose Identity is Unknown

If a patient is admitted unconscious and their identity is unknown, the following procedure must be followed if blood transfusion is necessary:

- The patient must be allocated a unique identification number.
- The minimum identifying dataset must include this number plus Unknown Male/Female (e.g. “Unknown Male A123456”).
Not Controlled if printed

- A patient identification band including this minimum data must be attached to the patient.
- This dataset must be used on samples and request forms for transfusion until additional identification details become available.
- When additional identification details become available, the hospital blood bank must be informed.

4.5 Collection Procedure

Across NHS Forth Valley only staff that have completed transfusion education and have completed BloodTrack training with a visual competency assessment in the collection of blood for transfusion may collect blood, accessing the fridge with their unique barcode and using a blood collection slip with patient’s minimum data (see below). These are the legal requirements set by The Blood Safety & Quality Regulations SI 2005/50.

The following procedures must be followed for collection of blood or blood components from the laboratory or issue fridge:

- Laboratory will contact ward/area when blood is ready to be collected
- Laboratory staff will place the blood in the appropriate issue fridge in the blood issue room adjacent to the laboratory
- Ward staff, when they are ready to commence transfusion will complete the following patient information, on a blood collection slip:
  1. First Name
  2. Surname
  3. Date of Birth
  4. CHI number of patient who is going to receive the blood product.
  5. Ward/area where patient is to be transfused

Only staff who have been trained in the use of the BloodTrack System and have a valid barcode can access the blood fridges and collect blood for transfusion.

4.6 Porter’s Role

Porters have no role in the routine collection of blood from the issue fridges; they do not have the appropriate training to do so.

Porters do have a role in the transport of blood when a Massive Haemorrhage protocol is activated and this is detailed in the Forth Valley Massive Haemorrhage Protocol.

4.7 Ward/Area Staff Role

Ward staff are responsible for collecting blood from the issue fridge. When collecting blood the member of staff must take a completed blood collection slip, containing the minimum data set described in section 4.5. This is the only item of identifying paperwork which may be used when collecting blood from the laboratory/issue fridge.
Ward staff must login to the BloodTrack system using the kiosk next to the fridge that the patients’ blood is in and the unique barcode issued to them once they have completed relevant training in BloodTrack system. The member of staff collecting blood must scan each unit of blood collected from the fridge as prompted by the BloodTrack kiosk; the units of blood are then put into a bag, available at the side of the fridge, for transportation to ward/area. Members of staff returning blood to the fridge must login to the kiosk for the appropriate blood fridge using their unique barcode and then scan the unit of blood being returned to fridge when prompted by the BloodTrack kiosk. If the BloodTrack system alarms the member of staff must immediately speak to laboratory staff as there may be a problem with the unit of blood and it may be unsuitable for transfusion.

Once the blood component has been collected the collection slip must be signed, name printed and dated by the person who collected the blood and put into the box provided at the issue fridge.

Staff collecting the product should deliver it immediately to the clinical area.

- Blood Products delivered in a Massive Haemorrhage by portering staff must be handed to a member of the registered nursing/midwifery or medical staff in the ward/area. (see below)

- When the blood product arrives in the ward / clinical area, the member of staff responsible for the transfusion should ensure that the correct blood or blood product has been collected for the patient who is due to receive the transfusion.

- Blood can only be removed from a blood fridge by a member of staff (nursing, midwifery, theatre and Blood Bank staff) who has completed Module 1 Safe Transfusion Practice education (which is mandatory for all staff who take any part in the transfusion process) and who has been Competency Assessed in the Collection of Blood and completed BloodTrack training. This is a legal requirement as stated in the Blood Safety & Quality Regulations 2005.

Please note - Porters will only bring Blood or Blood Products to the ward/area in a Massive Haemorrhage situation

- All matched units of red cells are stored in Blood Bank or in the issue fridges awaiting collection. Platelets, FFP and Cryoprecipitate are only stored in the Blood Bank Laboratory.
- Units should be collected individually and taken directly to the patient’s location for immediate transfusion.
- It is recommended that only one unit be removed from the fridge at a time. However, in an emergency it may be necessary to remove more than one unit.
- If the blood is not used within 48 hours of the request date, it will be de-reserved and removed from the issue fridge and returned to Blood Bank.
- Staff collecting the product should deliver it immediately to the clinical area.
- Blood Products delivered by portering staff in a Massive Haemorrhage must be handed to a member of the nursing or medical staff in the ward/area.
- When the blood product arrives in the ward / clinical area, the member of staff responsible for the transfusion should ensure that the correct blood or blood product has been collected for the patient who is due to receive the transfusion.
- Administration of blood transfusion should ideally commence within 30 minutes of removal from Blood Bank fridge, issue fridge or (in the case of
platelets/plasma products) the HTL and must be completed within four hours of leaving the fridge.

- In most cases, a unit of red cells should be transfused over 2 hours and no more. Of course, a transfusion may be given much more quickly, at the clinician’s discretion, if clinical need dictates (e.g. massive blood loss).
- If a unit of blood has been out of the blood issue fridge for more than 30 minutes, AND there is no prospect of completing the transfusion into the patient within 4 hours of removal from the fridge, it must be returned to blood bank for disposal (if it is likely to be transfused before 4 hours is up, transfusion should commence, but the infusion must be discontinued at 4 hours even if not completed).
- Blood can be returned to the issue fridge if transfusion has not commenced within 30 minutes of removal from issue fridge. The BloodTrack system electronically tracks the time a unit is removed and returned to fridge. The fridge door will not unlock if the unit has been out for more than 30 minutes, in these cases the unit must be given to the laboratory staff.
- If in doubt about whether or not blood transfusion may be commenced, or discontinued, due to time out of the fridge, take advice from blood bank staff.

Under no circumstances may red cell components (or FFP or platelets) be stored in a ward or other domestic refrigerator.

5 ADMINISTRATION OF BLOOD COMPONENTS

A Transfusion Document (Pathway) must be used for every unit of blood transfused. Where practical, patients should be informed of their need for transfusion and the potential risks involved, including symptoms that should be reported during the infusion. Whenever possible, they should be given the opportunity to read the leaflet “Receiving a transfusion: information for patients and relatives” and give informed verbal consent to transfusion. A tick list can all be found on the front page of the Transfusion Document to document that patients have been informed of reasons for transfusion and given consent for transfusion. The clinical indication for transfusion, the date the decision to transfuse was made and the date it should be administered (if different) should be documented in the patient clinical records.

Transfusion must only take place when there are enough staff available to monitor the patient, and when the patient can be readily observed for the duration of the transfusion. Overnight transfusion should be avoided unless clinically essential.

All patients receiving blood should be in a clinical area where resuscitation facilities are available. After a blood product has been removed from an approved blood storage fridge and taken to the patient’s bedside (see section 4.2) the following procedures should be strictly adhered to:

5.1 Prescription of blood

The transfusion should be prescribed by a medical practitioner, or a registered nurse/midwife who has undergone specific training, on the Transfusion Document designed specifically for this purpose. To minimise communication error, ideally the person
requesting the transfusion should also write the prescription, though in practice this is not always possible. They should ensure that the blood requested meets all the patient’s transfusion requirements.

The infusion time for a single unit of red cells should not exceed 4 hours* from leaving the fridge (after this time the risk of bacterial infection of the blood becomes unacceptably high). There is extensive experience indicating a red cell transfusion rate of 90-120 minutes per unit, and this should be the norm for most patients**.

The prescription must contain the following minimum information:

- Minimum patient identifiers (Surname, forename, date of birth, CHI number or other acceptable unique identifier)
- Blood components to be transfused and their volume. The text must be clearly written and unambiguous. In NHS Forth Valley, the following terminology/abbreviations are acceptable/unacceptable:

<table>
<thead>
<tr>
<th>Component</th>
<th>Acceptable terminology</th>
<th>Not acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red cell concentrate</td>
<td>Red cell concentrate or RCC</td>
<td>“Blood”</td>
</tr>
<tr>
<td></td>
<td>Packed red cells or PRC</td>
<td>“Whole Blood”</td>
</tr>
<tr>
<td></td>
<td>Concentrated red cells or CRC</td>
<td>Any other term or abbreviation</td>
</tr>
<tr>
<td></td>
<td>Red cells</td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td>Platelets</td>
<td>Plats</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any other term or abbreviation</td>
</tr>
<tr>
<td>Fresh Frozen Plasma</td>
<td>Fresh Frozen Plasma or FFP</td>
<td>Plasma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any other term or abbreviation</td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td>Cryoprecipitate</td>
<td>Any other term or abbreviation</td>
</tr>
</tbody>
</table>

- Duration of infusion for each component
- Any clinical special requirements (such as irradiated, Hepatitis E negative or CMV negative, or use of a blood warmer)

*The only exception is for some cases of transfusion to neonates, where this time may, exceptionally, be extended to 4 1/2 hours.

**Red cell concentrates contain relatively little fluid – usually >70% of the volume is cellular, and therefore will contribute relatively little to intravascular volume. In most circumstances, therefore, it is unnecessary to extend the infusion time beyond 2 hours, and the decision to do so must be made on clinical grounds (more rapid transfusion is also, of course, acceptable for clinical reasons – e.g. massive blood loss).

Also the common practice of routinely prescribing a diuretic with blood (e.g. 20mg furosemide per unit of red cells) should be discouraged in favour of a more individualised approach, where administration of diuretic is determined by the cardiovascular/fluid status of the patient, and the presence or absence of other risk factors for Transfusion Associated Circulatory Overload (TACO) (see section 6.8). Diuretic must NOT be prescribed on the transfusion prescription – it belongs on the drug prescription chart – though the transfusion prescription may include an indication that it is required.

5.2 Bedside checking procedure
Blood and blood products must be administered by a registered medical / nursing/midwifery practitioner who has undergone appropriate training.

All patients receiving blood or blood products must wear an identification band (or risk assessed alternative identification device), whether an in-patient or a day patient.

*Always* adhere to the following procedure *at the bedside/next to the patient* for *each unit to be transfused*:

**If the checking process is interrupted, the entire process should restart from the beginning.**

- The final administration check must be conducted independently by the registered practitioner who is to administer the component.

- When a second practitioner is asked to confirm the final administration check, this must be performed entirely independently of the first check (“double independent checking”). (This should only be undertaken for patients who are unconscious, confused, or for children)

- The practice of two practitioners performing the check *together* is not acceptable and is more likely to reinforce an error than to prevent one. Again, “double independent checking” is required.

- The most important part of the procedure is to confirm that the information on the COMPATIBILITY LABEL attached to the product is identical to the information on the PATIENT’S IDENTIFICATION BAND (or risk assessed alternative identification device):

  - Full name
  - Date of Birth
  - CHI number or other acceptable unique identifier

- Where possible (fully conscious patient) ask the PATIENT to positively identify themselves by stating their:
  - Full name
  - Date of Birth

- It is important that the person administering the transfusion assesses the patient’s condition and ability to identify themselves. If the patient is unconscious, or unable to positively identify him/herself for other reasons (for example, confusion, neonates and small children), then identity must be confirmed by rigorous inspection of the patient’s identification band (or risk assessed alternative identification device). Verification of the patient’s identification should be obtained from a carer, if present at the patient’s bedside, and checked against the patient identification band.

- Caution is also required during a major incident where patients may be identified solely by a unique emergency number and *Unknown Male/Female*. This will also apply to unidentified patients in the Emergency Department.

- The donation number on the pack must be identical to the donation number on the compatibility label attached to it.
The expiry date of the blood product must be checked (units expire at midnight on the date of expiry).

The product should be examined for abnormalities e.g. clotting, discoloration and leakage.

If the patient has special requirements (e.g. CMV negative / irradiated blood/ HEV negative) the product should be checked to confirm its suitability.

DO NOT administer any blood product if there is any discrepancy identified in the above checking procedure. If there is a discrepancy discuss the matter with medical staff and Blood Bank staff, before commencing the infusion. If in doubt contact the HTL, Transfusion Practitioner or duty Consultant Haematologist.

Transfusion must not commence until there has been an investigation (however brief) and any discrepancies have been resolved.

The registered member of staff starting the transfusion should wear gloves.

The Transfusion Pathway / Prescription Form must be completed - ideally this should remain at the patient’s side throughout the transfusion, and be filed in the patient’s case notes at the end of the transfusion event. The following information must be documented:

- Date and time transfusion commenced
- Unique donation number of component transfused
- Legible identity, signature and role of person commencing transfusion
- Volume administered (in mls)
- Date and time transfusion completed

A standard blood transfusion administration set (with a 170 – 200 micron filter) must be used unless otherwise indicated by medical staff or the Blood Bank. An administration set is viable for 12 hours and may be used for more than one unit of red cells (but note below re-platelets).

It is not necessary to prime a blood / blood product administration set; however 0.9% saline (not dextrose) can be used for priming if required. If administering platelets and red cells then a fresh administration set should be used when administering a different component (e.g. if a unit of platelets is followed by a unit of red cells).

The transfusion should be commenced as soon as possible after a product is removed from either the blood fridge or controlled storage in the Blood Bank laboratory – see section 4.7.

No drugs should be added to blood or blood components.

If the Identity band is removed or becomes inaccessible it should be replaced as soon as possible on another limb, or an alternative risk assessed form of identification must be applied (see section 2.4).
Not Controlled if printed

- If a patient declines blood transfusion this must be documented in the case notes and a copy of any Patient Advanced Directive should be filed in case notes. A separate policy is available, giving guidance on the management of such patients.

5.3 Observation of patient during transfusion

In the Forth Valley Royal Hospital there are a large proportion of single rooms. This has the potential to mean that observation of patients during transfusion may be restricted. We have recorded no instances of patients coming to harm because of this, but would recommend that:

- The standard procedure for recording observations during transfusion is strictly adhered to – observations before (within 60 mins) of the start of transfusion, repeated at 15 mins into the transfusion, then hourly until the transfusion has finished; observations must also be taken up to one hour after each transfusion has completed.
- All patients should be in easy reach of the bedside call bell, informed of symptoms which might indicate a developing transfusion reaction, and told to inform a member of staff should these arise;
- For patients who are not able to call for help if symptoms arise, consideration should be given to nursing them in a four bedded bay rather than a side room, or performing observations more frequently.

Once a blood component transfusion has commenced, it is highly recommended that the patient remain in the same clinical area until the component has been fully transfused.

(See Flow Chart for Transfer of Patients with Blood Transfusion In progress Appendix 11)
Special care should be taken in patients who are unable to complain of symptoms which might raise suspicion of an adverse transfusion reaction (unconscious, very young, confused, language barrier). More frequent observations may be required.

Record pre-transfusion observations
A pre-transfusion recording of the patient’s temperature, pulse, respiration rate and blood pressure must be measured and recorded no more than 60 minutes before the start of EACH UNIT, and ideally before each unit is collected from the blood fridge (to minimise the likelihood of the component being “out of temperature control” - see 5.1). The Pre-Transfusion Checklist MUST be completed for each unit transfused.

Collect blood from blood fridge

Transfuse over 90-120 minutes (unless clinical reason for slower or more rapid infusion)

MAX 4 HOURS

Temperature, blood pressure and pulse should then be measured and recorded at 15 minutes after the start of the transfusion (this is the time when most acute transfusion events may occur) and if these measurements have altered significantly from the baseline values, then respiratory rate should also be taken. Observations should be recorded hourly thereafter until the end of the transfusion episode.

All monitoring of the patient should be recorded on the Observation chart during the transfusion episode.

The Transfusion Recordings must be clearly marked on the Observation chart and this chart must be filed in the patient’s case notes once the transfusion has been completed.

Record date and time when transfusion completed
Record post-transfusion temperature, pulse and blood pressure not more than 60 minutes post-transfusion. The date and time when the transfusion was completed must be recorded on the transfusion document. The Post Transfusion Checklist must be completed after each transfusion episode.
5.4 Post-transfusion observations

All in-patients should continue to be observed for signs of a transfusion reaction for the 24 hours following transfusion.

Patients transfused as a day case, or patients discharged soon after transfusion (within 24 hours), should be provided with a post transfusion advice slip which advises them to look out for any symptoms which might be due to a transfusion reaction and includes space to provide a contact telephone number which they can call should they have any concerns. (Appendix 12)
5.5 Confirming the transfusion - traceability

On commencement of transfusion of Red Blood Cells, Platelets, Fresh Frozen Plasma and Cryoprecipitate the Compatibility Label attached to the unit must be completed.

The Pink “peel off” part must be signed by the registered staff member checking / administering the transfusion with the date and time stated and placed on the blood prescription sheet, which must be filed in the patient’s case notes.

The Blue “tear off” section MUST be completed in full by the registered member of staff administering the transfusion, and MUST be returned to Hospital Blood Bank as soon as possible but always within 3 days of the transfusion. (Even if the patient only receives only a fraction of the unit of blood this still means the patient has received a transfusion). This is to comply with European and UK law – the Blood Safety and Quality Regulations 2005.

Please note that we are required by law to keep records of traceability of blood products for 30 years. Failure to return the traceability label means that records in blood bank cannot confirm that the blood component has been transfused. This will result in follow up action by the blood transfusion laboratory and Hospital Transfusion Team to confirm the fate of the blood component. This follow up action is detailed in the Forth Valley traceability non-compliance protocol flowchart below. **It is the responsibility of the practitioners administering the blood to return the label, and failure to do so places the organisation in breach of UK law.**
DAY 0
COMPONENT ISSUED TO PATIENT

DAY 3
TAG RETURNED

NO

YES

NO FURTHER ACTION REQUIRED

LETTER SENT VIA EMAIL TO SERVICE MANAGER ASKING FOR CONFIRMATION OF FATE

SERVICE MANAGER CO-ORDINATES A REVIEW OF MEDICAL NOTES TO ENSURE FATE OF COMPONENT i.e. COMPLETED PINK STICKERS AND ARRANGES FOR FORM TO BE SIGNED AND RETURNED TO BLOOD BANK

YES

NO FURTHER ACTION REQUIRED

TRANSFUSION CONFIRMED

NO

YES

NO FURTHER ACTION REQUIRED

NO FURTHER ACTION REQUIRED

NO FURTHER ACTION REQUIRED

IR1 ISSUED

NO

YES

IR1 RAISED FOR NON COMPLIANCE AND SENT TO THE GENERAL MANAGER FOR THE AREA CONCERNED

GENERAL MANAGER INITIATES AN INVESTIGATION AND REVIEW OF MEDICAL NOTES IF THIS HAS NOT OCCURRED TO ENSURE FATE OF COMPONENT

NO FURTHER ACTION REQUIRED

BLOOD BANK MANAGER INFORMS TRANSFUSION PRACTITIONER OF DETAILS BY EMAIL. TRANSFUSION PRACTITIONER INVESTIGATES BY ARRANGING REVIEW OF MEDICAL NOTES

NO FURTHER ACTION REQUIRED

DAY 0 COMPONENT ISSUED TO PATIENT

LABS GENERAL MANAGER INFORMED OF UNFATED UNIT

REPORTS REGARDING MISSING UNITS WILL BE PROVIDED TO THE HOSPITAL TRANSFUSION TEAM AND HOSPITAL TRANSFUSION COMMITTEE.
5.6 **Completion of the transfusion**

On completion of the transfusion all blood or blood product packs should be disposed of in clinical waste bags unless there has been a suspected transfusion reaction. In the latter situation the packs must be returned to the Hospital Blood Bank, immediately, for investigation.

Upon completion of the transfusion the Blood Transfusion Document/ Prescription Form should be filed in the patient’s medical notes.

An indication of whether or not the transfusion achieved the desired effect should be noted in the patient’s case record, along with the management and outcome of any transfusion reactions or adverse events.

5.7 **Blood Spillage**

Blood is a potentially infectious substance and must be handled carefully;

- Personal protective equipment must be used when dealing with spills, e.g. gloves, apron.
- If a blood bag is damaged when being removed from the blood fridge the spill must be dealt with immediately. Inform Laboratory staff immediately, they will deal with all blood spills in the Issue fridge area.
- Spilled blood can be treated with chlorine granules and scooped into a hazardous waste bag.
- Spilled blood can be treated with 100ppm chlorine solution and mopped up with absorbent paper towels. Discard the towels into a hazardous waste bag.
- The fridge cabinet or floor area must be cleaned with a 10000ppm chlorine solution, rinsed with water and dried. All tissues must be disposed of into a hazardous waste bag.
- If a carpet is contaminated it can be treated with 10,000 ppm chlorine solution and advice sought from the domestic supervisor.
- Inform the Hospital Transfusion Laboratory of the unit number of any pack which bursts in the ward/clinical area and which is not transfused to the patient, as the fate of all blood units must be documented to comply with the Blood Safety and Quality regulations. The Hospital transfusion laboratory will also be able to arrange for a replacement unit to be cross-matched if still required. When disposing of any burst packs, if the blood bag is heavily contaminated place it in a leak proof plastic bag before disposal in a hazardous waste bag.

5.8 **Blood arriving from another hospital**

Blood arriving with a patient from another hospital (outwith NHS Forth Valley) should be taken to the Hospital Blood Bank. Only HTL staff can ensure that the blood can be transfused (and only if it was transported in a validated temperature controlled container which has not been opened en route). Ideally, the blood component should be transferred between the Blood Transfusion Laboratories of the two hospitals rather than between clinical areas, and issued from the receiving Hospital Blood Bank as for any other unit of blood.
6 BLOOD TRANSFUSION REACTIONS

Acute complications of transfusion

A detailed knowledge of the mechanisms of the various types of transfusion reaction is not required in most instances. It is more important to have a clear idea what to do if a patient develops a transfusion reaction, and which investigations to carry out. Please see separate policy available on the Transfusion Laboratory page on the Intranet.

The algorithm in Appendix 9 describes recognition and immediate management of acute complications of transfusion. The basic principles of management are as follows (from BCSH Guideline on the investigation and management of Acute Transfusion Reactions 2012):

6.1 Recognition of acute transfusion reactions (ATR)

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

Acute transfusion reactions can present with a range of symptoms and signs of varying severity, including:

- Fever
- Chills and rigors
- Myalgia
- Nausea and/or vomiting
- Cutaneous symptoms and signs including urticaria, rashes and pruritus
- Angioedema
- Respiratory symptoms and signs including dyspnoea, stridor, wheeze and hypoxia
- Hypotension
- Pain
- Severe anxiety or feeling of impending doom
- Bleeding diathesis with acute onset.

Differentiating between a mild reaction and the early stages of a more severe reaction can be difficult. The safe option is to stop the transfusion, even temporarily, and have the patient assessed. Some guidance on differentiating between mild and more severe reactions is given in section 6.3.

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

If in doubt assessment by a more senior clinician is essential. Advice may also be sought from the duty Consultant Haematologist.

Patients should be asked to report symptoms which develop within 24 hours of completion of the transfusion.
6.2 Immediate management of ATR (Acute Transfusion Reaction)

If a patient develops new symptoms or signs during a transfusion, as described above:

- Stop the transfusion – close off the infusion so that no more donor blood is infused (in ABO incompatibility, even a small amount of blood can cause a severe reaction);
- Maintain venous access with normal saline;
- Assess Airway, Breathing Circulation (ABC);
- If necessary and as indicated by ABC, begin resuscitation of the patient and call for help;
- Call for early medical review, regardless of severity and before recommencing transfusion;
- Check that identification details given by the patient (positive identification), their ID wristband band and the compatibility label of the blood component, all match;
- Perform a visual inspection of the component and assess the patient with standard observations (EWS chart).

6.3 Management of mild reactions

For patients with mild reactions, such as pyrexia (temperature of > 38°C and rise of 1.2°C), and/or pruritus or rash but without other features, the transfusion may be continued with appropriate treatment and direct observation;

- Patients with mild isolated febrile reactions may be treated with oral paracetamol (0.5-1.0g in adults).
- Patients with mild allergic reactions may be managed by slowing the transfusion and treatment with an antihistamine such as chlorpheniramine.

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

For patients with recurrent febrile reactions, premedication with oral paracetamol given one hour before the transfusion, or a non-steroidal anti-inflammatory drugs in patients with predominant chills or rigors, may be beneficial.

Patients who continue to react should have a trial of washed blood components.

For patients with recurrent allergic reactions, alternative causes such as allergy to drugs or latex gloves should first be excluded.

For patients with recurrent moderate or severe allergic reactions, other than those in which the patient is IgA deficient, options for further transfusion include:

- Use of directly monitored transfusion of standard components in a clinical area with resuscitation facilities. Consider antihistamine prophylaxis. This may be the only option when further transfusion is urgent and withholding blood is a greater risk.
- Transfusion of washed red cells or platelets.
6.4 Management of moderate or severe reactions

Consider the following possible causes:

- Anaphylaxis (see section 6.5) including IgA deficiency (section 6.7)
- Acute haemolytic transfusion reaction
- Bacterial contamination (more common with platelet transfusions)
- Pulmonary complications of transfusion (section 6.8)

Immediate management is described in section 6.2, and in addition:

- Take down the blood pack and blood administration set.
- Replace with fresh administration set and keep line open with saline.
- Report to nurse in charge who will notify medical staff, including on call haematologist (contact via switchboard).
- Senior doctor must be involved in managing the patient.
- Maintain airway and resuscitate the patient.
- Catheterise and measure hourly urine volumes.
- Notify duty BMS staff in Blood Bank. Urgently dispatch blood pack, blood administration set and a fresh EDTA cross-match specimen to the Blood Bank.
- Send blood for blood cultures (see below) and consider broad spectrum intravenous antibiotics if bacterial contamination possible.
- Return all other used, or unused blood packs to the Blood Bank.
- Further investigation, treatment and need for transfusion require discussion with the duty consultant haematologist.

6.5 Management of anaphylaxis

The recognition of anaphylaxis is outwith the scope of this protocol. Rapidly developing features of airway, breathing or circulation problems usually associated with skin and mucosal change would suggest anaphylaxis.

Anaphylaxis should be treated with intramuscular adrenaline (epinephrine) according to UKRC guidelines.

Patients who have experienced moderate or severe allergic reactions should have IgA levels measured. Low levels found on screening, in the absence of generalised hypogammaglobulinaemia, should be confirmed by a more sensitive method and IgA antibodies should be checked.

Patients who have experienced an anaphylactic reaction associated with transfusion must be discussed with an allergist or immunologist.

For patients with reactions due to IgA deficiency, see section 6.7.

6.6 Laboratory Investigations

In all moderate and severe transfusion reactions, the following standard investigations must be performed urgently:

- Full blood count
- Renal and liver function tests
Not Controlled if printed

- Serum LDH and haptoglobin
- Full coagulation screen
- Assessment of the urine for haemoglobin
- Group and Save transfusion sample (to repeat transfusion serology, including DAT)
- Blood cultures
- Chest X-Ray if dyspneic or hypoxaemic
- Implicated units should be returned to the laboratory for further investigation.

It is also appropriate to request serum immunoglobulin levels (looking for IgA deficiency) particularly in a patient who suffers a severe allergic or anaphylactic reaction.

6.7 **IgA deficiency**

Patients with confirmed IgA deficiency and a history of reaction to blood should be transfused with components from IgA-deficient donors (first choice) or washed red cells (second choice) if time allows.

Life-saving transfusion should not be denied or delayed if these are not immediately available but the facilities and skills to manage severe allergic reactions must be present.

Patients with IgA deficiency diagnosed after an ATR should be discussed with an allergist or immunologist regarding future management.

Patients with known IgA deficiency (IgA <0.07g/l) and no history of reactions to blood must be assessed on an individual basis, taking into account the urgency of transfusion, the indication for IgA testing, the anticipated frequency of transfusion and history of allergy/anaphylaxis in other settings. Most will receive standard components without problems, but discussion with a transfusion medicine or clinical immunology or allergy specialist is advisable if time allows.

6.8 **Pulmonary complications of blood transfusion**

There are two main causes of severe respiratory distress precipitated by blood transfusion:

1. Transfusion Associated Circulatory Overload (TACO) - hydrostatic pulmonary oedema due to transfusion;
2. Transfusion Associated Acute Lung Injury (TRALI) - acute lung injury (ALI) due to increased pulmonary microvascular permeability with increased protein in the oedema fluid (the cause remains controversial).

Consider one of these if respiratory distress occurs during or within 6 hours of completing a blood transfusion (including FFP).

Differentiating between TACO and TRALI can be difficult and a senior clinician should be involved in the management of either/both:

<table>
<thead>
<tr>
<th></th>
<th>TRALI</th>
<th>TACO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient characteristics</strong></td>
<td>More frequently reported in haematology and surgical patients</td>
<td>May occur at any age, but characteristically age &gt; 70</td>
</tr>
<tr>
<td><strong>Type of component</strong></td>
<td>Usually plasma or</td>
<td>Any</td>
</tr>
</tbody>
</table>
### Platelets

<table>
<thead>
<tr>
<th>Speed of onset</th>
<th>Defined as occurring within 6 hours of transfusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>During or within 6 hours of transfusion, usually within 2 hours.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oxygen saturation</th>
<th>Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood pressure</td>
<td>Often reduced</td>
</tr>
<tr>
<td>JVP</td>
<td>Normal</td>
</tr>
<tr>
<td>Temperature</td>
<td>Often raised</td>
</tr>
<tr>
<td>CXR findings</td>
<td>Often suggestive of pulmonary oedema with normal heart size: may be a “whiteout”</td>
</tr>
<tr>
<td></td>
<td>Cardiomegaly, signs of pulmonary oedema</td>
</tr>
<tr>
<td>Echo findings</td>
<td>Normal</td>
</tr>
<tr>
<td>Pulmonary wedge pressure</td>
<td>Low</td>
</tr>
<tr>
<td>Full blood count</td>
<td>May be fall in neutrophils and monocytes followed by neutrophil leucocytosis</td>
</tr>
<tr>
<td></td>
<td>No specific abnormalities</td>
</tr>
<tr>
<td>Response to fluid load</td>
<td>Improves</td>
</tr>
<tr>
<td>Response to diuretics</td>
<td>Worsens</td>
</tr>
</tbody>
</table>

In addition to the categories of TRALI and TACO, SHOT (Serious Hazards of Transfusion) is now collecting cases of **transfusion associated dyspnoea (TAD)**. The International Haemovigilance Network defined as respiratory distress within 24 hours of transfusion that does not meet the criteria of TRALI, TACO or allergic reaction.

**Anaphylaxis** also presents with SOB but also with acute severe hypotension.

**TACO in particular should be considered preventable. Risk factors for TACO include:**

- Age of patient (very young or very old – esp. >75);
- Pre-existing LV dysfunction;
- Low BMI;
- High volume plasma transfusion (including for reversal of anticoagulation);
- Rapid rate of transfusion;
- Renal impairment;
- Hypoalbuminaemia;
- High whole blood or plasma viscosity.

**Suggestions to minimise risk:**

- Make sure transfusion is appropriate and necessary;
- Avoid “standardised transfusion protocols” (i.e. giving blood volume according to Hb) in favour of using a dose calculator (especially in the elderly and those <60kg);

**Transfusion volume (mls) = (desired Hb g/dl – actual Hb g/dl) x 3 x body weight (kg)**

---

1 Standard unit of packed cells contains 300-400mls – volume varies from unit to unit.
Not Controlled if printed

- Make better use of smaller volume transfusions at reduced transfusion interval (especially in the elderly), e.g. 1 unit weekly rather than 2-3 units less often;
- In patients at risk of TACO, transfuse each unit over as long a period as practicable (the “4 hour out of cold chain” rule means that realistically 3 1/2 hours is the maximum time per unit, allowing for transport to bedside and other delays);
- In patients at risk of TACO, pre-medication with furosemide is reasonable (20-40mg/unit of blood transfused);
- If a day medicine patient exhibits any signs of TACO (especially hypertension or fluid overload), even if they appear to respond well to diuretic, it might be appropriate to admit overnight for post-transfusion monitoring.

6.9 Delayed Complications of Transfusion

These include:
- Delayed haemolytic transfusion reactions, usually presenting with jaundice and falling haemoglobin 5-10 days after transfusion of red cells.
- Transfusion Associated Graft Versus Host Disease – preventable by giving irradiated blood products to at risk patients (see appendix 6 Special Requirements). Fever, rash, liver and renal impairment and bone marrow failure 4-30 days after transfusion.
- Post-transfusion purpura – severe thrombocytopenia presenting 5-12 days after transfusion of red cells or platelets.
- Transfusion Transmitted Infection – other than acute bacterial infection.

Details can be found in The Handbook of Transfusion Medicine (see bibliography) but if any of these are suspected, a consultant haematologist must be contacted for advice on investigation and management.

6.10 Reporting complications of transfusion

All transfusion reactions and near misses (errors or events which have the potential, if not detected, to cause harm to a patient) except mild febrile and/or allergic reactions must be reported to the Hospital Transfusion Team.

Once appropriate action has been taken to safeguard the patient, the Consultant Haematologist and/or Transfusion Practitioner and the relevant Service Manager should be informed. An electronic Safeguard report must be completed by ward/area nursing/medical staff.

There is now a legal requirement for any SAR (Serious Adverse Reaction) or SAE (Serious Adverse Event) to be reported to the MHRA (Medicines and Healthcare products Regulatory Agency) via SABRE (Serious Adverse Blood Reactions and Events). Such events MUST therefore be reported to a member of the Hospital Transfusion Team. If it is unclear whether the incident is transfusion related, or needs to be reported, it is always appropriate to discuss with the HTT.

It is also appropriate good practice to inform the patient and/or relatives that an adverse reaction/event has occurred as a consequence of a blood transfusion.
The term blood product is used for all therapeutic materials made from blood and includes both cellular components and plasma fractions. In addition to red cell concentrates, the following blood products are available via the Hospital Blood Transfusion Laboratory:

- Fresh Frozen Plasma (FFP)
- Cryoprecipitate (“cryo”)
- Platelet concentrates
- Specific coagulation factor concentrates for specific deficiencies (e.g. factor VIII concentrate for haemophilia A)
- Prothrombin Complex Concentrate (Beriplex) for oral anticoagulation reversal

All these products are made available ONLY after discussion with the duty Consultant Haematologist (available via switchboard) who will assess the appropriateness of the request.

In addition, the following product is available according to protocol and issued according to agreed guidelines for the prevention of anti-D sensitisation in RhD negative pregnant women:

- Human Anti-D Immunoglobulin

Please note that the Consultant Haematologist will often provide useful advice about which product to use – ask early on in the patient’s management.

The following plasma-derived products are available from pharmacy:

- Human Albumin 5.0% solution 500ml
- Human Albumin 20% concentrate 100ml
- Human normal Immunoglobulin (intravenous immunoglobulin or “IVIg”)
- Human Hepatitis B Immunoglobulin
- Human Tetanus Immunoglobulin
- Human Varicella-Zoster Immunoglobulin
- Human Rabies Immunoglobulin

### 7.1 Ordering blood products

Blood products may only be ordered by an appropriately registered member of medical or nursing/midwifery staff.

For FFP, cryoprecipitate and platelet concentrates, the Blood Bank requires fresh or historical evidence of the patient’s ABO and RhD blood group. If there is a historical record of the patient’s blood group, a fresh transfusion sample will not be required as “cross-matching” is not required. However, this means that particular care is required to ensure accurate identification of the patient when the request is made, and when the product is transfused.

See Appendix 3 for guidance on FFP and Cryoprecipitate transfusion and Appendix 2 for guidance on platelet transfusion.
For other products no blood group is required.

To order non-red cell components, follow the procedure for telephone requesting described in section 2.7 above.

### 7.2 Administration of non-red cell Blood Products

Blood products other than red cells must only be stored in and collected from Blood Bank and should be taken to the patient’s bedside where the standard procedure for administration of blood components must be followed (see section 5).

#### 7.3 Table of Products

<table>
<thead>
<tr>
<th>Blood Component</th>
<th>Storage Conditions</th>
<th>Filter Requirements</th>
<th>Duration of Transfusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Blood Cells</td>
<td>Stored at +2 to +6 ºC in a designated blood fridge with temperature control and alarm system. Not to be returned to blood fridge if out of storage for &gt; 30 minutes (Contact Blood Bank)</td>
<td>Blood component administration set (integral mesh filter (170-200 micron pore size))</td>
<td>The transfusion must be commenced within 30 minutes of removal from the fridge and completed within 4 hours of leaving the blood fridge</td>
</tr>
<tr>
<td>Platelets</td>
<td>Stored at +20ºC to +24ºC in the lab in an incubator with temperature control and alarm system on an agitating rack, with continuous gentle agitation and must never be refrigerated.</td>
<td>Blood component administration set (integral mesh filter (170-200 micron pore size) which has not been used to give other blood components)</td>
<td>Should be infused immediately after arrival in the clinical area over 30-60 minutes.</td>
</tr>
<tr>
<td>Fresh Frozen Plasma and Methylene-blue treated FFP</td>
<td>Stored frozen at -30ºC in Lab in a freezer with temperature control and alarm system. Thawed prior to use. Once thawed cannot be re-frozen</td>
<td>Blood component administration set (integral mesh filter (170-200 micron pore size)</td>
<td>Should be infused as soon as possible over approximately 30 mins per unit (may be given faster if clinically indicated, e.g. major haemorrhage). If stored at 20-24ºC transfuse within 4 hours of thawing. If stored at +2 to +6ºC in a designated blood fridge, transfuse within 24h of thawing.</td>
</tr>
</tbody>
</table>
Cryoprecipitate | Stored frozen at -30°C in a freezer with temperature control and alarm system. Thawed prior to use. Once thawed cannot be re-frozen. | Blood component administration set (integral mesh filter (170-200 micron pore size)) | Should be infused as soon as possible over approximately 30-60 mins per pool (may be given faster if clinically indicated, e.g. major haemorrhage). Once thawed it must be stored at ambient temperature and transfused within 4 hours.

8 ADDITIONAL INFORMATION

8.1 Informed consent

Although in the UK there is no legal obligation to obtain written informed consent for a blood/blood component transfusion, there is a clinical and ethical responsibility to ensure that the patient receives adequate information to allow them to give informed verbal consent, whenever possible. This should include information pertaining to the risks and benefits of transfusion as well as information relating to available alternatives, for example, iron supplementation. The medical practitioner should document on the transfusion document:

- That the patient has been given an information leaflet and explanation of reasons for their transfusion
- That informed verbal consent has been obtained.

Leaflets for this purpose are provided free of charge by the SNBTS and have a sticker on the back page for completion by registered practitioners, to put into patients case notes as record of consent. These leaflets are available in all areas where transfusion may take place, and further copies can be obtained from the Transfusion Practitioner.

Nurses and doctors have a professional duty to ensure that they have adequate knowledge of transfusion related issues or that they can access the information and give support required by patients undergoing transfusion therapy.

If a patient is unable to consent at the time of transfusion (e.g. unconscious in ITU, ED or theatre), they should be informed after the event that they had a transfusion, and provided with an information leaflet.

A separate policy is available giving guidance on the management of patients who refuse transfusion.

8.2 Professional accountability

Every practitioner, both as a member of society and as a professional, is subject to the law. As well as adhering to professional standards, drawn up by the Nursing & Midwifery Council/General Medical Council, nurses/midwives and doctors are accountable to patients for the provision of safe and appropriate care during the transfusion process. They
are also accountable to their functional employer (NHS Forth Valley) for the provision of care appropriate to their level of knowledge and skills. All individuals performing any role in the transfusion process must ensure that they are aware of the procedures and are acting in accordance with these Guidelines. Transfusion of blood and blood components must be prescribed by a doctor, or a registered nurse/midwife who has undertaken specific education which allows them to prescribe blood. Only doctors and nurses/midwives who have completed module 1 Safe Transfusion Practice can take part in transfusion. It is a legal requirement that only those who have been competency assessment in the process of collecting blood for transfusion can collect blood components for transfusion (BSQR 2005). Both of these must be updated every two years.

8.3 Record keeping

Details of all blood components used and the clinical / laboratory indications for the transfusion must be recorded in the patient's health record. The components must be prescribed before transfusion is commenced.

The Transfusion Document must be used to record each transfusion episode

On completion of the transfusion, staff should ensure that all transfusion documents are filed in the correct patient’s case notes.

Ideally the following information should be documented in the Transfusion Document for every transfusion episode:

- Pre transfusion haemoglobin or platelet count
- Reason for transfusion
- Baseline observations (no more than 60 minutes prior to commencing transfusion)
- Prescription
- Pre-Transfusion Checklist
- Time and date transfusion commenced
- Duration of transfusion
- Signature of person(s) administering transfusion (pink sticker from blood bag label attached to transfusion prescription sheet completed with date and time transfusion commenced)
- Transfusion observation chart (Transfusion observations clearly marked)
- Fluid balance chart
- Record of any adverse event / complication of transfusion
- Post transfusion results: i.e. haemoglobin, platelet count
- Post Transfusion Observations (no more than 60 minutes after completion of transfusion)
- Post Transfusion Checklist

This information is essential for a number of reasons, including the investigation of a serious adverse event/reaction, look back exercises for transfusion-transmitted infection and for Audit purposes to ensure compliance with relevant National and local Guidelines.

8.4 Infusion devices

Blood warmers are most commonly required in:
Not Controlled if printed

- Large volume rapid transfusion i.e.
  - >50ml/kg/hour for adults
  - >15ml/kg/hour for infants

- Exchange transfusion in infants

- Patients with cold-agglutinins requiring transfusion

If a blood warmer is required, then the person responsible for the transfusion should strictly follow the manufacturer’s guidelines. Blood must NOT be warmed by any other means.

**Infusion pumps** are commonly used in intensive care to achieve optimum flow rates. Always check the manufacturer’s specification to ensure that the pump is suitable for the infusion of red cells, and that the doctor responsible for the patient’s care approves of its use. Gemini Blood Administration Sets must always be used when using Gemini Pump for transfusing patients.

In large volume rapid infusions, the use of a **pressure device** is recommended (rather than manual squeezing of blood bags). The maximum pressure that should be applied to a blood transfusion pack is 300mmHg.
FURTHER INFORMATION ON TRANSFUSION PRACTICE (BIBLIOGRAPHY)

a. Serious Hazards of Transfusion Annual Reports. SHOT office, Manchester Blood Centre, Plymouth Grove, Manchester.


h. Guidelines for policies on Alternatives to Allogeneic Blood Transfusion: British Committee for Standards in Haematology, Transfusion Task Force. 2006

i. Blood Safety and Quality Regulations (UK) 2005. HMSO.


k. Compendium of product information 2005 SNBTS.

l. RCN Guideline for Improving Transfusion Practice, Right blood, right patient, right time. 2013, Royal College of Nursing. Third Edition


o. www.learnbloodtransfusion.org.uk
GREEN GUIDELINES FOR RED CELL TRANSFUSION

APPENDIX 1

GREEN GUIDELINES FOR THE CLINICAL USE OF RED CELL TRANSFUSIONS


This document is intended to act as a guideline for clinicians on the indications for the use of red cell transfusion in the clinical setting.

- Before prescribing red cell transfusions, clinicians should be aware of when transfusion is and is not appropriate, and the risks and benefits of transfusion.
- Patients should give informed verbal consent to transfusion wherever possible, and have the right to refuse transfusion.
- Whenever possible patients should be given a clear reason for the transfusion.
- Whenever possible patients should be given information about the risks and benefits of transfusion in advance, and possible alternatives.
- An attempt to establish the cause of anaemia should always be made and transfusions should not be given if an effective alternative exists without a very clear and valid clinical reason.
- The reason for transfusion, the amount of blood transfused and an indication that the patient has consented should be documented in the case notes.

TRANSFUSION FOR ACUTE BLOOD LOSS

All patients with acute blood loss should be managed by a clinician with experience in such cases, and no patient should be allowed to come to harm because of a delay in red cell transfusion.

In the event of massive blood loss it is highly recommended that the NHS Forth Valley Massive Haemorrhage Protocol is activated – this is by far the most efficient mechanism for rapid delivery of blood components to the patient. Forth Valley guidelines on Major haemorrhage should be followed. These can be found on the intranet home page under clinical guidance.

ANAEMIA IN THE CRITICAL CARE SETTING

There is evidence to suggest that “over-transfusion” may increase mortality in the critical care setting, and current guidelines4 now recommend:

- A transfusion threshold Hb of 70g/l or below, with a target Hb range of 70-90g/l, should be the default for all critically ill patients, unless specific co-morbidities or acute illness-related factors modify clinical decision making (e.g. elderly, severe cardiac/respiratory disease).
- If specific co-morbidities or acute illness-related factors support a higher threshold, this should not exceed 90g/l in most circumstances.

In critically ill patients with sepsis, if in the early stages of resuscitation there is evidence of inadequate $\text{DO}_2$, consider a target of 90-100g/l, but in the later stages revert back to the more conservative target (70-90g/l).

In patients suffering from an acute coronary syndrome the Hb should be maintained at >80-90g/l.

Further situation specific guidance is available in the 2012 BCSH guideline.

**PERI-OPERATIVE TRANSFUSION**

*Aim to manage the patient so that transfusion is not needed or is kept to a minimum.*

- Investigate and treat pre-existing anaemia before surgery.
- Minimise challenges to haemostasis at the time of surgery – timely discontinuation/modification of antiplatelet and anticoagulant medication, management of bleeding disorders and thrombocytopenia. Close liaison with haematology consultant is important.
- Consider alternatives to allogeneic transfusion in good time before elective surgery – intra-operative and post-operative cell salvage, intra-operative haemodilution.
- Consider use of pharmacological agents to minimise intra-operative bleeding.
- Do not transfuse pre-operatively to try to achieve a “normal” Hb – avoid pre-operative transfusion if Hb >10g/dl.
- Manage acute intra-operative blood loss as acute blood loss in any other setting – see above.

**CHRONIC ANAEMIA**

Urgent transfusion is rarely indicated in this setting and there is usually time to formulate an appropriate management plan:

- Always seek to establish and treat the underlying cause of anaemia before deciding to transfuse.
- DO NOT transfuse where effective alternatives exist – such as iron deficiency, B12 or folate deficiency, autoimmune haemolytic anaemia – without a very good reason (e.g. life-threatening anaemia, decompensating acute cardiac/respiratory disease). Transfusion in this setting is usually both unnecessary and potential dangerous! Be prepared to seek haematological advice.
- If no treatable cause is identifiable, transfusion is a valuable tool, but the use of universal transfusion triggers (e.g. Hb 10g/dl) is inappropriate. The decision to transfuse should be made on an individual case basis – many patients are asymptomatic with an Hb as low as 8g/dl, whilst others do not tolerate an Hb of less than 11g/dl. Seek haematological advice.
- In haemoglobin disorders such as Sickle Cell Disease, specific guidance must ALWAYS be sought from a consultant haematologist before deciding to transfuse.
- Consider pharmacological treatments for chronic anaemia’s – e.g. Erythropoietin +/- G-CSF in myeloma and myelodysplastic syndromes.
- Transfuse the appropriate volume of blood – be guided by the formula for estimating the required volume of transfused blood to be found on page 32 of this protocol.
APPENDIX 2 GUIDELINES FOR PLATELET TRANSFUSION

Platelets are normally supplied in a single bag containing one adult dose (>250 x 10^9/l platelets). This will have been prepared either from a single donor by apheresis or recovered from 4 whole blood donations. These platelet preparations contain <5x10^6 WBC but have not undergone any viral inactivation treatment.

Recognised indications for use include:

**Therapeutic**
- Massive bleeding (if platelets <75x10^9/l)
- Significant bleeding with marrow failure (if platelets ≤ 30-50x10^9/l)
- Significant bleeding with dysfunctional platelets (irrespective of count)

**Prophylactic**

<table>
<thead>
<tr>
<th>Indication</th>
<th>Detail</th>
<th>Threshold for platelet transfusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone marrow failure without additional risk factors for bleeding</td>
<td>Acute leukaemia (excluding APML), other bone marrow failure syndromes with expectation of recovery.</td>
<td>&lt;10 (consider &lt;5 if patient develops refractoriness)</td>
</tr>
<tr>
<td>Bone marrow failure with risk factors for bleeding</td>
<td>APML. Other marrow failure syndromes plus infection, concurrent use of antimicrobials, concurrent coagulopathy (including anticoagulants), use of ALG in aplastic anaemia.</td>
<td>&lt;20</td>
</tr>
<tr>
<td>Chronic stable thrombocytopenia due to marrow failure</td>
<td>No expectation of recovery, e.g. MDS</td>
<td>No transfusion unless bleeding or additional bleeding risk.</td>
</tr>
<tr>
<td>Pre-surgery (Moderate risk)</td>
<td>Including LP, epidural anaesthesia, endoscopy plus biopsy, insertion of central lines, liver biopsy, transbronchial biopsy, laparotomy or similar</td>
<td>&lt;50</td>
</tr>
<tr>
<td>Pre-surgery (High risk)</td>
<td>Critical sites such as eyes or brain</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Bone marrow biopsy</td>
<td>None required</td>
<td>Prophylaxis not indicated in the absence of bleeding. Perioperative management is complex and advice from haematologist must be sought.</td>
</tr>
<tr>
<td>Platelet function disorders</td>
<td>Inherited or acquired</td>
<td>Platelet transfusions not recommended unless active bleeding or requiring surgery.</td>
</tr>
<tr>
<td>DIC (no bleeding)</td>
<td></td>
<td>Prophylactic transfusions</td>
</tr>
<tr>
<td>ITP</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When platelets should not be transfused
Platelet transfusions are generally contra-indicated in patients with Haemolytic uraemic syndrome (HUS), Thrombotic thrombocytopenic purpura (TTP) or Heparin induced thrombocytopenia (HIT). There are other occasions when they are likely to be of limited or no benefit. Haematology consultant advice must be sought before requesting platelets.

Storage of platelets
A platelet pool is stored at room temperature in the blood transfusion laboratory, and must be collected immediately before transfusion commences. **Under no circumstances must platelets be refrigerated.** The platelet transfusion must be completed within 4 hours of collection from the HTL, or the dose of platelets should be returned to the HTL and discarded. If the transfusion has not commenced within 30 minutes of collection, and it is uncertain whether the transfusion will be completed within 4 hours, the platelets should be returned to the HTL for storage until ready to be transfused.

Because they are stored at room temperature, there is an increased risk of bacterial contamination/growth in a bag of platelets. For this reason, they have a shelf life of only 5 days.

Because of the short shelf-life, the hospital blood bank does not maintain a stock of platelets on site – when requested; they have to be transported from the SNBTS in Glasgow. If not used, they cannot readily be returned, and are more likely to be wasted than red cells. It is therefore very important that requests are appropriate and, once ordered, platelets are given to the patient.

Requesting platelets
Any request for platelets must be made by a doctor, and must first be discussed with the duty consultant haematologist, who will, if appropriate, verbally authorise the request. It is then the responsibility of the requesting doctor to contact the Blood Bank using the telephone requesting procedure outlined in section 2.7 of this policy.

Administration
Platelets should be transfused immediately the product reaches the ward / clinical area through a **fresh** standard blood giving set with a 170 – 200 micron filter (platelets must NOT be infused through a giving set already used to give red cells), usually over 30 minutes and no longer than 1 hour. The procedures for collection and administration of blood products described in sections 4 and 5 of this policy must be followed.

Any unused Blood Product MUST be returned to the Blood Bank for safe disposal and product traceability.
APPENDIX 3  GUIDELINES FOR PLASMA TRANSFUSION

Fresh frozen plasma (FFP) and Cryoprecipitate are prepared from plasma recovered from fresh blood donations. As such they do not routinely undergo any viral inactivation step. However, small amounts of these products are now available as Methylene Blue Treated FFP (MBT-FFP) or Cryoprecipitate which should be utilised in anyone born on or after 1 January 1996 and other patients likely to receive repeated product exposure. See separate policy on Transfusion of Neonates and Young Children.

Fresh Frozen Plasma is available in single donor units (approximately 250ml) containing most plasma proteins, including all coagulation factors (Fibrinogen 2-5g/l, Factor VIII > 70iu/dl), albumin and immunoglobulins.

Accepted clinical indications for use of FFP (usually at a dose of 12-15ml/kg) include:

- Replacement therapy in patients with single coagulation factor deficiency, for which a specific factor concentrate is not available (viral inactivated-FFP preferred)
- Acute Disseminated Intravascular Coagulation (DIC).
- Other situations where coagulation tests indicate a coagulopathy (e.g. massive transfusion, liver disease).

It is also effective in the following situations, but is not the product of choice and should only be used if the first choice product is unavailable:

- Reversal of warfarin effect (in addition to vitamin K). A Prothrombin Complex Concentrate such as Beriplex is the product of choice). See separate policies on Warfarin Reversal and Prothrombin Complex Concentrate.
- Thrombotic Thrombocytopenic Purpura (TTP) – the product of choice is Octaplas.

Cryoprecipitate is available in packs containing 5 donor units (a 5 donor unit pack is “one adult dose”) containing predominantly Fibrinogen (150-300mg per unit), Factor VIII (80-120 IU per unit) and Von Willebrand Factor. Cryoprecipitate is usually issued in doses of 2 or 4 adult doses.

Accepted indications for Cryoprecipitate include:

- Fibrinogen replacement therapy in congenital deficiency/dysfunctional states (where fibrinogen concentrate is unavailable).
- Severe coagulopathy (DIC), in addition to FFP, when Fibrinogen <1g/l.

Storage of FFP/cryoprecipitate

FFP and Cryoprecipitate are stored at < -30°C. Thawing takes approximately 15-30 minutes. Once collected it must be transfused as quickly as possible, but no longer than 4 hours after thawing if stored at room temperature.

If FFP, once thawed, is kept in the blood refrigerator, it may be stored for up to 24 hours. Under no circumstances may it be stored in a refrigerator not designed to store blood components.

Requesting FFP/cryoprecipitate

Any request for FFP/cryoprecipitate must be made by a doctor, and must first be discussed with the duty consultant haematologist, who will, if appropriate, verbally authorise the request. It is then the responsibility of the requesting doctor to contact the...
Blood Bank using the telephone requesting procedure outlined in section 2.7 of this policy.

**Administration**
FFP/cryoprecipitate should be transfused immediately the product reaches the ward/clinical area usually over 30 minutes per unit of FFP or adult dose of cryoprecipitate (more rapidly in emergency situations) and over no longer than 4 hours. The procedures for collection and administration of blood products described in sections 4 and 5 of this policy must be followed.

Any unused Blood Product MUST be returned to the Blood Bank for safe disposal and product traceability.
APPENDIX 4  LOCATION OF EMERGENCY 0 RH NEGATIVE BLOOD

Location of Uncross-matched O Rhesus Negative Blood at FVRH

- Theatre blood fridge 3 adult units and 2 Paedipacks
- Issue fridge 2: Blood issue room 3 adult units
- Hospital transfusion laboratory 15 units
APPENDIX 5  SPECIAL REQUIREMENTS

It is the clear and unambiguous responsibility of the requesting doctor to ensure that any special requirements are communicated to the blood bank at the time of the request.

Generally, there are three categories of special requirement:

Irradiated blood products

Transfusion-Associated Graft Versus Host Disease (TA-GVHD) is a rare but serious and usually fatal condition which may arise when certain groups of patients, particularly those with defective cell-mediated immunity, are transfused with cellular blood products (red cells and platelets).

It is almost entirely preventable by irradiation of donor blood/platelets destined for transfusion in the following circumstances:

- Where the recipient has at any time received treatment with purine nucleoside analogues (Fludarabine, Cladribine, 2-Deoxycoformycin, Clofarbine or Bendamustine) or the monoclonal antibody Alemtuzumab, or antithymocyte globulin (ATG), continued indefinitely.
- Where a patient is to donate bone marrow/peripheral blood stem cells, either for autologous stem transplant or to be given to an allogeneic transplant recipient, during and for 7 days before stem cell collection.
- Where the recipient is undergoing/has undergone an autologous bone marrow/peripheral blood stem cell transplant, from initiation of conditioning chemotherapy until 3 months post transplant (6 months if conditioned with TBI).
- Where the recipient is undergoing/has undergone an allogeneic bone marrow/peripheral blood stem cell transplant, from initiation of conditioning chemotherapy, continued for as long as the patient is receiving GVHD prophylaxis (at least 6 months post transplant or until lymphocytes >1, indefinitely if chronic GVHD).
- Where the recipient is undergoing/has undergone an autologous bone marrow/peripheral blood stem cell transplant, from initiation of conditioning chemotherapy until 3 months post transplant (6 months if conditioned with TBI).
- Where the patient has been given a diagnosis of Hodgkin Lymphoma, from diagnosis and continued for life.
- Where HLA-selected blood products are to be transfused.
- Any directed donation (transfusion of blood/platelets from a first or second degree relative).
- All blood/platelets for intrauterine transfusion (IUT), or for neonates who have previously received an intrauterine transfusion.
- Blood for neonatal exchange transfusion – essential if previous IUT recommended for neonatal exchange transfusion in other circumstances if it will not result in undue delay.
- All granulocyte transfusions.
- Where the patient has a congenital disorder of cell mediated immunity (for advice on which disorders pose a risk, see BCSH Guidelines clinical use of irradiated blood components).

Identification of patients requiring irradiated blood components

In NHS Forth Valley responsibility for identifying patients at risk of TA-GVHD lies with the doctor responsible for requesting blood components from the Hospital Transfusion Laboratory. It is incumbent on the requesting doctor to notify the blood bank that irradiated products are required. As a matter of good practice, this should happen every time blood is ordered for such a patient, but the following procedures/systems are in place to minimise the likelihood that an at risk patient receives a non-irradiated component:

At the time of diagnosis:
1. All prescriptions for chemotherapy or other drug regimes which increase the risk of TA-GVHD, or which are commonly given to patients with Hodgkin’s lymphoma or other at risk disease states, include a prompt for the prescribing clinician to notify the HTL of the need for irradiated products;
2. The generic haematology chemotherapy consent form/treatment plan includes a requirement to note if a patient is at risk of TA-GVHD, to remind the clinician to notify the HTL;
**Once identified:**

3. All patients at risk of TA-GVHD must receive a copy of the SNBTS information leaflet *Information for patients needing irradiated blood* which includes a credit-card sized alert card to be carried by the patient;

4. An alert sticker must be placed on the front of the patient’s case notes by the doctor informing the patient of the special requirement. The same doctor should also inform the HTL by telephone, following which a flag added to the patient’s iLab record indicating the special requirement;

5. The patient’s details, including indication for irradiated products, and duration of risk, should be added to the HTL database by the doctor informing the patient of the special requirement. This is filed in the Haematology Laboratory shared drive (R drive) in the Blood Transfusion file. This file is checked periodically (at least monthly) by the HTL manager, and a flag added to the patient’s iLab record indicating the special requirement if this is not already the case;

6. A further alert should be added to the patient’s e-ward record.

7. When a blood component is requested for a patient, the patient’s transfusion record in iLab is always checked by the HTL biomedical scientist (BMS): if a flag is present indicating a special requirement which has not been identified by the requesting practitioner, this prompts an enquiry by the HTL BMS to determine if irradiated components are indicated;

8. The compatibility label on all cellular blood components indicates whether or not they have been irradiated;

9. Before transfusion commences, blood components must be prescribed on the standard Transfusion Document. This includes a prompt for the prescribing practitioner to indicate whether or not irradiated products are required;

10. The final bedside check includes the requirement to ensure that, if the prescription indicates a special requirement, the blood component issued has been irradiated.

**Transfusing irradiated red cell components**

Irradiated red cells may be stored for a maximum of 14 days after irradiation. If the patient is at particular risk of developing hyperkalaemia (neonates), they should be transfused within 24h of irradiation.

*All platelet and granulocyte components are irradiated automatically, and it is not necessary to irradiate plasma products of any kind. This guidance is therefore pertinent to red cell transfusions only.*

**Cytomegalovirus seronegative blood products**

Cytomegalovirus is a herpes virus, and primary infection is most often sub-clinical. In a few immunocompetent individuals, primary infection manifests as a self-limiting glandular fever-like illness.

Like all herpes viruses, CMV persists and from time to time undergoes sub-clinical but detectable reactivation in the peripheral blood. In immunocompetent individuals this is of no clinical consequence.

Certain groups of immunocompromised patients are, however, at risk of a more serious infective illness due to CMV, which may be fatal if not promptly identified and treated (preferably before symptoms occur). CMV is an intracellular virus which is carried in white cells (lymphocytes). The advent of universal leukopheresis has thus significantly reduced the risk of transmission of CMV in blood components. Certain groups of patients remain at risk, however, and such a patient has never before been exposed to CMV (so is CMV sero-negative), blood and platelets which have been selected from CMV sero-negative donors should be used to prevent “transfusion-transmitted CMV”.

**Patient groups for whom CMV negative blood/platelets should be selected**
Intrauterine transfusions and transfusions to neonates (up to 28 days old);
Elective transfusion in pregnancy in women who are CMV seronegative or whose CMV status is unknown. Most of these transfusions will be for women with congenital red cell disorders (sickle cell disease or thalassaemia). It is not necessary to provide CMV negative blood components for maternal transfusion at the time of delivery.

The objective in both these cases is to prevent congenital CMV infection in the fetus.

Most transfusions in pregnancy occur at or around the time of delivery, and the use of CMV negative components in these circumstances is unnecessary.

Identification of patients requiring CMV seronegative blood components
In NHS Forth Valley responsibility for identifying patients who require CMV seronegative blood components lies with the doctor responsible for requesting blood. It is incumbent on the requesting doctor to notify the blood bank that CMV seronegative components are required. As a matter of good practice, this should happen every time blood is ordered for such a patient, but the following procedures/systems are in place to minimise the likelihood that an at risk patient receives a non-selected component:

1. For all neonatal transfusions (<28 days old as determined by expected date of delivery) cellular blood components issued by the HTL are selected to be CMV seronegative. Transfusion in these patients requires special consideration. Please see separate Guideline on transfusion on neonates and young children.
2. Intrauterine transfusions are not carried out in NHS Forth Valley;
3. Cellular components issued for women receiving elective antenatal transfusion are selected by the HTL to be CMV seronegative regardless of the CMV status of the woman;
4. Emergency transfusions in pregnancy are almost always at or around the time of delivery, when CMV selected components are not required;
5. When a blood component is requested for a patient, the patient’s transfusion record recorded in iLab is always checked by the HTL biomedical scientist (BMS): if a flag is present indicating a special requirement which has not been identified by the requesting practitioner, this prompts an enquiry by the HTL BMS to determine if CMV seronegative components are indicated;
6. Before transfusion commences, blood components must be prescribed on the standard Transfusion Care Pathway. This includes a prompt for the prescribing practitioner to indicate whether or not CMV seronegative components are required;
7. The final bedside check includes the requirement to ensure that, if the prescription indicates a special requirement, the blood component issued is CMV seronegative.

It is not necessary to select CMV negative plasma products.

In a life-threatening situation, if blood or platelets are required urgently and CMV seronegative products are not readily available, seropositive products may be used. The decision to do so must be made by a senior doctor, in the best interest of the patient at the time.

What if a patient requires CMV negative or irradiated blood, but this is not requested?

If a patient in any of the above risk groups receives blood which is not irradiated and/or CMV negative, this is treated as a clinical incident and an electronic Safeguard incident must be completed. The Transfusion Practitioner, Hospital Transfusion Laboratory and consultant haematologist must be informed, and the incident reported to SHOT (Serious Hazards of Transfusion Committee) and SABRE.

It is also appropriate good practice to inform the patient and/or relatives of the error and potential consequences.

Phenotyped blood
This may be indicated for patients with certain chronic haematological conditions who require repeated red cell transfusions. These patients will generally be under the care of a consultant haematologist who will determine if phenotyped blood is required.

**Hepatitis E Negative Blood Products**

**Hepatitis E Negative Blood Products**

We are seeing a significant increase in the number of reports of cases of hepatitis E virus (HEV) arising from infection acquired in the UK. In most cases, the infection is mild and self-limiting but there is increasing evidence that HEV infection in the immunosuppressed patient may lead to persistent infection which may lead to chronic hepatitis and cirrhosis.

SNBTS started HEV testing in February 2016 and from the 14th March 2016 HEV negative components became available for transfusion in NHS Forth Valley. In line with other UK blood services, SNBTS will also test components for neonates and infants.

In NHS Forth Valley it is the responsibility of the requesting doctor to notify the blood bank that HEV negative components are required. As a matter of good practice, this should happen every time a blood component is requested for such a patient.

**Which patients should receive HEV negative blood components?**
The laboratory will supply HEV negative blood components for:

- Solid organ transplant recipients
- Allogeneic haematopoietic stem cell and bone marrow transplant recipients
- Neonates and infants up to the age of 12 months

**How long before and after transplantation will patients require HEV negative blood components?**

- Allogeneic Haematopoietic Stem Cell Transplant (HSCT) recipients from 3 months prior to date of planned HSCT to 6 months following allogeneic HSCT, or for as long as the patient is immunosuppressed. For patients with high transfusion burden due to diseases with a significant likelihood of proceeding to allogeneic HSCT over a period of a few months (such as acute leukaemia, aplastic anaemia or high risk myelodysplastic syndrome) this should be from the time of diagnosis
- Solid Organ Transplant (SOT)
  - Any SOT recipients receiving immunosuppressive medication
  - Potential SOT recipients from 3 months prior to the date of planned elective live donor transplant or from the date of listing on the deceased donor transplant waiting list. Patients receiving immunosuppressive therapy prior to SOT should also receive HEV screened components.

**Are there any other groups of patients that may require HEV screened blood components?**

SNBTS has taken the decision to screen all neonatal blood components and to provide screened blood components for infants up to one year old.

**Which HEV negative components will be available?**

- Red cells
- Platelets
- Fresh frozen plasma
- Pooled cryoprecipitate
- Granulocytes
- Plasma components prepared from non-UK donations are tested at source for HEV and may not be labelled as 'HEV negative:
  - Methylene blue treated and removed FFP
  - Methylene blue treated and removed cryoprecipitate (single units and pools)
If the laboratory has no HEV negative components, in an emergency, can unscreened blood components be given?
The risk of giving a potentially HEV positive component is 1 in 2500 with an infection rate of 40%. This has to be balanced against the risk of delaying transfusion in a life threatening haemorrhage or delaying life saving surgery.

*In a life-threatening situation, if a blood component is required urgently and HEV seronegative products are not readily available, untested products may be used. The decision to do so must be made by a senior doctor, in the best interest of the patient at the time.*

How will units be labelled as HEV negative?
This will be printed on the component label in the same location as other modifiers (e.g. CMV negative, irradiated). See below
APPENDIX 6  COMPATIBILITY LABEL AND TRACEABILITY TAG

STOP, SEE BACK OF THIS TAG BEFORE TRANSFUSION

NHS SCOTLAND © Scottish National Blood Transfusion Service 2005 V9

Donation No:
Component:
Signature 1: Date Given:
Signature 2: Time Given:

Peel off label above and place in patient’s Medical Records

Surname: Forename:
DOB: Gender:

Patient Identity No: Date/Time Required:

Patient Blood Group: Component:

Donation Number:

Special Requirements:

Once transfusion has been started, you must send the completed section below to the Hospital Transfusion Laboratory.
This is a legal requirement

Surname: Forename:
Patient Identity No: Lab Sample No:
Donation Number:
Component:

Date Given: Time Given:

I confirm that the above patient received this blood component.
Sign and Print Name

PRE ADMINISTRATION

STEP 1: Check the component has been prescribed
Check any special requirements e.g. irradiated
Check concomitant drugs e.g. diuretic.

STEP 2: Check and document baseline observations.

STEP 3: Check expiry date and time of component.
Check pack for leaks, discoloration or dumping.

ADMINISTRATION

STEP 1: Ask the patient to tell you their Surname,
Forename and Date of Birth, be especially vigilant with
unconscious or compromised patients, refer to your
local hospital policy.

STEP 2: Check their Surname, Forename and Date of
Birth and Patient Identity Number against their wristband
and the compatibility label.

STEP 3: Check that the information on the compatibility
label matches the details on the blood component i.e
donation number, blood group.

If there are any discrepancies – DO NOT PROCEED -
contact your Hospital Transfusion Laboratory.

If you suspect a transfusion reaction: STOP the
transfusion immediately, seek medical advice,
and contact the Hospital Transfusion Laboratory.

Under the Blood Safety and Quality
Regulations 2005
IT IS A LEGAL REQUIREMENT
that this section of the label be completed and
returned to the Transfusion Laboratory

© Scottish National Blood Transfusion Service 2005 Version 9
Transfusion laboratory contact clinical area when blood ready

Transfusion Laboratory Staff place the blood in the appropriate Issue fridge in the blood issue room adjacent to the laboratory

Competency-assessed clinical staff member with BloodTrack training and unique barcode collects blood from issue fridge using a blood collection slip with patient’s full name; date of birth; CHI number and clinical area blood required. Person collecting blood scans unit out of the fridge at the BloodTrack kiosk and completes collection slip with date, time and name of person collecting blood from the issue fridge. Completed blood collection slip left in the appropriate box at the issue fridge. Unit of blood placed in bag to transport to clinical area
APPENDIX 9 Training and Competency Assessment

Minimum requirements

Any member of staff who has a role in any aspect of the transfusion process, at any stage, is required to complete the Generic Module 1 Safe Transfusion Practice of the Better Blood Transfusion continuing education programme (or the Paediatric version if they work in Paediatrics) (online in an e-learning package at nhs.learnpro.uk.com). This includes anyone who requests, prescribes or administers blood, takes blood for pre-transfusion testing or collects and distributes blood to the clinical area. This education MUST be revalidated every two years.

Induction training

All individuals are required to complete mandatory induction training when they join NHS Forth Valley, and this includes Generic Module 1 Safe Transfusion Practice e-learning on NHS Forth Valley’s learnPro site. (Paediatric Module 1 should be completed by staff who only work in Paediatrics)

Venous sampling for pre-transfusion testing

This is included as a component of venepuncture training for all staff who undertake this role, and reinforced by induction training and Module 1 Safe Transfusion Practice.

Requesting and prescribing blood components

This is traditionally the role of qualified medical practitioners, and training in this aspect of transfusion practice is included in the continuing education programme of all Foundation Year doctors in NHS Forth Valley.

Qualified nurses/midwives may request blood components in any of the following circumstances:

- If specifically instructed to do so by a doctor for a specified patient
- If acting in accordance with an agreed protocol (such as a transfusion care pathway or maximum surgical blood order schedule)
- If they have undertaken specific training in this aspect of transfusion

Although blood components are not designated as medicines in accordance with the Medicines Act, it is accepted practice and NHS Forth Valley policy that they must be prescribed by a qualified medical practitioner prior to transfusion. However, qualified nurses/midwives may prescribe blood components if they have undergone specific training in this aspect of transfusion.

Collection of blood components for distribution to the clinical area

This aspect of transfusion practice is governed by the Blood Safety and Quality Regulations (2005). Only individuals who have received specific training in this aspect of transfusion practice, and been deemed competent after a formal assessment, can undertake this role. This training/assessment must be renewed every 2 years

Administration of blood components

This is included in Module 1 Safe Transfusion Practice
Competency Assessment

BCSH Guidelines (2009) now recommend that the following aspects of transfusion practice should be competency assessed at least every 3 years:

- Obtaining a venous blood sample
- Collecting blood components for transfusion (already subject to visual competency assessment every 2 years, see above) Includes BloodTrack training and only staff with valid unique barcode can access the issue fridge to collect blood for transfusion.
Acute Care, Emergency Department, Acute Receiving Unit
Transfusion Transfer Flow Chart

Bed Available in Ward/Area

Patient Requires Transfusion

Emergency Transfusion

Transfer patient from ED / ARU with blood transfusion in progress only in emergency situations.

Patient going straight to/from Theatre/ITU, Diagnostic and Intervventional Radiography

Non-Emergency Transfusion

Patients must not be transferred with blood transfusion in progress

Clinician to decide if patient must have transfusion prior to transfer to ward/area

Ward/area informed if patient to have transfusion once patient transferred.

APPENDIX 11
Blood Transfusion Advice for Patients Discharged on day of Transfusion
Going home after you’ve received a blood transfusion

You received a blood transfusion today prior to being discharged home. Once you are home if you have any questions or concerns please do not hesitate to contact us:

Ward _____________

Phone: 01324 -----------------

If you develop any problems in the first 24 hours after the transfusion: For example:

- High temperature
- shivers
- rash
- breathlessness
- dizziness

Please contact your GP or out of hours NHS 24 on the following number: 111

Your named nurse: ----------------------------

Your consultant: -----------------------------