University Hospitals of Derby and Burton NHS Foundation Trust

**TRUST POLICY FOR THE TRANSFUSION OF BLOOD – QUEENS HOSPITAL BURTON SITE (QHB)**

| **Reference Number:** POL-CL/1776/BUR040 | **Version:** | 9.1 | **Status:** Final | **Author:** Julie Buchan<br>**Job Title**: Transfusion Practitioner |
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| **Version / Amendment History** | **Version** | **Date** | **Author** | **Reason** |
| | 1-5 | Dec 2007 | Ass. Dir. Of Nursing, Clinical Governance | Original Policy |
| | 6 | April 2014 | Julie Buchan | Multiple changes to provide increased guidance for clinical practice. |
| | 7 | April 2016 | Julie Buchan | Full rewrite of Policy to incorporate changes in collection of blood, blood warming, midlines and patient blood management. |
| | 8 | October 2020 | Deb Price | Transfer of Policy to UHDB template |
| | 9 | May 2021 | Julie Buchan | Review and amendments following hospital merge. Inclusion of pre-operative anaemia and removal of OctaplasLG. |
| | 9.1 | September 2023 | Jeby Jeyachandran | Updated requirements for Irradiated blood components, Provision of blood to St. Giles, sample requirement wordings and PBM for Transgender patients. |
| **Intended Recipients:** All staff with responsibility for any step of the blood transfusion process at Queens Hospital Burton. | | | | |
| **Training and Dissemination:** Dissemination of this Policy is via the Intranet. Theory training is required by all staff involved in all steps of the transfusion process. Competency assessment is required by staff involved with venepuncture for blood bank samples, collection of blood and blood products and administration of blood for transfusion. Theory training is incorporated in Trust Induction and requires update at a frequency according to the job role. The Transfusion Practitioner is responsible for training provision | | | | |

**To be read in conjunction with:**

- Records Management - Trust Policy and Procedure
- Blood Transfusion - Consent - Burton Sites Trust Policy and procedure
- Blood Transfusion Major Haemorrhage - Burton Sites Trust Policy and Procedure
- Emergency Management of Red Blood Cell and Platelet Shortages - Burton Sites Trust Policy and Procedure
- Aseptic Non Touch Technique - Trust Policy and Procedures
- Intravenous Therapy - Clinical Guideline - Burton Sites Only
- Incident and Serious Incident Management - Burton Sites Trust Policy and Procedure
- Developing Our People Policy - Overarching Policy (except for the Appraisal section) for University Hospitals of Derby and Burton NHS Foundation Trust
- Waste Management Policy - Combined Derby Burton UHDBFT Policy
- Medication in the Peri-Operative Period - Management of - Clinical Guideline - Burton Sites Only
- Blood Transfusion Guidelines (Paediatrics and Neonates) - Paediatric Clinical Guideline - Burton Sites Only
- Warfarin - Clinical Guideline - Burton Sites Only

**In Consultation with and Date:**

QHB Hospital Transfusion Committee (HTC) QHB

Hospital Transfusion Team

Patient Safety Group

**EIRA** **stage one Completed**

Stage two Completed - No

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|---|---|
| **Approving Body** | Trust Delivery Group |
| **Date Approved** | August 2023 |
| **Review Date and Frequency** | June 2024 (Then every 3 years) |
| **Contact for Review** | Transfusion Practitioner QHB |
| **Executive Lead Signature** |  <br>Dr Gisela Robinson - Deputy Medical Director<br>*(on behalf of the Executive Medical Director)* |

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**ABBREVIATIONS / DEFINITIONS**

| | | |
|---|---|---|
| APTT | Partial Thromboplastin Time | |
| | Blood | A generic term used for all blood components including RBC's, FFP, platelets and cryoprecipitate. |
| | Blood component | A therapeutic constituent of human blood, as defined by the Blood Safety and Quality Regulations (BSQR). This generally refers to bags/units of RBC's, FFP, platelets and cryoprecipitate. |
| | Blood transfusion | The process by which a blood component is infused intravenously to a patient |
| BSH | British Society for Haematology | |
| BMS | Biomedical Scientist | |
| | Clinical Special Requirements | Patients' whose treatment regimes' requires blood to have been screened or treated in a particular way as defined by their clinical requirement. This includes irradiated and CMV seronegative blood. |
| | Cold Chain | A cold chain is a temperature-controlled supply chain. An unbroken cold chain is an uninterrupted series of storage and distribution activities which maintain a given temperature range |
| CMV | Cytomegalovirus | |
| Cryo | Cryoprecipitate | A blood component obtained by thawing and re-freezing FFP. It is a rich source of fibrinogen.<br>They are obtained by pooling five whole blood donations. |
| DIC | Disseminated Intravascular Coagulation | |
| EP | Electronic Prescription | |
| EPR | Electronic Patient Record | |
| FBC | Full Blood Count | |
| FFP | Fresh Frozen Plasma | Plasma obtained from donors and frozen to maintain the function of clotting factors. |
| G&S | Group and Screen | |
| GMP | Good Manufacturing Practice | |
| g/l | Grams per litre | |
| Hb | Haemoglobin | |

| | | |
|---|---|---|
| HTC | Hospital Transfusion Committee | |
| HTT | Hospital Transfusion Team | |

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|---|---|---|
| IM | Intramuscular | |
| INR | International Normalised Ratio | |
| IV | Intravenous | |
| MCH | Mean Corpuscular Haemoglobin | |
| MCV | Mean Corpuscular Volume | |
| MHRA | Medicine and Health products Regulatory Authority | |
| NBTC | National Blood Transfusion Committee | |
| NHS BT | National Health Service Blood & Transplant | |
| NA | Nursing Assistant | |
| ODA | Operating Department Assistant | |
| ODP | Operating Department Person | |
| Plt | Platelets | A platelet concentrate suspended in additive solution for the purpose of transfusion to a recipient. They are either obtained from a single donor by apheresis, or by pooling platelets obtained from four whole blood donations. |
| PT | Prothrombin Time | |
| QHB | Queens Hospital Burton | |
| RBC | Red Blood Cell | A red blood cell concentrate suspended in additive solution for the purpose of transfusion to a recipient. |
| SABRE | Serious Adverse Blood Reaction and Events | |
| SHOT | Serous Hazards of Transfusion | |
| TACO | Transfusion Associated Circulatory Overload | |
| | Traceability | The ability to trace each individual unit of blood from the donor to the patient receiving it. |
| TTP | Thrombotic Thrombocytopenia Purpura | |
| U&E | Urea and Electrolytes | |
| | | |

## 1. INTRODUCTION

A blood transfusion is a potentially hazardous procedure, which should only be undertaken when the clinical benefits outweigh the potential risks to the patient. The most important of these risks being administration of wrong blood, haemolytic reaction, circulatory overload and transfusion transmitted infections. Stringent procedures must be followed to ensure the correct blood is given and any adverse reactions are dealt with promptly and efficiently.

## 2. PURPOSE AND OURCOMES

This Policy applies to staff within the Queens Hospital Burton (QHB) Site who are directly involved in the process of blood transfusion, and those who support clinical staff by providing resources, training and management infrastructure.

This Policy includes indications for transfusion, consent, ordering, prescribing, collection, administration, the management of any complications, teaching safe transfusion, documentation and reporting of any adverse incidents in relation to transfusion.

This Policy applies to all staff involved in the transfusion of blood. This includes, but is not exhaustive to nurses, Doctors, anaesthetists, Healthcare Support Workers, Porters, ODP's and other Trust employees.

This Policy relates to the provision of blood components to both adults and children. This includes red blood cells (RBC), fresh frozen plasma (FFP), platelets and cryoprecipitate. When administering blood transfusions to children, also refer to the Paediatric Blood Transfusion Policy.

## 3. KEY RESPONSIBILITIES / DUTIES

All staff involved in the administration of blood transfusions have a duty to ensure they are administered safely. Such staff will have an awareness of this Policy and where it is located.

The Trust Board has a corporate responsibility for ensuring;

- The Trust provides a safe environment and systems of work for staff, patients and visitors, as far as reasonable practicable
- Overall responsibility of compliance with, and effectiveness of the administration of blood transfusions and the Blood Transfusion Policy
- That the Trust adheres to all statutory regulations relating to blood transfusion.

Clinical Directors and Associate Clinical Directors are responsible for:

- Ensuring staff who are involved in the blood transfusion process are competent through mandatory training and completion of competency requirements to ensure that the correct blood is given to the right patient at the right time
- Ensuring that staff follow policies and procedures for patient identification and the transfusion process from prescription, sampling, laboratory testing and issue of blood, to collection and administration of blood transfusions
- Ensuring that the approved National Health Service Blood and Transplant(NHSBT)

written information are made available to patients receiving a blood transfusion. This outlines the risks, benefits and potential alternatives to transfusion.

The Medical Director, Chief Nurse / Chief Operating Officer, Head Nurses, and Matrons, working with the Hospital Transfusion Committee (HTC), are responsible for ensuring that health care professionals are informed of and adhere to the Trust Policy.

Hospital Transfusion Committee (QHB)
Is responsible for reviewing this Policy as part of the consultation process. It is also responsible for identifying and managing risks associated with transfusion. The HTC meets quarterly. Minutes from the HTC are received by the Trust's Patient Safety Group.

Hospital Transfusion Team (HTT) (QHB)
The duties of the HTT include ensuring that the Trust has policies and procedures in place to meet national and clinical requirements, ensuring compliance with national transfusion standards and reporting near misses and Serious Hazards of Transfusion to SHOT and SABRE when appropriate.

The Site Lead for Blood Transfusion is responsible for:

- Ensuring the transfusion quality management system for blood bank is developed, implemented and maintained
- Haemovigilance.
- Participation in national quality assurance schemes
- Participation in national Blood Stocks Management Scheme
- Maintaining adequate stocks of blood and blood products
- Safe storage of blood components and products in line with Medicine and Health products Regulatory Authority (MHRA) requirements, and ensuring the cold chain is maintained
- Accurate ABO grouping and antibody screening / identification, cross matching and compatibility testing
- Timely provision of blood for routine and emergency use
- Recording end fate of all blood components and products issued by blood bank.

The Transfusion Practitioner is responsible for:

- Endorsing national transfusion guidelines and evidence-based practice
- Feedback any transfusion related issues to relevant Trust groups and external bodies as required
- Encouraging transfusion education/training and increasing clinical competency
- Facilitating transfusion audit and feedback (continuous improvement)
- Haemovigilance.

Staff
This Policy will be communicated through the staff briefing and via the intranet. All staff involved in any step of transfusion need to be aware of the transfusion policies and procedures and how they impact on their work. They are responsible for maintaining and updating their knowledge and practice, and ensuring that adverse incidents and reactions are reported.

## 4. PATIENT BLOOD MANAGEMENT

Patient Blood Management is an evidence-based, multidisciplinary approach to optimising the care of patients who might need transfusion. It encompasses measures to avoid transfusion such as anaemia management without transfusion and the use of anti-fibrinolytic drugs to reduce bleeding as well as restrictive transfusion. It ensures that patients receive the optimal treatment, and that avoidable, inappropriate use of blood is reduced (NBTC, 2014). Patient outcomes should focus on measures for the avoidance of transfusion and reducing the inappropriate use of blood. Therefore, it can help to reduce health-care costs and ensure the availability of blood components for those patients where there are no transfusion alternatives. It is everyone's responsibility to ensure that blood components are used appropriately for the benefit of patients.

The Trusts patient blood management program includes interventions taken early in the preparation of medical and surgical patients for treatment, as well as techniques and strategies in the preoperative, operative, and postoperative periods or completion of treatment. Three pillars of this type of program include optimizing haematopoiesis, minimizing blood loss and bleeding, and harnessing and optimizing tolerance of anaemia.

Two components of patient blood management offer the greatest opportunity to reduce blood use:

- Since preoperative anaemia is strongly associated with increased risk of transfusion in surgical patients, it is important to screen for anaemia early enough prior to surgery to have time to evaluate the cause of anaemia and treat it if possible
- Use of a restrictive transfusion approach reduces blood transfusion for those who do not need it.

In addition to these approaches, some other techniques that may reduce blood use include stopping drugs that impair haemostasis (e.g., aspirin) when possible, and using meticulous surgical technique.

However, the Patient Blood Management program and the broad guidelines should not supersede clinical judgment in decisions regarding transfusion, especially by clinicians who are familiar with the individual patient. As an example, if a patient is experiencing symptoms that are known to reflect cardiac ischemia in that individual, transfusion may be appropriate. Alternatively, if a patient is known to tolerate a lower Hb than that specified in the guideline, then it may be possible for that patient to avoid transfusion.

For queries regarding the Trusts Patient Blood Management Programme, refer to members of the QHB HTT or HTC.

## 5. MANAGEMENT OF PATIENTS - SURGERY

Surgery is associated with blood loss. Patients who are already anaemic before surgery have a higher risk of receiving a blood transfusion. Patient blood management focuses on avoiding blood transfusions by correcting anaemia before starting a surgical procedure, minimising blood loss during the surgery and optimising the anaemia treatment postoperatively.

### 5.1. Preoperative Management of Anaemia and Haemostasis

It is important to optimise the patient prior to any surgical procedure. Refer to Appendix D.

- Timely arrangements must be made for the identification and correction of anaemia before elective surgery, particularly if it is likely to involve significant blood loss
- The diagnosis of anaemia should be based on WHO classifications (130g/l)
- Where necessary, investigation should take place to exclude previously undetected serious illness
- If there is a suggestion of iron deficiency anaemia, the patient may need Ferrous Sulphate 200mg three times daily, if possible six weeks pre-operatively
- Avoid transfusion for managing anaemia if alternatives are possible e.g. oral iron for iron deficiency anaemia. Consider intravenous iron for functional iron deficiency (where adequate iron stores are present, but the availability of iron for erythropoiesis is reduced; as with anaemia of chronic disease), poor compliance with oral iron or the interval between diagnosis of anaemia and surgery is predicted to be too short for oral iron to be effective
- Anaemia not related to iron disturbance may be due to other nutritional deficiencies (Vitamin B12 and folate), secondary to renal failure, or of other causes. Testing for deficiency in vitamin B12 and folate is advised for anaemic patients.
- Clinical assessment is required for the timely management of patients taking anticoagulants and anti-platelet drugs that may increase the risk of bleeding
- Abnormal results should be discussed with a member of the clinical team who has sufficient authority to commence treatment, refer for further investigation and delay surgery as necessary
- For patients undergoing elective surgery, consider referral to the G.P. to assist with optimising the patient prior to surgery
- Ensure the patient has a historical blood group (G&S) recorded on their EPR (Blood Tests) in case transfusion is required. Refer to the 2 Sample Rule (section 11 .1) as the provision of group specific blood will require two blood group tests recorded on the patient's blood test history on EPR.
- Discuss the possibility of requiring blood with the patient if transfusion may be a possibility during the procedure. Inform the Consultant surgeon and Consultant Anaesthetist immediately if it is possible that the patient may decline blood during the procedure. Further discussion between the patient and the Consultant will need to take place to establish what the patient will accept in the event of massive haemorrhage. This may require referral back to the GP if the surgeon is unwilling to operate without the use of blood or blood products. Take blood tests for FBC, serum ferritin, B12, folate, U&E's, coagulation screen and estimated percent lysis (EPL) (ideally six weeks before elective surgery). If MCV is below 27, order ferritin
- Those patients who were found to be anaemic should be re-assessed prior to listing for theatre.

### 5.2 Patients on anticoagulants or antiplatelet drugs

A decision to temporarily stop the drug or reduce the dose must balance the risk of surgical bleeding against the indication for anticoagulation and be made in collaboration with the prescribing specialist (BSH 2012a).

Minor dental procedures, joint aspiration, cataract surgery and gastrointestinal endoscopic procedures (including biopsy) can be safely carried out on warfarin if the INR is within the therapeutic range. More complex perioperative management should be guided by the Warfarin Policy and specialist haematological advice. The BSH Guidelines on Oral Anticoagulation with Warfarin (BSH, 2011) provides detailed discussion of perioperative management.

Refer to the Medication in the Peri-Operative Period – Management of – Clinical Guideline (QHB) for further information.

### 5.3 Intraoperative Management

- Use pharmacologic agents to reduce blood loss e.g. tranexamic acid. Offer tranexamic acid to adults undergoing surgery who are expected to have at least moderate blood loss (greater than 500ml) or with children expected to have at least moderate blood loss (greater than 10% blood volume) (NICE, 2015)
- Maintain physiological homeostasis (normothermia, acid-base management, normocalcemia, avoid overtreatment with intravenous fluid)
- Use controlled hypotension whenever indicated and safe
- Position patients to minimise central venous pressure and capillary oozing
- Minimise surgical blood loss through use of technologies
- Minimise the frequency and amount of blood sampling. The decision to transfuse should be based on clinical assessment as well as laboratory tests. In the event of major haemorrhage, Hb monitoring at 30 minute intervals may be useful.
- In the haemodynamically stable, non-bleeding patient transfusion should only be considered if the Hb is 80 g/L or less. A single red cell unit (or equivalent weight-related dose in children) may be transfused and the patient reassessed
- Most invasive surgical procedures can be carried out safely with a platelet count above 50×109/L or international normalised ratio (INR) below 2.0.

### 5.4 Postoperative Management

- Consider the effects of intraoperative fluid administration e.g. haemodilution leading to false Hb estimation
- Consider alternatives to transfusion for postoperative anaemia management (volume expanders, intravenous iron).

## 6. MANAGEMENT OF ABNORMAL HAEMOSTASIS

- Reversal of warfarin should include the consideration of the use of vitamin K and prothrombin complex concentrates (Refer to the Warfarin Guideline)
- Consider the use of anti-fibrinolytics, e.g. tranexamic acid, for major bleeding.

### Haematinic deficiencies

### 6.1 Iron deficiency anaemia

- Low MCV and low MCH are sensitive measures of iron deficiency anaemia (except of Asian / Afro-Caribbean patients – haemoglobinopathy carriers have low MCV / MCH). Ferritin alone is not a measure of iron deficiency as it can be falsely raised due to acute

and chronic inflammatory responses

- Identify and correct the underlying cause of the anaemia before considering transfusion, wherever possible
- In most cases, iron deficiency anaemia can be treated with oral iron. Safe intravenous iron preparations (Ferinject) are available for patients who do not tolerate oral iron
- In patients without acute blood loss, transfusion should only be considered if an immediate increase in Hb concentration is essential on clinical grounds – symptoms of severe anaemia such as chest pain or congestive heart failure
- The minimum number of red cell units should be transfused with careful monitoring to 'buy time' for a response to iron therapy. One-unit transfusions are perfectly acceptable in this situation, especially for small, elderly patients at risk of TACO. Consider the use of intravenous iron after administering a unit of red blood cells.

### 6.2 Intravenous Iron (Ferinject) in Management of Iron Deficiency Anaemia

In patients with proven iron deficiency anaemia, IV replenishment of iron can reduce the need for blood transfusion as well as the need for oral iron supplements, which often have a lot of side effects usually resulting in poor compliance and tolerance, and have a slower effect.

- When significant iron deficiency is diagnosed resulting in abnormal haemoglobin levels, or rapid correction of anaemia is necessary (eg some preoperative situations) IV iron replenishment should be considered.
- The usual dose is 500-1000mg once weekly, with 1000mg being the maximum. The patient can be administered a second dose if required after 7-14 days after the initial dose
- Ferinject is for IV use only; do not administer as a subcutaneous or IM
- Closely monitor patients for signs of hypersensitivity and hypotension during and for 30 minutes after the injection. Cardio-pulmonary resuscitation equipment and an anaphylactic pack must be available during administration.
- After IV administration of ferric carboxymaltose, iron is incorporated into red blood cells within 6–9 days
- Intravenous iron can be administered to out-patients within the Medical Day Case Unit (Book a 1 hour slot).

### 6.3 Vitamin B12 or folate deficiency

Deficiency of vitamin B12 or folate produces megaloblastic changes in bone marrow cells and anaemia with large ('macrocytic') red cells in the peripheral blood. Vitamin B12 deficiency is most often due to autoimmune pernicious anaemia with failure to absorb B12 in the terminal ileum. Folate deficiency usually results from dietary deficiency, consumption by increased red cell production (such as pregnancy or haemolytic anaemia) or malabsorption in coeliac disease. Patients may present with very low Hb concentrations.

- Treatment is with intramuscular B12 injections and/or oral folic acid
- Severe megaloblastic anaemia causes impaired cardiac muscle function and red cell transfusion should be avoided wherever possible because of the risk of causing potentially fatal circulatory overload
- Patients with severe symptomatic anaemia can often be treated with bed rest and high-concentration oxygen while a response to B12 or folate occurs (the Hb

concentration starts to rise in 3 or 4 days)

- If red cell transfusion is essential, single units of red cells should be transfused over 3 hours with close monitoring and diuretic cover. Red cell exchange transfusion may also be considered
- Make individualised plans for patients needing regular transfusion and consider the potential for complications of transfusion such as red cell alloimmunisation and iron overload and their management.

## 7. INDICATIONS FOR BLOOD TRANSFUSION

The Trust has developed general guidelines for the appropriate use of blood transfusion (Appendix B). The Patient Blood Management program uses an evidence-based multidisciplinary approach to optimizing the care of patients who might need transfusion.

Avoid transfusion for managing anaemia if alternatives are possible.

Refer to 13.1 for transfusion rates.

### 7.1 Red Blood Cells

The definition of anaemia are Hb in adult males <130g/L and adult females <120g/L (WHO). In general, the different guidelines recommend that transfusion is not indicated for Hb >100 g/L, but the lower threshold varies from 60 g/L to 80 g/L. The following guidelines should be considered for hemodynamically stable patients without active bleeding:

- Hb <60 g/L – Transfusion recommended except in exceptional circumstances
- Hb 60 to 70 g/L – Transfusion generally likely to be indicated. Consider administering 1 unit, then re-assess to determine if further transfusion is necessary, or if administration of oral/intravenous iron is appropriate
- Hb 70 to 80 g/L – Transfusion should be considered in postoperative surgical patients, including those with stable cardiovascular disease, after evaluating the patient's clinical status. Consider administering 1 unit, then re-assess to determine if further transfusion is necessary, or if administration of oral/intravenous iron is appropriate
- Hb 80 to 100 g/L – Transfusion generally not indicated, but should be considered for some populations (eg, those with symptomatic anemia, ongoing bleeding, acute coronary syndrome with ischemia). Consider the use of oral/intravenous iron if appropriate
- Hb >100 g/L – Transfusion generally not indicated except in exceptional circumstances.

The decision to transfuse should not be based only on haemoglobin level but should incorporate individual patient characteristics and symptoms. Clinical judgment is critical in the decision to transfuse; therefore, transfusing red blood cells above or below the specified haemoglobin threshold may be dictated by the clinical context. Similarly, the decision not to transfuse red blood cells to a patient with a haemoglobin concentration below the recommended thresholds is also a matter of clinical judgment. Some patients may tolerate a lower Hb level. Consider setting individual thresholds and Hb targets for each patient who needs regular blood transfusions for chronic anaemia.

Optimal transfusion practice should provide enough red blood cells to maximize clinical

outcomes while avoiding unnecessary transfusions. The final decision to transfuse should incorporate the clinical status, co-morbidity, and the individual wishes of the patient.

For most patients, consider a restrictive transfusion strategy (ie, giving less blood; transfusing at a lower Hb level; and aiming for a lower target Hb level) rather than a liberal transfusion strategy (ie, giving more blood; transfusing at a higher Hg level). For most haemodynamically stable medical and surgical patients, considering transfusion at a Hb of 70 to 80 g/L.

Whenever possible, initiate or continue treatment of the underlying condition responsible for the anaemia.

As a general guide for adult transfusions, transfusing a volume of 4ml/kg will typically give a Hb increment of 10 g/L. The concept that one unit of red cells gives a Hb increment of 10 g/L should only be applied as an approximation for a 70-80 kg patient. For patients of lower body weight the prescription should be reduced.

Transfuse one unit of red blood cells at a time for a haemodynamically stable patient who is not actively bleeding. Consider the use of intravenous iron at each clinical assessment.

Assessment of the post-transfusion haemoglobin level can be performed as early as 15 minutes following transfusion.

Major exceptions to the use of a threshold of 70 to 80 g/L include the following:

**Symptomatic patient**

Symptomatic anaemia should be treated with transfusion in all patients with Hb <100 g/L, regardless of the Hb level, provided that the symptoms are severe enough and are clearly related to the anaemia rather than the underlying condition. Symptoms of anaemia include symptoms of myocardial ischemia, orthostatic hypotension or tachycardia unresponsive to fluid replacement. While exertional symptoms can be helpful in alerting the clinician to the presence of anaemia, they are generally not considered indications for red cell transfusion.

**Acute coronary syndrome**

The optimal transfusion threshold in the setting of acute coronary syndromes is to transfuse when Hb is <80 g/L and to consider transfusion when the Hb is between 80 and 100 g/L. If the patient has ongoing ischemia or other symptoms, maintain the Hb ≥100 g/L. In a stable, asymptomatic patient, it is unknown when to transfuse, maintain a higher Hb level using clinical judgment based on evaluating the patient's symptoms and underlying condition.

**Acute bleeding**

Threshold-based transfusion is not appropriate for patient's requiring massive transfusion, such as in the setting of trauma, because it requires waiting for Hb levels to be reported. Where possible haematinics should be assessed at regular intervals according to the clinical situation. Refer to the Blood Transfusion Major Haemorrhage - Burton Sites Trust Policy and Procedure for further guidance.

## 7.2 Plasma

Components prepared from human plasma can be lifesaving in some conditions (eg, trauma, massive transfusion, DIC, bleeding associated with vitamin K antagonist anticoagulation). At the same time, plasma carries infectious and other risks. Thus, it is

important to use the appropriate plasma in the appropriate clinical setting. The recommended adult therapeutic dose is 15mL per kg of body weight. This equates to approximately 1L (four units) of FFP for an 'average' 70kg patient, heavier patients may require more units and lighter patients fewer. Therefore, one dose of FFP is considered to be 4 units.

Clinical indications for use of FFP (based on the National Blood Transfusion Committee (NBTC) Indication Codes for Transfusion – An Audit Tool – updated April 2020).

- Replacement of single inherited coagulation factor deficiencies where a specific or combined factor concentrate is unavailable eg factor V, DIC in the presence of bleeding and abnormal coagulation results
- TTP, usually with plasma exchange, consider transfer to a specialist unit
- Replacement of coagulation factors due to major haemorrhage. If emergency uncontrolled bleeding and massive haemorrhage is anticipated, early infusion of FFP (initially in a ratio of 0.5 to 1 unit of FFP for every unit of red cells) is recommended to treat coagulopathy. Aim for a PT and APTT ratio of <1.5 and a fibrinogen level of >1.5g/L
- For immediate reversal of warfarin effect, in the presence of life threatening bleeding, Prothrombin Complex Concentrate is the treatment of choice. FFP only has a partial effect and is not the optimal treatment and should only be used on the advice of a Haematology Consultant
- Liver disease; there is no evidence of benefit from FFP in non bleeding patients regardless of the PT ratio
- FFP should NEVER be used simply as circulating volume replacement
- -

Reassess the patient's clinical condition and repeat the coagulation tests after FFP transfusion (suggested 15 minutes after transfusion).

### 7.3 Platelets

Platelets are transfused for the prevention and treatment of bleeding due to thrombocytopenia or platelet function defects. Consult the Haematologist for advice on transfusion thresholds in individual clinical situations.

- Transfuse one unit of platelets at a time in non-bleeding patients and reassess the patient clinically and with a further blood count to determine if further transfusion is needed
- Dosage - One standard adult therapeutic dose (ATD) is either one apheresis donation pack or a pool of 4 single Buffy coat-derived platelets. Larger doses are required in acute bleeding, non-immune refractoriness, DIC and Autoimmune thrombocytopenia
- Prophylactic platelet transfusions should be given to patients receiving intensive chemotherapy, with a transfusion trigger of $10x10^9/L$
- Platelet prophylaxis is not required for bone marrow aspiration or trephine biopsy and a level of $50.10^9/L$ is safe for other invasive procedures. Advice of the Haematology Consultant is advisable before prescribing platelets
- Prophylactic platelet transfusions are not required in stable patients with chronic bone marrow failure (NCA, 2018)
- One adult therapeutic dose of platelets is required for prophylaxis. Pre-procedure consider the size of the patient, previous platelet count increments and the target platelet count (NCA, 2018).

### 7.4 Cryoprecipitate

Cryoprecipitate consists of the cryoglobulin fraction of plasma containing the major portion of Factor VIII and fibrinogen. It is obtained by thawing a single donation of FFP at 4°C ± 2°C. The cryoprecipitate is then rapidly frozen to -30°C.

Clinical Indications - Bleeding associated with hypofibrinogenaemia (<1g/litre) and congenital or acquired dysfibrinogenaemia.

- Dose - A single unit of pooled cryoprecipitate contains a mean of approximately 400 - 460mg fibrinogen. The adult therapeutic dose is 2 units of pooled cryoprecipitate, or one unit per 5 - 10 kg body weight, dependent on the degree of fibrinogen deficiency
- Response should be monitored by repeat coagulation tests (suggested 15 minutes after transfusion). Advice of the Haematology Consultant is advisable before prescribing cryoprecipitate.

## 8. CONSENT

Patient Blood Management and the consent process puts the patient at the heart of decisions made about blood transfusion to ensure they receive the best treatment and avoidable, inappropriate use of blood is reduced.

**8.1** The decision to transfuse should be made by the Doctor and patient following consideration of the potential risks and benefits of, and the alternatives to, transfusion. Where possible this is discussed between the clinician and patient (or their legal guardian) in advance of transfusion.

**8.2** The principles governing the requirement for explanation and discussion, obtaining the patients consent and documenting this information in the medical records are the same for the transfusion of blood as for any other therapeutic intervention.

**8.3** Documentation of consent occurs in the electronic prescription for blood components.

**8.4** Leaflets explaining the risks and benefits of, and alternatives to, transfusion are to be provided to patients to support this discussion. Patient information leaflets, produced nationally by the NHSBT, are available for adult and paediatric transfusion. Where possible it is recommended that a leaflet is provided to assist in obtaining informed consent. They can be obtained from the blood bank (next to the Blood Bank fridge).

**8.5** Prior to collecting blood components, the administering healthcare professional has a duty to ensure the patient still agrees to have the blood transfusion, has no further questions and that they have received the relevant patient information leaflet if they have not already done so.

**8.6** Refer to the Blood Transfusion Consent Policy (QHB) for further information.

## 9 PLANNING A TRANSFUSION

**9.1** When wishing to provide a patient with blood, the following is required;

1. Medical assessment of the patient and documentation of
2. Discuss the transfusion plan with Blood Bank
3. Phlebotomy - Group and Screen
4. Order the blood and send the sticky bar-code label to blood bank (or hand-written order form if not ordered electronically)
5. Prescribe the blood.

Note –

- Phlebotomy sample for ordering the group and screen sample is giving permission to the Blood Bank staff to identify the patient's blood group
- The order for blood gives permission to the Blood Bank staff to prepare the blood for a patient
- The prescription of the blood provides permission to clinical staff to administer the blood.

**Blood Bank staff are only made aware of the need to prepare the blood component when they receive the sample and order form (or electronic sticky label if ordered electronically). When ordering blood, it is important that the ordering doctor discusses the request with the bank BMS. This allows for clarification of the order and identification of any potential delays. In the event of urgent requests, a phone request needs to be made to the Blood Bank BMS (as defined in the Major Haemorrhage Policy.**

### 9.2 Documentation in the Medical Notes

Each transfusion must be documented in the patient's medical records by the medical team responsible for the patient. The following information must be documented:

- Date of the planned transfusion
- Clinical indication for transfusion
- Type of blood component and the number of units required
- Patient consent issues
- Document any transfusion risks specific to the patient
- State when the transfusion is required including if transfusion is required overnight
- If not prescribing electronically, a statement confirming where possible; the patient has provided verbal consent for the transfusion, alternatives have been offered, the risks and benefits have been explained to the patient
- When Hb is to be checked post transfusion
- Target Hb
- Transfusion reactions and their management

The decision to transfuse must be based on a thorough clinical assessment of the patient and their individual needs. The rationale for the decision to transfuse and the specific components to be transfused should be documented in the patients' clinical records.

This clinical assessment should include an evaluation of the patient's age, body weight and concomitant medical conditions that predispose to Transfusion Associated

Circulatory Overload (TACO): cardiac failure, renal impairment, hypoalbuminaemia and fluid overload. These factors should be documented in the patients' clinical notes and should be considered when prescribing the volume and rate of the transfusion, and in deciding whether diuretics should be prescribed.

Comments regarding the effectiveness of the transfusion, (either post transfusion increment rates or improvement in patient symptoms) where appropriate, are good medical practice, including clinical effectiveness e.g. arrest of haemorrhage due to platelet transfusion in a thrombocytopenic patient or relief of symptoms of anaemia after a red cell transfusion.

It is recommended that patients have their haemoglobin levels checked after each unit of red blood cells they receive, unless they are bleeding or are on a chronic transfusion programme (NICE, 2015). Hemoglobin and hematocrit values rapidly equilibrate after transfusion in normovolemic patients who are recovering from an acute bleeding episode. When a measure of the effect of a transfusion is needed, a single haemoglobin determination shortly afterward is sufficient.

In patients with minor but ongoing blood loss, Hb should be regularly monitored, as a minimum after every 2-3 units of red cells.

Upon discharge the GP should be informed that the patient had a blood transfusion. The GP letter should state the number of units transfused and the reason for the transfusion.

## 10 BLOOD SAMPLE REQUIREMENTS FOR BLOOD BANK

Misidentification at blood sampling may lead to fatal ABO- incompatible blood transfusion, especially if the patient has not previously had their blood group documented. Inaccurately or mislabelled samples carry a significantly increased risk of containing blood from the wrong patient. As directed by the British Committee for Standards in Haematology (BSH, 2012), the staff have a zero tolerance for incorrectly labelled samples, and will reject samples that do not meet the required minimum standards identified in this Policy.

Blood samples (pink top BD Vacutainers blood sample tubes)) for compatibility testing (cross-match) or potential cross-match, i.e. group and screen (G&S), may be taken by medical staff, midwives, nurses, nursing assistants, phlebotomists and medical students who have been trained and competency assessed in venepuncture. Particular attention must be paid to the following:

a. Positive identification based on interrogation of the patient (whenever possible) by asking them to state their full name and date of birth and checking this against the EPR produced barcode labels or handwritten order form
b. The patient's identification patient identity band (full name, date of birth and B number / NHS number)
c. If the patient is an out-patient, the patient must be positively identified by asking them to state their full name, date of birth and first line of the address and checking this against the request form / EPR produced labels.

Collection of the sample and labelling of the sample tubes must be performed as one

uninterrupted process involving one member of staff and one patient. The sample must be labelled immediately after the blood has been added. Never pre label the sample tubes. Never leave the patient until the sample tubes have been labelled. The sample tubes must contain the minimum patient identifiers (exactly matching those on the patient identity band and the request form/patient EPR sticky label), date and time of sampling and identity of the person taking the sample. Check that the barcode label for blood transfusion sample has the same patient identifiers as the patient identity band.

Addressograph labels and/or patient EPR barcode sticky labels must **not** be used to label blood bank sample tubes. Information must be hand written using suitable black ink which does not easily smudge. The labelling must be legibly with the following details:

- Unique patient identification number (hospital B number, NHS number, unknown patient or major accident number In the event of computer/EPR down-time, where no B number is able to be issued, the first line of the patients address should be recorded)
- Surname
- First name
- Date of birth
- Location
- Signature of person taking the blood
- Date and time of obtaining the sample

The details on the sample tube must match the details on the order form/EPR barcode sticky label for the sample order. The patient's last name must be correctly spelt, and must be the correct name for the patient. The first name should be spelt correctly, but Blood Bank may accept the sample if it is considered phonetically correct. Initials only are insufficient.

If the patient is unconscious **and** unknown, details must be completed according to the **UHDB Patient Identification Policy** utilising either an unknown patient number or major accident number. The patient gender must be identified. In the event of no B number due to computer/EPR down-time, the first line of the address should be recorded instead of a B number. It is also acceptable to use the patients NHS number EPR during downtime. The patient must continue to be transfused on the unknown patient number until the patient record is updated and a new, fully labelled sample is tested with the patient's correct details.

Paediatric sample requirements are;

- Neonates <4 months of age: require a 1.7ml EDTA sample together with maternal samples at first presentation only
- Children <10kg: require a 1.7ml EDTA containing at least 1ml sample for group & save and crossmatch
- Children >10kg: same as for adults (Adult Sample: The pink top sample should be filled to a minimum of 3ml. NHSBT: 2 pink top samples handwritten and filled up to 4ml.).

Paediatric samples do not have integral blank labels. Blank sticky labels may be used but must contain all of the above information. When obtaining blood samples from paediatrics, it is acceptable to write the above details onto a blank label, and then attach this onto the sample tube while next to the patient. This must though be done by using

the information from the patient identity band. Check that the barcode sticky label has the same patient identifiers as the patient identity band.

Paediatric sample tubes should not be used to obtain samples from adult patients as paediatric samples are processed differently. Inability to provide sufficient blood in a sample tube must be discussed with the Blood Bank BMS as the range of testing able to be performed will be reduced.

Blood Bank operates a zero tolerance to incorrectly labelled samples, and will reject samples/orders that incorrectly labelled which could result in a patient receiving a wrong bag of blood.

Prevent haemolysis of blood bank samples as this will interfere with the tests:

- Use a 20-22 gauge needle for routine collection
- Draw the sample from the antecubital region of the arm; drawing from other sites—sometimes a necessity in the emergency room—has been shown to result in a higher degree of haemolysis
- Avoid the need to "milk" the site
- Do not leave the tourniquet on for longer than one minute.If using a syringe, pull the plunger gently; pulling too quickly exerts excess pressure—well beyond that of a standardized evacuated tube—and will shear the cell walls
- Similarly, pushing hard on the syringe plunger while transferring blood to another tube exerts a destructive level of pressure
- Take care when drawing from a Vascular Access Device; these are designed to deliver fluids to the patient, not drawn from the patient as risk of haemolysis increases. Blood can only be taken at the time of cannulation and should not be taken at any other time. Specific venepuncture training is required to allow you to be able to perform this task.

If the correct fill for the sample tube is not possible, please ensure this is discussed with the blood bank BMS prior to sending the sample. Ideally this should be done by the requesting doctor as they need to agree what testing will take place. There may not be sufficient blood to perform a cross-match.

The volume and frequency of blood samples should be minimised to prevent iatrogenic anaemia.

### 10.1 Issuing of Blood Components - 2 Sample Rule

Accuracy of group and save (G&S) and cross-match for the blood transfusion is heavily dependent on the patient blood sample provided.
A second sample is required for confirmation of the ABO group of a first-time patient prior to transfusion. This is to reduce the risk of patients being transfused with the wrong blood group.

Two samples should not automatically be taken. On most occasions, the patient is likely to have a historical blood group documented on their EPR. To find out, access the patients EPR, select all visits, select blood bank, select blood bank tests. If the blood type is known, this will appear under the "Most Recent Results".

In the few patients who require blood transfusion but may not have a historical blood group (either because they have never needed a blood grouping sample, or they are a new patient to the area) Blood Bank will not have a historical sample to compare with. In such patients the UK blood service guidance (BSH) requires that two samples are obtained using two separate venepuncture episodes, and therefore undertaking two correct patient identification checks. Two G&S orders are required on EPR. Blood Bank will reject one of the samples if the exact same time is recorded on both samples.

In the unlikely event of Blood Bank requiring two samples from a patient who has a central venous catheter, it is not practical to undertake two separate venepuncture episodes. Both samples should be taken in the presents of two nurses who undertake the positive patient identifications checks.

### 10.2 Sample Validity and Timing of Sample Collection in Relation to Previous Transfusions

Routine Blood Bank samples processed by QHB laboratory are able to be used for a period of 7 days prior to the proposed transfusion date. Exceptions to this include patients who have had transfusions or a pregnancy within the last three months.

| Patient Type | Sample validity |
|---|---|
| Patient transfused or pregnant in the last 3 month | 72 hours * (three days) |
| Patient not transfused and not pregnant in the last 3 month | 7 days* |

*This is the time between the sample being taken and subsequent transfusion date.

A formal deviation from the 3 day rule may be considered for pregnant women with no clinically significant alloantibodies who require blood standing for potential obstetric emergencies (e.g. placenta previa).

The maximum surgical blood ordering schedule (MSBOS) is a table that lists the number of units of blood routinely requested and cross-matched for a number of elective surgical procedures. The MSBOS is based on the likelihood of transfusion being required in each procedure after consultation with the anaesthetists and clinical teams for each speciality. Refer to appendix A for the Maximum surgical blood ordering schedule.

Many operations rarely need transfusion. As long as the laboratory can provide blood quickly in an emergency, there is no need to reserve blood units in the blood bank. A sample for group and screen allows for this (refer to the Two-Sample Rule).

### 10.3 Blood Samples Requiring Cross-matching at NHSBT (Send Always)

Patients with complex antibodies may require cross matching to be undertaken within the laboratories at NHSBT. NHSBT may require additional samples to be taken (2 pink BD Vacutainers blood sample tubes, taken at the same time Blood Bank will advise if further samples are required. Cross match may take several hours. Blood Bank will inform ward

staff of any delay in the provision of blood, and if blood cannot be issued within the timeframe required, the BMS will advise the requesting doctor to discuss with the on-call haematology doctor to consider concessionary release of blood.

## 11 PROCEDURE FOR ORDERING BLOOD

Blood components must be requested from the blood bank on an individual named patient basis.

Requests for blood will normally be made by medical staff. Exceptions to this include life-threatening situations (refer to the Major Haemorrhage Policy), or by midwives or pre-operative assessment. Blood components ordered by non-medical staff must be prescribed by medical staff.

The blood request flow chart can be found in appendix F.

All routine requests for blood components should be ordered electronically through Meditech. A sticky label/barcode label will be printed automatically when the blood is ordered on the EPR system. Blood Bank will acknowledge the request once the sample and barcode label has been received by blood bank.

In the event of computer down-time, the white and red blood bank request forms can be used and all the required information fields should be completed. Addressograph labels are acceptable on request forms.

All requests for blood and blood products will initially be validated against the Indication Codes for Transfusion (April 2013). Any request that does not comply with the guidelines will require authorisation from the Consultant in charge of care.

Patients with certain clinical conditions may require special blood components e.g. CMV negative or gamma irradiated. Special blood requirements should be clearly documented on the order. It is the responsibility of the person requesting the blood to ensure that Blood Bank staff are informed of special requirements. Patients requiring irradiated blood will have a special indicator on their EPR stating “irradiated blood”. Refer to Appendix C for further information regarding irradiated blood requirements.

When ordering blood for a pregnant lady, it is important to complete the field stating the lady is pregnant. Blood Bank will then issue CMV negative blood.

The practice of warming blood to prevent hypothermia during administration of massive transfusion does not need to be requested on the prescription.

Blood Bank obtains blood components from NHSBT. A certain amount of stock is held in Blood Bank. Additional blood is obtained from NHSBT on a daily basis at 08.15am each morning. Where possible, orders for non-stock blood should be received by Blood Bank in sufficient time to be included on this order. This includes orders for platelets, and uncommon blood groups. If requesting blood close to 08.00, please inform the on- call BMS (bleep 367). Orders for blood made after the 08.15 order time will delay treatment and require special delivery which may incur additional costs.

In times of limited availability of blood components, as dictated by the NHSBT, requests will be processed according to the Emergency Management of Red Blood Cell and Platelet Shortages - Burton Sites Trust Policy and Procedure.

### 11.1 Procedure for routine requests for blood components out of hours.

Non-urgent 'out of hours' requests should be avoided wherever possible as SHOT data clearly shows an increased risk of errors. Where possible, administration of blood transfusions should be avoided between the hours of 8pm and 8am unless there is an urgent clinical need for the transfusion. When ordering/prescribing blood, the requesting doctor will document in the transfusion plan if administration of some or all of the units of blood are required overnight. Nurses should refer to the transfusion plan or discuss with the requesting doctor if the plan is not clear. In the event of any difficulties, advice should be sought from the Clinical Site Practitioners. This should not delay the transfusion of blood for acutely ill patients.

**Important**

- The blood bank must be provided with the time the blood is required to enable requests to be prioritised
- The blood bank will record receipt of samples electronically in the patient's EPR as soon as practically possible.

### 11.2 Procedure for emergency requests for blood components including out of hours.

Refer to the Major Haemorrhage Policy for further information.

In the event of a life threatening emergency situation blood components can be requested by telephone. Telephone requests for blood components should be kept to an essential minimum because of the risk of transcription errors.

You will be asked to provide the following information which will be recorded:

- State the nature of the emergency (e.g. major haemorrhage)
- Current location of the patient
- Patients B number
- Patients full name
- Confirm date of birth
- The name of the requesting consultant
- Number and type of blood or blood component required and in what timeframe
- The caller's name, designation and a phone number to contact in the event of queries.

Blood Bank staff will advise the level of serological compatibility testing (e.g. group O, group compatible or full cross match) in the required timeframe.

### 11.3 Blood Required Immediately

It may be possible to provide blood by using the patient's Blood Bank/blood group History. If time permits, contact the Haematology/Blood Bank BMS to check if this is possible. If

this is not possible, emergency stock "flying squads" can be used. Two units of O Rh D Negative (rr), K negative, HBS negative red blood cells are available at all times. Nationally, stocks of 0 Rh D Negative, K negative red blood cells are low, so this should only be used if no alternative is possible. Blood Bank will provide O Rh D positive blood for men or women who are not of child bearing age.

The decision to transfuse Flying Squad and Group Compatible blood lies with the consultant in charge of the patient. Flying squad units are retrospectively cross matched if an adverse reaction is suspected.

It is essential that a blood sample is collected for G&S before "flying squads" are transfused.

Before Flying Squad blood is collected, ideally the blood bank staff should be informed. If it is not possible, inform blood bank as soon as possible after the event.

Conformation of end fate of the units is essential and must be documented on the Blood Compatibility Tag attached to the bag of blood. This will require the administering clinician to enter the patient identification information.

### 11.4 Blood Required in 5 - 10 Minutes

The blood bank may be able to provide group compatible blood if there is a valid blood type already identified for the patient. A "valid blood type" occurs when there are 2 or more samples for the patient blood group recorded on their EPR record and they correlate. If there is no valid blood type then O group blood will be issued. The responsibility for serological compatibility lies with doctor who prescribes the uncross-matched units.

D positive red cells may be selected for D negative patients in the following situations:

i. Female patients over 51 years
ii. Adult males who are D negative or whose D status is unknown
iii. Patients undergoing a large volume red cell transfusion (more than 8 units), excluding children, females of childbearing potential and patients with immune anti-D.

D negative red cells should always be selected for:

i. D negative women of childbearing potential (under 51 years)
ii. D negative male and females under 18 years of age
iii. Patients who have formed immune anti-D, even if not currently detectable
iv. Transfusion-dependant D negative adults.

### 11.5 Concessionary Release of Blood

"*Concessionary release of blood components, or acting contrary to a Policy or SOP, is sometimes the necessary and appropriate course of action in the best interest of the patient. To act contrary to an SOP requires prior authorisation, or justifiable authorisation as soon after as is practicable, preferably by a Haematologist or other suitably competent person who should discuss the clinical consequences with the clinicians in charge of the patients*" (BSH guidelines, 2012). The blood bank BMS will advise the ordering clinician to contact the on-call Haematology Consultant if release of concessionary blood is required.

The following are covered by a concessionary release procedure:

- Use of D positive blood for a D negative patient who would normally be excluded from receiving D positive units
- Use of antigens positive or un-typed red cells in patients with atypical antibodies
- Issue of red cells to auto immune haemolytic anaemia without the exclusion of underlying antibodies where 'least incompatible red cells might be the best option.
- Issue of components that do not meet know special requirements, E.g. CMV negative or irradiated.

## 12 PROCEDURE FOR PRESCRIBING BLOOD

Prior to prescribing blood a patient clinical assessment should be undertaken to include an evaluation of the patient's age, body weight, medications and concomitant medical conditions that predispose to TACO: cardiac failure, renal impairment, hypoalbuminaemia and fluid overload. These factors should be documented in the patients' clinical notes and should be considered when prescribing the volume and rate of the transfusion, and in deciding whether diuretics should be prescribed.

Blood may only be transfused with a valid prescription by a doctor or if covered by a Trust Patient Group Directive (PGD). Each unit of blood must be prescribed individually.

Blood for transfusion should ordinarily be prescribed using the Electronic Prescription (EP) facility in EPR. In emergency situations where this is not feasible, a written prescription on a dedicated drug administration card, anaesthetics/ITU chart or casualty slip is acceptable, but must identify the patients full name, B number and date of birth. The prescription must be legible, complete, dated and signed by the prescribing doctor.

Paediatric transfusions should be prescribed in mls. This may also be appropriate for very low body weight adults, as may the use of smaller volume paediatric packs. This should be discussed with the hospital transfusion laboratory, and specific guidance given to the clinical staff administering these unfamiliar components.

Special blood requirements (e.g. irradiated blood) should be clearly documented on the prescription so the member of staff carrying out the administration checks ensures the blood to be transfused complies with any special requirements. The practice of warming blood to prevent hypothermia during administration of massive transfusion does not need to be requested on the prescription.

### 12.1 Rate of Transfusion

The rate of transfusion in an adult patient is dependent upon the reason for transfusion and is to be decided by the medical staff based on clinical assessment, and must be recorded in the medical records. All blood can be administered as quickly as possible during major haemorrhage.

Patients at risk of Transfusion Associated Circulatory Overload (TACO) will require slower transfusion rates. Patients most at risk of developing TACO are:

- Age >50 years
- Congestive cardiac failure, left ventricular failure or aortic stenosis
- Chronic kidney disease

- Liver dysfunction
- Peripheral oedema
- Prescription of concomitant IV fluids
- Pulmonary oedema
- Undiagnosed respiratory symptoms
- Use of regular diuretics
- Weight <50kg

(NCA, 2018)

Consider prescribing with a diuretic, administering individual units on separate days, or ideally, alternatives to transfusion such as iron infusion. It is advisable to check the Hb between units to identify if more than one unit is required, or if intravenous iron can be used instead. Specific attention should be given to monitoring the patient for signs of circulatory overload, including fluid balance. The rate of transfusion should be carefully assessed, as TACO can occur after one unit of red cells in at risk patients.

In patients identified as having risk factors, it is recommended that documentation includes:

- Risk of TACO
- Benefits of transfusion
- Discussion with the patient

(NCA, 2018)

Most patients without co-morbidity will tolerate a red cell unit transfusion over 90 minutes (United Kingdom Blood Services, 2013).

Standard Prescription Rates

| **Component** | **Normal Prescription Rate** | **Prescription Rate if Risk of TACO** | **Additional Information** |
|---|---|---|---|
| **RBC** | 90 mins | 2-3 hours<br>Consider use of diuretics. | Consider alternatives to transfusion if TACO risk.<br>Stop transfusion 4 hours after leaving cold storage. |
| **FFP** | 30 mins | 1 hour | Stop transfusion 4 hours after leaving cold storage.<br>Must be used within 24 hours of defrosting. |
| **Platelet** | 30 mins | 1 hour | Stop transfusion 4 hours after leaving temperature control. |
| **Cryo** | 30 mins | 1 hour | Stop transfusion 4 hours after leaving temperature control. Must be used within 24 hours of defrosting. |

Refer to the Paediatric Transfusion Policy for transfusion rates in paediatrics.

## 13 COLLECTING BLOOD

Prior to collecting blood, ensure the patient is prepared to have the transfusion. A patent cannula is required. Ensure the patient is aware of the transfusion plan they have provided consent and do not have any further questions. Ensure they have received the relevant patient information if they have not previously received this. The blood must be correctly prescribed, and issued by blood bank. Record baseline observations on the relevant Blood Transfusion Integrated Care Pathway chart and discuss concerns with the Doctor. Commence fluid balance monitoring.

All staff involved in the collection of blood components must have completed their mandatory training on blood handling (BT2/BT5/BT6 - QHB).

All staff involved in the collection of blood components must have a valid competency assessment in blood collection (BTC - QHB). Access to Blood Bank and the Blood Bank fridge is not permitted unless the individual has an up to date competency assessment for collection of blood.

Nurses, midwifes, ODAs, ODPs, NAs, Porters and Ward Clerks employed by the Trust (including bank staff) can collect blood and blood products as long as they have completed the relevant blood transfusion theory training and collection training.

Student nurses, student midwives and agency staff do not receive Trust blood transfusion mandatory training and therefore, are not trained and competency assessed to collect blood components.

If ward / theatre staff collect blood printed patient specific identification must be taken to the collection fridge to facilitate the required checks. This must have printed on it, the patient full name, B number and date of birth.

If a porter is required to collect blood at Queens Hospital site:

a. Contact porter via 5400 or bleep 901 during the following hours 0800-2200 or bleep the dedicated night porter for your location, 905 for Phase II, 904 for AE / phase 1.
b. The porter will require;
    i. Full patient name
    ii. Hospital B number, unknown patient number or major accident number
    iii. Date of birth
    iv. Product and number required
    v. Location
    vi. Degree of urgency
    vii. Confirmation that patient identification has been printed on HAEM11 (EPR printer located next to the Blood bank fridge).

When collecting a blood component, it is important to ensure the correct item is taken. This avoids the risk of administering a patient the wrong item. Standard checks include:

- When collecting blood or blood products the printed patient identification details (either on the hospital notes, prescription chart or patient identification document) must be carefully checked to ensure it matches the information printed on the Blood

Compatibility Tag. This includes first name, last name, date of birth and B number

- Further checks include
- Check the blood has not expired
- The pack number of the blood is the same as the number on the Blood Compatibility Tag and the bag of blood
- Compatibility of the patient and donor blood (if the ABO blood group is different, the scientist will write a message in the comment field of the Blood Compatibility Tag if the blood groups are different but compatible)
- The blood packaging has not signs of damage
- The blood does not have any signs of clotting or discolouration
- Any discrepancies noted during the checking process must be checked with the Blood Bank BMS prior to the blood leaving the storage area
- All blood components must be signed out of the issue fridge and blood bank by completing the required (full name/date/time) sections of the Blood Compatibility Tag
- One bag of blood should be collected at a time unless extremely rapid transfusion of large quantities of blood is needed
- Single units of red blood cells must be transported in red Labcold blood transport boxes
- When collecting multiple units of cold blood during a life threatening situation (more than 1 unit of red blood cells or fresh frozen plasma for an individual patient) a red Helapet cold blood transport box for multiple units of blood must be used. The use of a red Helapet box extends the cold-chain by 4 hours. Therefore, the time of removal from temperature control is when the blood is removed from the red Helapet box (to a maximum of 4 hours)
- Red Helapet cold blood transport box for multiple units of blood must be packed in accordance with manufactures guidelines to ensure blood remains at the correct temperature for up to 4 hours. This requires a maximum of 4 bags of cold blood from a refrigerated storage (only RBC/FFP) and one cold pack placed on top of the blood. Instructions for this can be located in the Blood Bank where the Helapet boxes are stored. The lid must be closed in-between removing units of blood
- Transport of cross-matched blood to remote dedicated blood fridges, (remote fridges must be approved by blood bank as appropriate for use), must be prompt. Blood Bank will pack the blood in a red Helepet box and transport time between removal from the issue refrigerator and entry in to the remote fridge must not be greater than 4 hours
- Platelets and cryoprecipitate are stored at room temperature and therefore do not require transport in cool boxes or with cool packs. Transport bags are provided for transport of these, or they can be transported in a red Labcold box
- Blood collected in a red Labcold box which is not started within 20 minutes of the removal time must be returned to the blood bank and handed to a member of Blood Bank staff. RBC and FFP returned to the issue fridge within 30 minutes of the collection time can be returned to the fridge by a member of staff from the Blood Bank.

Blood requiring refrigeration is stored within Blood Bank in dedicated blood fridges. A satellite blood fridge is located in The Samuel Johnson - Renal unit. Staff responsible for using satellite blood fridges are trained to undertake daily fridge checks. Blood must never be stored in a domestic fridge.

## 14 TRANSPORTING BLOOD TO / FROM ANOTHER CARE PROVIDER

### 14.1 Blood to accompany a patient being transferred to another provider

There may be occasion where a patient is transferred to another care provider, and the blood is to accompany the patient. In such circumstances, it is imperative that Blood Bank is informed as soon as possible to ensure the safe transportation of the blood to the Blood Bank at the receiving hospital.

It is a legal requirement for the Trust to be able to account for all blood components received by Queen's Hospital Blood Bank, and to ensure the transfusion was administered safely. Therefore, only Blood Bank can provide the necessary correct packaging of such blood and ensure the receiving Hospital's Blood Bank is informed.

The blood must be accompanied by the Blood Compatibility Tag. The blood box must be given to a clinician at the receiving hospital immediately so they can arrange to store the blood in their Blood Bank.

Transfusion of blood during transit of adult patients should be avoided where possible. If blood is to be transfused during transit, a nurse trained in blood administration must accompany the patient to administer the blood. Generally, such unstable patients will also require a doctor/anaesthetist to accompany the patient. Paediatric ambulance crews are trained to administer blood so will not require a nurse to administer the transfusion. The clinician responsible for the transfer of the patient must ensure the Blood Compatibility Tag is returned to Blood Bank at Queen's Hospital within 3 working days. If the transfusion is still in progress at the time of leaving the patient the nurse should write on the Blood Compatibility Tag the name of the receiving hospital, ward, the time the patient arrived, and approximately how much blood was transfused. Blood Bank will then identify the actual end time from the area.

### 14.2 Blood Received From Other Hospitals

Blood arriving with patients from other hospitals should only be used if it has been transported in a cool box with documentation. On arrival, the blood should be given to the Blood Bank Laboratory staff as soon as possible to log and be stored in the appropriate blood refrigerator until required for issue.

## 15 BEDSIDE CHECKING FOR BLOOD TRANSFUSION

Checking of blood components **must** be performed at the patient's side by two qualified healthcare professionals that are up-to date with their blood transfusion mandatory training and blood administration competency assessment. The nurse connecting the blood must be trained and assessed to administer intravenous drug administration. Both must be a nurse/midwife or doctor holding a current GMC / NMC registration. In theatre / recovery this may be an ODP provided they hold current registration with the HCPC and have obtained a Diploma in preoperative care or equivalent. The second staff member may be any of the above. Both staff should undertake all the following checks independently of each other.

### 15.1 Check the Blood Pack

- The integrity of the pack i.e. leakage
- Evidence of haemolysis or clots
- Unusual discoloration or turbidity

- If transfusion platelets check the bag does not show any signs of clumping or cloudiness.

### 15.2 Check the Blood Unit Details

- The correct unit has been collected
- The pack number of the unit of blood corresponds to the pack number on the Blood Compatibility Tag
- The ABO and Rh group (when applicable) match on both the bag of blood and the Blood Compatibility Tag (or there is a comment written on the Blood Compatibility Tag by Blood Bank stating that the groups are different, but it is compatible)
- The blood is in date (expires at midnight on the date stated). Expired blood must be returned to Blood Bank
- Any special requirements, detailed in the prescription, have been met e.g. irradiated or warmed blood or administering medications with the blood
- Note – the final blood check MUST be between the Blood Compatibility Tag and the patient wrist band.

### 15.3 Patient Identification checks

The patient must be positively identified by asking them to state their SURNAME, FORENAME AND DATE OF BIRTH (wherever possible).

Check the above information and the patient identifier are identical on:

- The patients wrist band (**ALL PATIENTS RECEIVING A BLOOD TRANSFUSION MUST WEAR A PATIENT IDENTIFICATION BAND**)
- The prescription
- The Blood Compatibility Tag attached to the blood.

**DO NOT USE BLOOD IF ANY OF THESE CHECKS FAIL.**

**It is the responsibility of the two checkers to complete all relevant documentation.**

- If both checkers are satisfied with the check; enter the blood pack number on the observation chart
- Once all checks have been successfully completed, the transfusion should be started immediately. If the checking process is interrupted, the entire process should be restarted from the beginning
- Record the date and time each unit of blood is commenced on the Blood Compatibility Tag
- The people administering the blood must clearly enter their personal mnemonic or write their full names on the Blood Compatibility Tag
- All documentation relating to the transfusion should remain at the patient's side throughout the transfusion
- The administering healthcare professionals must enter on the prescription that the blood has been administered. Include the date, time, and blood pack number. (When using an electronic prescription record the pack number in EPR and electronically sign the prescription. When using all other forms of handwritten prescription; date, time and sign the prescription and enter the pack number.)

### 15.4 Returning Blood if Transfusion is Delayed

- The administration of the blood transfusion must be commenced as soon as possible after delivery to the ward
- If the transfusion cannot commence within 20 minutes of leaving Blood Bank, the blood must be returned to Blood Bank within 30 minutes of it leaving Blood Bank. This will ensure that the blood is not wasted if the patient no-longer requires it. Blood that has been removed from temperature controlled can be used for another patient as long as it has not been outside of temperature control for more than 30 minutes
- If the blood cannot be used, lab staff MUST be notified and the blood should be **returned immediately** to the Scientist in the Blood Bank Laboratory
- Blood returned to the Blood Bank laboratory must be handed directly to a member of blood banks staff (if responsibility has been delegated this instruction must be given to staff)
- Blood collected in a Red Helapet cold blood transport box for multiple units of blood remains within temperature control for 4 hours as long as the blood remains in the box and the box remains securely closed. The principles above apply when the blood is removed from the red Helepet Box.

## 16 PRACTICAL GUIDELINES FOR SETTING UP A TRANSFUSION

These guidelines refer to administration of planned blood transfusions. In the event of administering blood during a major haemorrhage, also refer to the Major Haemorrhage Policy as slight variations exist.

Transfusions at night (between 8pm and 8am) should be avoided to minimise the increased risk of errors. This also minimises sleep disturbance, checking errors, and allows for easy identification and treatment of adverse events and subsequent care of the patient. Exceptions to this include transfusions required for urgent clinical need. If prescribed late at night, the requesting Doctor is required to document what blood is required overnight. Queries about this should be discussed with the prescribing doctors, and if necessary, with the Clinical Site Practitioner. Transfusion of blood should not be delayed for acutely unwell patients or those requiring urgent transfusion.

Administration of a blood transfusion should not be delayed if the patient is moving from one clinical area to another. Care must be taken during the handover process to ensure the receiving clinical area is aware of the transfusion plan, when the unit of blood is to be completed, and details about observation monitoring. Relevant documentation must accompany the patient. A nurse is required to accompany the patient during the transfer.

### 16.1 Documentation on the Blood Transfusion Observation Chart

At the start of the transfusion a core care plan is available for the patient care plan. Commence the dedicated Blood Transfusion Integrated Care Pathway observation chart. Maintain a fluid balance chart – record volume of blood transfused. Document in the nursing records/care plan that the patient is having a transfusion.

Whenever possible, the patient should be provided with or have previously seen a NHSBT Patient information leaflet regarding blood transfusion. Informed consent for the transfusion should have been recorded in the electronic prescription by the prescribing doctor. Refer to section 9 of this Policy for further information regarding consent. Ensure

the patient is aware of the plan for the administration of the blood components.

Complete the consent section of the blood transfusion observation chart (where used) confirming that consent has been obtained, that the patient has no further questions and that the patient has received the relevant patient information leaflet (s).

### 16.2 Hand Hygiene

Wash your hands or decontaminate with alcohol hand gel before starting the transfusion. Disposable non-sterile gloves should be worn to protect the practitioner. Utilise an aseptic no-touch technique for the connection of the transfusion.

### 16.3 Cannula

The intravenous cannula should be appropriate for the size of the patient's vein and the required rate of infusion. Recommendations: The needle diameter for transfusion of blood in adults is 18-19 gauge. Needles as small as 23 gauge can be used in paediatric practice.

The connection of the cannula should be visible and secured. The procedure for setting up an intravenous infusion should be followed and the usual care for intravenous lines should be applied as per the Intravenous Therapy for Adults Policy. When a multi-lumen catheter is used, the lumen specific for blood components should be used for transfusion.

**N.B:** Other infusion fluids should **NOT** be run simultaneously through the same lumen as a transfusion. When the transfusion is complete, either flush the cannula with 0.9% Sodium Chloride or remove as per instruction.

### 16.4 Central Vascular Access Devices/Midlines

Blood transfusions should where possible be administered through a dedicated peripheral cannula to prevent contamination of the blood by other infusion fluids and / or incompatibility reactions. In the event of transfusing a patient whose IV access is compromised or cannot be maintained and therefore has a detrimental effect on the planned care of that patient, a central vascular access device can be used. Administering blood transfusions through a midline should only be considered in exceptional circumstances. If this is being considered, please obtain advice from the following teams (where possible) prior to commencing the transfusion;

**Monday to Friday 09.00 – 17.00**
The Midline Team
To establish that a peripheral cannula is not an option

**Outside of these hours**
Clinical Site Practitioner
If necessary, the site practitioner can contact the on-call ODP on bleep 267 to identify if there is a member of the Midline Team on duty.

To administer blood transfusions, refer to the Trusts Intravenous Therapy Policy for Adults.

- The midline must be at least 22 gauge or wider (Vygon blue)
- The infusion set must be connected directly to the Midline pressure valve (Bionector TKO device). Do not use a Bionector Octopus as this increases the risk of line blockage
- A Baxter's pump is used to administer the blood
- The midline must be flushed (pulsated) with at least 10mls of 0.9% Sodium Chloride unless otherwise indicated prior to commencing the infusion
- The midline must be flushed (pulsated) with at least 10mls of Sodium Chloride 0.9% when the infusion has completed unless otherwise indicated
- If medications are administered through the midline in-between blood products, as per the Trusts Intravenous Therapy Policy for Adults, the midline must be flushed with at least 10mls of Sodium Chloride 0.9% before and after administering each medication
- Disconnecting the infusion set from the midline during the transfusion should be avoided wherever possible. Unless in an acute emergency situation, a new infusion set and blood component should be used prior to reconnecting
- Document in the patients nursing records that the transfusion was administered through a midline and include the rationale
- behind this decision.

### 16.5 Blood Infusion Sets

All blood components (RBC, FFP, platelets and cryoprecipitate) must be transfused through an approved sterile blood infusion set, which incorporates a 170u – 200u (micron) in-line filter.

Connect the unit to the infusion set taking care to avoid puncturing the side of the bag. Ensure the infusion set has a label stating the date and time the infusion set was first used (this is found on the packaging for the Baxter Infusion set).

Special paediatric blood giving sets should be used for transfusing infants and neonates, especially where the transfusion is administered by a syringe. This incorporates an in- line filter.

The infusion set must be changed;

- When changing the type of blood component (e.g., when transfusion a unit of RBC, then a unit of platelets). Exceptions to this will be under the guidance of anaesthetists.
- Every four units or 12 hours (whichever is soonest), if a transfusion runs continuously.
- On completion of the transfusion episode.

### 16.6 Priming

To reduce the risk of TACO, the blood should be used to prime the blood infusion set. In the unlikely event that additional priming is necessary, it may be primed with 0.9% Sodium Chloride to check patency of the infusion line prior to transfusion, but this must be prescribed. Flushing the infusion set with saline at the end of the transfusion episode should be avoided.

### 16.7 Compatibility of Blood During Administration

During routine transfusion the practice of changing the infusion set when changing the

type of blood component is encouraged (e.g. red blood cells to platelets). During major haemorrhage the Anaesthetist may feel there is an increased risk if this is done. The administration of different blood components through the same infusion set should only take place under the supervision of an anaesthetist. Red cells and FFP may be given through the same cannula via a binector provided the connection to the cannula is a short line. Platelets should not be transfused through an administration set which has previously been used for other blood components. Platelets are ideally infused through a separate line, or after a clear flush with at least 0.9% saline with a short connection to the cannula, but the mixing must only occur after the platelets have passed through. Intravenous solutions which contain calcium, such as Ringer Lactate, and calcium-containing colloids, such as Haemaccel™ or Gelofusine™ may antagonise citrate anticoagulant and allow clots to form in the blood component. Hypotonic intravenous solutions, such as 5% dextrose in water, may cause haemolysis of red cells.

### 16.8 Additives

No medication, additives or solutions should be used to prime or flush blood infusion sets during transfusion as many can lead to clotting / haemolysis of transfused component. If the administration of drugs through the same cannula cannot be avoided, the cannula must be flushed well with 10ml 0.9% Sodium Chloride before administration, and before recommencing the transfusion. Do not exceed the transfusion time for the blood component as a result of this action and do not stop the transfusion for a prolonged period.

<u>Administration of other bolus injection</u>

Cannulae should have a Bionector octopus connected

- Clamp off extension lead of Bionector connected to blood infusion set
- Release the clamp of the other Bionector extension and flush with 10ml 0.9% Sodium Chloride
- Administer bolus IV
- Flush with 10ml 0.9% Sodium Chloride
- Re-start transfusion.

### 16.9 Infusion Pumps

Where possible, an electric infusion pump should be used to administer routine blood transfusions. Baxter pumps are available from the Equipment library. The pump should only be used if:

a. It has been verified as safe to use for this purpose, according to the manufacturer's instructions
b. A blood administration set designed for use with the Baxter pump is provided with the pump
c. Blood components suitable for administration via an infusion pump include Red Blood Cells, Plasma, Platelets and Cryoprecipitate
d. In the event of an unforeseen shortage of pumps, priority should be made to patients potentially at higher risk of harm. This includes situations whereby close monitoring of the flow rate by staff trained and assessed to administer blood may be problematic, or if the patient is at risk of TACO.

### 16.10 Pressure Devices

The maximum pressure that should be applied to a blood transfusion using a pressure device is 300mm Hg.

### 16.11 Blood Warming

Indications for warming blood components include;

- Adults: flow rates greater that 50ml/kg/hr (rapid transfusion during major haemorrhage)
- Children: flow rates greater then 15ml/kg/hr
- For automated red cells exchange procedures and plasma exchange
- When transfusing patients with Cold Agglutinin Disease.

Patients with Cold Agglutinin Disease, a rare Autoimmune Hemolytic Anemia blood disease, have antibodies called *cold agglutinins.* The antibodies are activated by cold temperatures and the red cells which they are attached to clump together. Patients with Cold Agglutinin Disease require transfusions of blood components to be warmed. Inform blood bank when a patient is diagnosed with cold agglutinin disease. The BMS issuing the blood will state that the blood requires warming within the patient's blood product history on EPR. This will also appear on the comments field on the Transfusion Issue Card.

Inadvertent perioperative hypothermia is a common but preventable complication of perioperative procedures, which is associated with poor outcomes for patients. Adult surgical patients are at risk of developing hypothermia at any stage of the perioperative pathway. Intravenous fluids (500 ml or more) and blood components should be warmed to 37°C using a fluid warming device (NICE, 2008).

Red cells and plasma must only be warmed through equipment designed for this purpose. Ranger Blood warmers can be obtained for clinical use from the Medical Equipment Library. The Ranger unit will be issued with an infusion cassette that must be used in addition to the standard blood transfusion infusion set. Priming the infusion lines with 50ml of 9% Saline prior to transfusion may be required. There is no need to flush the infusion set at the end of the transfusion episode.

When using any temperature recording or warming device, healthcare professionals should: be trained in their use, maintain them in accordance with manufacturers' and suppliers' instructions and comply with local infection control policies.

The Ranger blood warmers are categorised within the Medical Equipment Policy as Low Grade Equipment. Training is provided by the Medical Equipment Officer or can be accessed on-line via the Haematology, Blood Transfusion Department Intranet site.

Clinicians who are competent to use the Ranger can show other individuals how to use it. Further assistance can be sought from the Site Practitioners.

## 17 CARE AND MONITORING OF PATIENTS DURING TRANSFUSION

### 17.1 Observation Monitoring

The person who administers the blood transfusion is responsible for ensuring the patient observations are carried out before, during and after the transfusion.

Clinical staff responsible for monitoring patients undergoing transfusion must be;

- Trained – have undertaken the appropriate Trust Mandatory training and competency assessment for their role
- Knowledgeable of the signs and symptoms of transfusion reactions
- Know what actions to take in case of transfusion reaction.

When delegating observation monitoring to a Healthcare Support Worker, Student Nurse / agency nurse or midwife, accountability for the transfusion and monitoring remains with the nurse responsible for the transfusion.

Commence an appropriate Transfusion Observation Chart (Transfusion Integrated Care Plan) for the patient. There are 3 charts available;

- Adult Blood Transfusion Integrated Care Pathway
- Paediatric / Neonatal Blood Transfusion Integrated Care Pathway
- Adult Blood Transfusion Massive Transfusion Integrated Care Pathway

The anaesthetic record card can also be used in the event of the patient being within theatre.

With the exception of the anaesthetic chart, the blood transfusion observation chart should be used alongside the patients current observation monitoring chart, as the observations required for blood transfusion monitoring does not include observations sets as required of other monitoring charts.

The Transfusion Observation Chart must be completed in full in black ink, and recorded in accordance with the Records Management - Trust Policy and Procedure. It must have the patient name, date of birth and B number recorded on it. Patient identification labels with the patients address must not be used on the Transfusion Observation Chart.

The date, start and finish times of each unit of blood must be clearly identifiable on the observation chart.

### 17.2 Observations sets

| | |
|---|---|
| Baseline Observations (up to 1 hour **prior** to administration) | Respirations, pulse, blood pressure, oxygen saturations and temperature |
| Observations 15 minutes after the start of each unit (+/- 5 mins). | Respirations, pulse, blood pressure, oxygen saturations and temperature |

| *IF ANY OBSERVATIONS INDICATE A TRANSFUSION REACTION STOP THE TRANSFUSION IMMEDIATELY* | |
|---|---|
| Observations hourly, (+/- 5 mins) until the end of the unit (or more frequently depending on the patients clinical need) | Temperature and pulse |
| Post transfusion observations (up to an hour after transfusing). This will detect the delayed onset and act as a baseline for the next transfusion. | Respirations, pulse, blood pressure, oxygen saturations and temperature |

- Each observation set recorded must be initialled by the person who undertook them. More frequent observations may be required depending on the patient's clinical condition.
- In the unconscious patient, nursing staff need to be more vigilant in observing signs of a reaction or circulatory overload.
- Ask patients to report any symptoms they experience during or after the transfusion. Patients should be warned of the risks of reacting to the transfusion or the cannula not working.

### 17.3 Fluid Balance

During the transfusion of blood it is important to monitor fluid balance to allow measures to be taken to avoid the development of over transfusion, particularly in vulnerable patients, elderly patients over 70 years of age and those with medical problems that would predispose to transfusion associated transfusion overload (TACO) including cardiac failure, renal impairment or hypoalbumuinaemia. A fluid balance chart should be used for this. Discression can be used when transfusing transfusion dependent patients who have already received a transfusion on a previous occasion with no ill effects within the Medical Day Case Unit.

### 17.4 Ending a Transfusion

Do not flush the infusion set. When the transfusion episode is completed, the transfusion infusion set should be disconnected directly from the patient and the cannula flushed with 0.9% Sodium Chloride solution.

If a transfusion reaction has been suspected, the component pack and infusion set should be returned immediately to Blood Bank for further investigation.

The Blood Compatibility Tag along with the Transfusion Observation Chart must remain at the patient's bedside during the transfusion. Once the transfusion of each unit is complete, the end time for the transfusion must be recorded on the Blood Compatibility Tag.

Record the actual amount of blood transfused on the Blood Compatibility Tag, and any amount wasted. In the event of an incomplete transfusion, the Doctor must be informed of the quantity of blood not transfused. Additional transfusion may be required.

On completion of the unit, the completed Blood Compatibility Tag must be returned to Blood Bank within three working days. The information provided on the Blood

Compatibility Tag returned to blood bank will be entered into EPR to provide a permanent record of the transfusion date, start time, stop time and individual responsible for the initial administration of the blood. It is a legal responsibility of the Trust to ensure that records relating to the traceability of blood administered are available for 30 years. MHRA expects the Trust to have 100% of traceability completed for all transfusions administered.

The safe management of healthcare waste must be adhered to when disposing of blood. Refer to the Waste Management Policy for further information. Disposal of partially empty blood bags without a giving set is in the orange clinical waste bags as per the Waste Management Policy. If the transfusion episode is completed uneventfully, the empty component pack and administration set should be discarded into a sharps bin. The pack and infusion set should not be separated.

## 18 COLLECTION AND ADMINISTRATION OF SPECIFIC BLOOD COMPONENTS

Refer to 13.1 for transfusion rates for red blood cells, plasma, platelets and cryoprecipitate.

Standard procedure for patient identification, patient preparation, component collection and transfusion applies to all the blood components. The Blood Compatibility Tag must be completed and returned to Blood Bank within three working days.

Physiological observation monitoring for all the blood components are as per the standard procedure for transfusion of blood. If a reaction is suspected or has occurred, additional observations and monitoring should be carried out as per the Blood Transfusion Reaction Policy.

### 18.1 Red Blood Cells

Transfusions of red cells should take place as soon as possible after reaching the ward.

Check that each unit complies with any prescribed special requirements e.g. CMV-negative or irradiated. The need to warm blood during administration will be documented on the comments field of the Blood Compatibility Tag or at the verbal request of a doctor if during a massive transfusion.

Transfusions must commence within 20 minutes of removal from blood bank or the red Helapet cold transport box for multiple units of blood. If the transfusion cannot commence within 20 minutes of the blood being removed from the blood issue fridge, the blood should be returned immediately to the BMS in blood bank so the blood can be returned to the refrigerator within 30 minutes of it leaving the Blood Bank. This avoids the need to waste blood.

From removal of the red blood cells from a blood fridge to completion of transfusion, the maximum time allowed is 4 hours. Any blood left in the pack after this time must be discarded and the amount transfused recorded on the Blood Compatibility Tag. Inform the Doctor of the amount not transfused.

### 18.2 Fresh Frozen Plasma (FFP)

When ordering FFP, pathogen-inactivated FFP (Methylene blue treated FFP) may be

issued for patient's born after 01/01/96.

FFP is stored frozen and is thawed in a dedicated water bath within the blood transfusion laboratory by Blood Bank staff (thawing takes approximately 20 minutes). Thawed FFP is stored in the blood issue fridge at 4˚C (+/- 2˚C). The transfusion must be completed within 24 hours of the defrost time, which is recorded on the bag.

FFP must be transfused through an approved sterile blood administration set, which incorporates a 170u – 200u (micron) in-line filter.

Thawed FFP should normally be administered as soon as possible to avoid any loss of activity of coagulation factors.

Start the transfusion as soon as the bag has been received, which must be within 20 minutes of removal from the refrigerator or red Helapet cold transport box for multiple units of blood.

The transfusion of FFP should normally be completed within 30 minutes and no more than 1 hour (faster in the event of major haemorrhage). From removal from a blood fridge to completion, the maximum time allowed for administration is 4 hours. Any FFP left in the pack after this time must be discarded. The transfusion must be completed within 24 hours of the defrost time, which is recorded on the bag. Inform the Doctor of the amount not transfused.

### 18.3 Platelet concentrates

Platelet concentrates are stored in blood bank on an agitator. Transfusions should take place as soon as possible after reaching the ward.

Check that each unit of platelet concentrate complies with any special requirements e.g. CMV-negative, irradiated etc.

Platelet concentrates are stored at room temperature and must not be refrigerated or transported in cool boxes with cool packs. They must be transported in blood product transport bags.

Platelets must be transfused through an approved sterile blood administration set, which incorporates a 170u – 200u (micron) in-line filter. Platelets must not be administered through a giving set that has been used for red blood cells. A fresh standard blood infusion set must be used.

The transfusion of platelet concentrate should normally be completed within 30 minutes and no more than 1 hour (faster in the event of major haemorrhage).

Observations during a platelet concentrate transfusion are as per the standard procedure for transfusion of blood components. If a reaction is suspected or occurred, additional observations and monitoring should be carried out as per the Blood Transfusion Reaction - Burton Sites Trust Policy and Procedure

### 18.4 Cryoprecipitate (Cryo)

Prior to use, Cryoprecipitate must be thawed in a dedicated water bath within the blood transfusion laboratory by Blood Bank staff. It must be transfused within 4 hours of defrosting.

Cryoprecipitate must be transfused through an approved sterile blood administration set, which incorporates a 170u – 200u (micron) in-line filter.

Thawed Cryoprecipitate should normally be administered as soon as possible to avoid any loss of activity of coagulation factors. Cryoprecipitate is stored at room temperature. The transfusion must be completed within 24 hours of the defrost time, which is recorded on the bag.

### 18.5 Special Requirements; CMV-negative or Irradiated Blood

It is the responsibility of the prescribing doctor to request special requirements such as irradiated blood components if these are required. During the administration checks, it is important to check the prescription for the requirement for irradiated blood, and that the blood issued has been irradiated. RBC's and platelets that have been irradiated will have a irradiator indicator on the bag.

## 19 TRANSFUSION REACTIONS

### 19.1 Clinical Presentation

Refer to the Blood Transfusion Reaction - Burton Sites Trust Policy and Procedure for management of suspected transfusion reactions.

Transfusion reactions should be considered when assessing a change or deterioration in a patient's condition, particularly during the first 15-20min following the start of a blood transfusion, but can occur at any stage of the transfusion, or several days later. Further management depends on the type and severity of the reaction.

Symptoms include but are not limited to:

- Discomfort at the Cannula Site
- Pain (especially Chest or Loin Pain)
- Fever
- Rigors
- Flushing
- Shortness of Breath
- Hypotension
- Tachycardia
- Nausea
- Urticaria.

### 19.2 Immediate Action to Take When Suspecting a Transfusion Reaction

Stop the transfusion by closing the infusion set. Do not take the unit of blood down immediately – first confirm with a doctor that the action is needed. Call a member of the Medical Staff (fast bleep if necessary).

Check identity of the patient (Surname, Forename, Patient identifier and Date of Birth) matches on:

- Patient Identity Band

- Blood Compatibility Tag
- Cross-match form

Monitor Respiration, Pulse, Oxygen Saturations, Blood Pressure and Temperature.

Blood Bank will require a post transfusion urine sample.

## 20 REPORTING TRANSFUSION INCIDENTS

Any unexpected transfusion event that has an actual or potential short term or long term detrimental effect on a patient must be reported using the Trust's Datix adverse incident reporting system under the category patient incident - blood/plasma products. Incident reporting should include "near miss" episodes involving procedural errors which were detected in time to prevent a serious complication of blood transfusion. All incidents related to transfusion graded 3 to 5 must be discussed with the patient or their representative.

**Blood Bank staff must be informed of any grade 3 to 5 incidents relating to transfusion as soon as is possible. This includes any suspected transfusion reactions that do not respond quickly to symptomatic treatment including paracetamol, anti-histamine or steroid medication.**

The Site Lead Blood Transfusion (QHB) and Transfusion Practitioner (QHB) will be notified of all incidents entered with a Transfusion category. The Clinical Risk Manager provides the Transfusion Practitioner with a monthly report of transfusion related incidents. This is then reported to the HTT (QHB) and HTC (QHB).

The Trust actively reports to both Serous Hazards of Transfusion (SHOT) and Serious Adverse Blood Reaction and Events (SABRE). The HTT will investigate all adverse incidents relating to blood transfusion and submit the required external report to SHOT or SABRE. Significant incidents are reported to the HTC.

The following events are reported to SHOT (Serious Hazards of Transfusion). If an event is suspected (including near-miss), an adverse incident must be entered as soon as possible under the heading of transfusion.

- WBIT – wrong blood in tube
- Transfusion of an incorrect blood component
- Transfusion associated circulatory overload (TACO)
- Avoidable transfusion, delayed transfusion or under transfused
- Specific requirements not met
- Acute transfusion reaction
- Haemolytic transfusion reaction
- Post transfusion purpura
- Transfusion associated dyspnoea
- Transfusion related lung injury
- Transfusion transmitted infections

Transfusion of an ABO-Incompatible blood component categorised as a Never Event, and will also be reported to external agencies.

## 21 TRAINING NEEDS ANALYSIS AND COMPETENCY

It is essential that staff involved in the transfusion process are sufficiently educated in transfusion matters and assessed as competent to perform critical tasks. The Medicines & Healthcare Regulatory Authority (MHRA) dictate that all staff involved in issuing and collecting blood components undertake dedicated, mandatory blood transfusion training on a regular basis. The National Blood Transfusion Committee states all staff involved in the transfusion process must have in place a system for training, knowledge and understanding assessments to be undertaken a minimum of every 3 years, every 2 years for collection or more frequently if deemed necessary at a local level (NBTC, 2016). Blood transfusion training is site specific. Staff involved in transfusion at Queens Hospital Burton must complete transfusion theory training and competency assessment locally delivered at QHB. It is not transferable between Royal Derby Hospital and Queens Hospital Burton.

The Education and Development Mandatory Training Matrix and My Learning Passport identify the training requirements for Blood Transfusion. This defines the course content, duration of course, frequency and staff groups required to attend.

The Trust's Mandatory Training Matrix is located within the Training and Development internet page (NET-i) under the heading Mandatory Training and on the individual staff members My Training Passport. Our Learning Hub allows for the monitoring of level of compliance.

The training allows practitioners to:

- Meet national training requirements for staff involved in blood transfusions
- Develop the technical / theoretical knowledge required to underpin new and existing clinical skills
- Review and update their knowledge to inform their practice.

The person connecting the blood transfusion at administration must also have undertaken training and competency assessment for administration of intravenous drugs. This includes care of lines and anaphylaxis training.

**Competency Assessment**

In addition to undertaking transfusion theory training, All staff involved in the practice of; phlebotomy, collection or administration of blood components require a competency assessment to be completed.

The administration of blood is a knowledge based assessment is required once only for all qualified healthcare professionals who put blood up, or who check it. It can be undertaken as an on-line module (BTA – Blood Transfusion Administration). The questionnaire can also be facilitated by key staff that have a remit for education with the agreement of the Transfusion Practitioner. The educator staff must be up to date with their own blood transfusion mandatory training. The Transfusion Practitioner will support the educator staff and ensure they are aware of relevant changes to practice.

An observed competency assessment (based on NPSA guidelines) for staff involved in the collection of blood components from Blood Bank is required to be undertaken by staff

new to collecting blood. This is an observed competency which can be booked via ESR (title BTC – Blood Transfusion Collection). Update is every three years and can be undertaken as a knowledge based on-line assessment. The nominated educator staff may also be able to undertake this competency assessment with prior agreement from the Transfusion Practitioner.

An observed assessment is required to be undertaken by staff involved in taking venepuncture samples for blood bank. This one-off competency assessment is incorporated within the Trusts venepuncture training.

Competency documents for all **Blood Bank laboratory staff**, which are in line with Good Manufacturing Practice (GMP) standards as defined by the Blood Safety and Quality Regulations 2005.

All blood transfusion training records are held by the Learning and Development Unit, accessed via the Our Learning Hub.

A database of requirement and achievement of competency assessment is maintained by Learning and Development. Unit managers can access the records for their department to allow them to ensure their staff are trained to undertake the training required for their role.

## 22 MONITORING COMPLIANCE AND EFFECTIVENESS

The key requirements will be monitored and reported to the QHB Hospital Transfusion Committee.

| | |
|---|---|
| Monitoring Requirement | To demonstrate that the Trust is compliant with the documented process for blood transfusion. |
| Monitoring Method: | A monthly report will be provided to the Hospital Transfusion Team identifying training compliance, policies outstanding, audit progress and analysis of adverse incidents entered.<br>Any areas of deficiency will be addressed by the Hospital Transfusion Team.<br>The Hospital Transfusion Committee will also receive a quarterly report on the same topics, to assure the Committee that the process is robust. |
| Monitoring Report presented to: | Monthly report to the Hospital Transfusion Team.<br>Quarterly report to the Hospital Transfusion Committee which reports to the Patient Safety Group.<br>Audit findings and analysis of adverse incident reports are used to inform teaching programmes and ward / department based education. |

| | |
|---|---|
| Frequency of report | Monthly. |

## 23 CONTACTS

Blood Bank – Telephone Extension 4087
Out of hours (any time other than 0900-1700 Monday - Friday) bleep the on call BMS on 367.

## 24 REFERENCE


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**Appendix A**

## Maximum Surgical Blood Ordering Schedule QHB (MSBOS)

The maximum surgical blood ordering schedule (MSBOS) defines the agreed transfusion requirements for patients undergoing elective surgical procedures. It is based on the likelihood of requiring transfusion. In many cases two valid group and screen tests processed at QHB are sufficient in case of unforeseen bleeding.

Pre-op samples: For G&S; The patient requires two valid G&S results available, one within the last seven days. For two units of blood; Order blood, ensuring the surgery date is entered.

| | |
|---|---|
| Abdominoperineal Resection of Rectum (APER) | G&S |
| Abdominoperineal Excision of Rectum (APER) – Oncology/ Re-do rectal cancer surgery | 2 units |
| Anterior resection of the rectum (open and laperascopic) | G&S |
| Anterior Placenta Previa | 2 units |
| Breast surgery with axillary lymph node clearance and latissimus dorsi flap | G&S |
| Cholecystectomy | G&S |
| Delorme's procedure | G&S |
| ERCP (Endoscopic Retrograde Cholangio-Panceatography | G&S |
| Hartmann's Procedure | G&S |
| Hemicolectomy – Left/Right or extended | G&S |
| Partial gastrectomy | 2 units |
| Reversal of colostomy / ileostomy | G&S |
| Revision of hip | G&S |
| Revision of knee | G&S |
| Shoulder replacement | G&S |
| Sigmoid Colectomy | G&S |
| Splenectomy | 2 units |
| Total hip replacement (THR) | G&S |
| Total knee replacement (TKR) | G&S |
| Varicose vein surgery | G&S |

The list is not exhaustive, nor does it supersede clinical judgement. Clinical decisions that override this schedule should be discussed with blood bank staff at the time of the request. Requests received for cross-match with non-specific clinical details / reason for request including unwell, for surgery, pre op., off legs etc. will be downgraded to a G&S as there are insufficient details to indicate the need for cross-match.

If a patient has known antibodies, is anaemic or complications are envisaged, extra units of blood may be required. If antibodies are detected during the G&S or cross- match process, Blood Bank will consider if 2 units require cross matching. The requesting consultant will be advised of the detection of antibodies and blood sample requirements.

Cross-matched blood will be returned to stocks 24 hours post-surgery unless otherwise requested by the clinician / ward. In the event of surgery being cancelled or postponed it is the responsibility of the doctor to inform the blood bank of the change in circumstances.

**Appendix B**

## INDICATION CODES FOR TRANSFUSION (QHB)

The indications for transfusion provided below are taken from national guidelines for the use of blood components (see references). Although it is accepted that clinical judgment plays an essential part in the decision to transfuse or not, the purpose of drawing available transfusion guidelines together into one short document is to help clinicians decide when blood transfusion is appropriate and to facilitate documentation of the indication for transfusion. Each indication has been assigned a number, which may be used by clinicians when requesting blood or for documentation purposes. Specific details regarding the patient s diagnosis and any relevant procedures to be undertaken should also be provided.

These are current guidelines and may change depending on new evidence.

### RED CELL CONCENTRATES

Dose - in the absence of active bleeding, use the minimum number of units required to achieve a target Hb. Assume an increment of 10g/l per unit for an average adult.

R1 Acute bleeding Acute blood loss with haemodynamic instability. After normovolaemia has been achieved/maintained, frequent measurement of Hb (including by near patient testing) should be used to guide the use of red cell transfusion – see suggested thresholds below.

R2 Hb ≤ 70g/L stable patient Acute anaemia. Consider a Hb threshold of 70g/l and a target Hb of 70-90g/l to guide red cell transfusion. There are different recommendations (based on weak evidence) from other organisations e.g. Association of Anaesthetists.

R3 Hb ≤ 80g/L stable patient and acute coronary syndrome Use an Hb threshold of 80g/l and a target Hb of 80-100g/l.

R4 Chronic transfusion-dependent anaemia Transfuse to maintain an Hb which prevents symptoms. Suggest an Hb threshold of 80g/l initially and adjust as required. Haemoglobinopathy patients require individualised Hb thresholds depending on age and diagnosis.

R5 Radiotherapy - maintain Hb > 100g/L There is some evidence for maintaining an Hb of 100g/l in patients receiving radiotherapy for cervical and possibly other tumours.

R6 Exchange transfusion

### FRESH FROZEN PLASMA

(Dose - 15 ml/kg body weight equivalent to 4 units for an adult).

F1 Major haemorrhage In the trauma setting transfuse empirically in a 1:1 ratio with red cells. Other settings give FFP in at least a 1 unit:2 unit ratio with red cells until results from coagulation monitoring are available. Once bleeding is controlled, further

FFP should be guided by abnormalities in PT and APTT (keep PT/APTT ratio of <1.5x mean normal), or by the use of viscoelastic haemostatic assays in a near patient setting.

F2 PT Ratio / INR > 1.5 with bleeding Clinically significant bleeding without major haemorrhage. FFP required if coagulopathy. Aim for a PT and APTT ratio of < 1.5, or local protocol range for near-patient viscoelastic assays.

F3 PT Ratio / INR >1.5 and pre-procedure Prophylactic use when coagulation results are abnormal e.g. disseminated intravascular coagulation and invasive procedure is planned.

F3 PT Ratio / INR >1.5 and pre-procedure Prophylactic use when coagulation results are abnormal e.g. disseminated intravascular coagulation and invasive procedure is planned.

F5 TTP / plasma exchange.

F6 Replacement of single coagulation factor

**Prothrombin complex concentrate**
Dose should be determined by the situation and INR. Local guidelines should be followed.

PCC1 Emergency reversal of VKA for severe bleeding or head injury with suspected intracerebral haemorrhage.

PCC2 Emergency reversal of VKA pre-emergency surgery

**CRYOPRECIPITATE**

Dose – 2 pooled units, equivalent to 10 individual units, will increase fibrinogen by approximately 1g/l in an average-sized adult. Cryoprecipitate should be used with FFP wherever there is a requirement for volume, except in the rare setting of isolated deficiency of fibrinogen.

C1 Clinically significant bleeding and fibrinogen <1.5 (<2g/L in obstetric bleeding

C2 Fibrinogen <1g/L and pre-procedure, with a risk of bleeding

C3 Bleeding associated with thrombolytic therapy

C4 Inherited hypofibrinogenaemia - fibrinogen concentrate not available

**PLATELET CONCENTRATES**

Dose – for prophylaxis, do not routinely transfuse more than 1 adult therapeutic dose. Prior to invasive procedure or to treat bleeding, consider the size of the patient, previous increments and the target count.

*Prophylactic platelet transfusion*

**P1 Plt <10 x 10*9/L in reversible bone marrow failure**

Not indicated in chronic bone marrow failure if not on intensive treatment, and not bleeding.

**P2 Plt 10-20 x 10*9/L with sepsis / haemostatic abnormality, or other additional risk factor for bleeding**

*Prior to invasive procedure or surgery*

**P3 To prevent bleeding associated with invasive procedures**

To raise the platelet count above the following thresholds for these procedures:

- **P3a Plt >20 x 10*9/L - central venous line**
- **P3b Plt >40x10*9/L - lumbar puncture/spinal anaesthesia**
- **P3c Plt >50x10*9/L - pre-percutaneous liver biopsy / major surgery**
- **P3d Plt >80x10*9/L - epidural anaesthesia**
- **P3e Plt >100x10*9/L - critical site surgery e.g. CNS / eye**

Transfusion prior to bone marrow biopsy is not required.

*Therapeutic use to treat bleeding (WHO bleeding grade 2 or above)*

**P4a Major haemorrhage - Plt <50 x 10*9/L**
**P4b Empirically in a Major Haemorrhage Pack / Protocol**
**P4c Critical site bleeding e.g. CNS - Plt < 100 x 10*9/l**
**P4d Clinically significant bleeding - Plt < 30 x 10*9/l**

*Specific clinical conditions*

**P5a DIC pre-procedure or if bleeding**
**P5b Immune thrombocytopenia (emergency treatment pre-procedure / severe bleeding)**

P6. Platelet dysfunction

**P6a Consider if critical bleeding on anti-platelet medication**
**P6b Inherited platelet disorders directed by specialist in haemostasis**

**Appendix C**

**CLINICAL REQUIREMENTS FOR IRRADIATED BLOOD COMPONENTS (QHB)**

In an emergency the provision of red cells or platelets must not be delayed by sourcing irradiated components for patients with the appropriate indication; LD blood or platelets must be sourced rapidly from the blood bank; where non-irradiated components are used in this setting because of urgency this should be recorded and clinical observation made for any evidence of TA-GvHD over the next 6 weeks

**Irradiated red blood cells and platelets are indicated for the following patient groups:**

1. Once a diagnosis of severe T-lymphocyte immunodeficiency has been suspected, irradiated components should be given while further diagnostic tests are being undertaken. A clinical immunologist should be consulted for advice in cases where there is uncertainty.

2. There is no indication for irradiation of cellular blood components for infants or children with temporary defects of T-lymphocyte function as the result of a viral infection. There is also no indication for irradiation of cellular blood components for adults or children who are HIV-antibody positive or who have acquired immune deficiency syndrome.

3. All recipients (adult and paediatric) of allogeneic HSCT should receive irradiated blood components from the time of initiation of conditioning chemo/radiotherapy. The recommendation applies for all conditions where HSCT is indicated regardless of the underlying diagnosis (1/B). Irradiated components should be continued until all of the following criteria are met:

    - >6 months have elapsed since the transplant date
    - The lymphocyte count is >1·0 × 109/l
    - The patient is free of active chronic GvHD
    - The patient is off all immunosuppression

1. If chronic GvHD is present or continued immunosuppressive treatment is required, irradiated blood components should be given indefinitely.

2. Treatment with irradiated blood components should continue indefinitely if this is required based on transplant conditioning, underlying disease or previous treatment, e.g. previous diagnosis of HL or previous purine analogue treatment

3. Allogeneic cellular blood components transfused to bone marrow and peripheral blood stem cell donors of all ages within 7 days prior to or during the harvest should also be irradiated.

4. Patients (adult and paediatric) undergoing bone marrow or peripheral blood stem cell collections for future autologous re-infusion should receive irradiated cellular blood components for 7 days prior to and during the bone marrow/stem cell harvest to prevent the collection of viable allogeneic T lymphocytes, which can potentially withstand cryopreservation.
5. All patients undergoing ASCT irrespective of underlying diagnosis or indication for this treatment should receive irradiated cellular blood components from initiation of conditioning chemo/radiotherapy until 3 months post-transplant (6 months if total body irradiation was used in conditioning) unless conditioning, disease or previous treatment determine indefinite duration, for example previous diagnosis of HL or previous purine analogue treatment.

6. All adults and children with HL at any stage of the disease should have irradiated red cells and platelets indefinitely.

7. All patients treated with purine analogue drugs (fludarabine, cladribine, bendamustine and pentostatin) should receive irradiated blood components indefinitely.

8. Patients with aplastic anaemia undergoing treatment with ATG or alemtuzumab should receive irradiated blood components.

9. Patients with CLL or other haematological diagnosis treated with alemtuzumab should receive irradiated components.

10. Patients receiving ATG or other T-lymphocyte-depleting serotherapy for rare types of immune dysfunction conditions should receive irradiated blood components.

11. Patients (adult and paediatric) undergoing peripheral blood lymphocyte collections for future CAR-T cell re-infusion should receive irradiated cellular blood components for 7 days prior to and during the harvest, to prevent the collection of viable allogeneic T lymphocytes. Irradiated blood components should continue to be used until 3 months following CAR-T cell infusion unless conditioning, disease or previous treatment determine indefinite duration, e.g. previous diagnosis of HL or previous purine analogue treatment.

12. For patients with aplastic anaemia, transfusion of irradiated cellular components is not routinely recommended, except for HLA-selected platelets, transfusion of granulocytes, donations from first- or second-degree relatives, or planned relevant treatment (e.g. ATG, alemtuzumab, HSCT)

13. Use of irradiated components for adult patients or children treated for acute leukaemia or NHL (including CLL unless treated with alemtuzumab) is not routinely recommended except for HLA-selected platelets, transfusion of granulocytes, donations from first- or second-degree relatives, or due to current or previous treatment.

14. Use of irradiated cellular blood components is not indicated following treatment with alemtuzumab using the schedule currently recommended for MS or vasculitis.

15. Use of irradiated cellular blood components is not indicated for patients undergoing solid organ transplantation who have received alemtuzumab or ATG as induction therapy or for treatment of graft rejection.

16. Treatment of patients with rituximab is not an indication for use of irradiated cellular blood components unless this is indicated for a different reason (underlying diagnosis, type of component or previous treatment)

This should be done at the point of diagnosis or commencement of relevant medication.
Email UHDB.BloodBank@nhs.net Ext. 4087 Bleep 367

**Inform the Patient**
If relevant, discuss with the patient. Leaflets are available from Blood Bank (Information for Patients Needing Irradiated Blood (NHSBT)

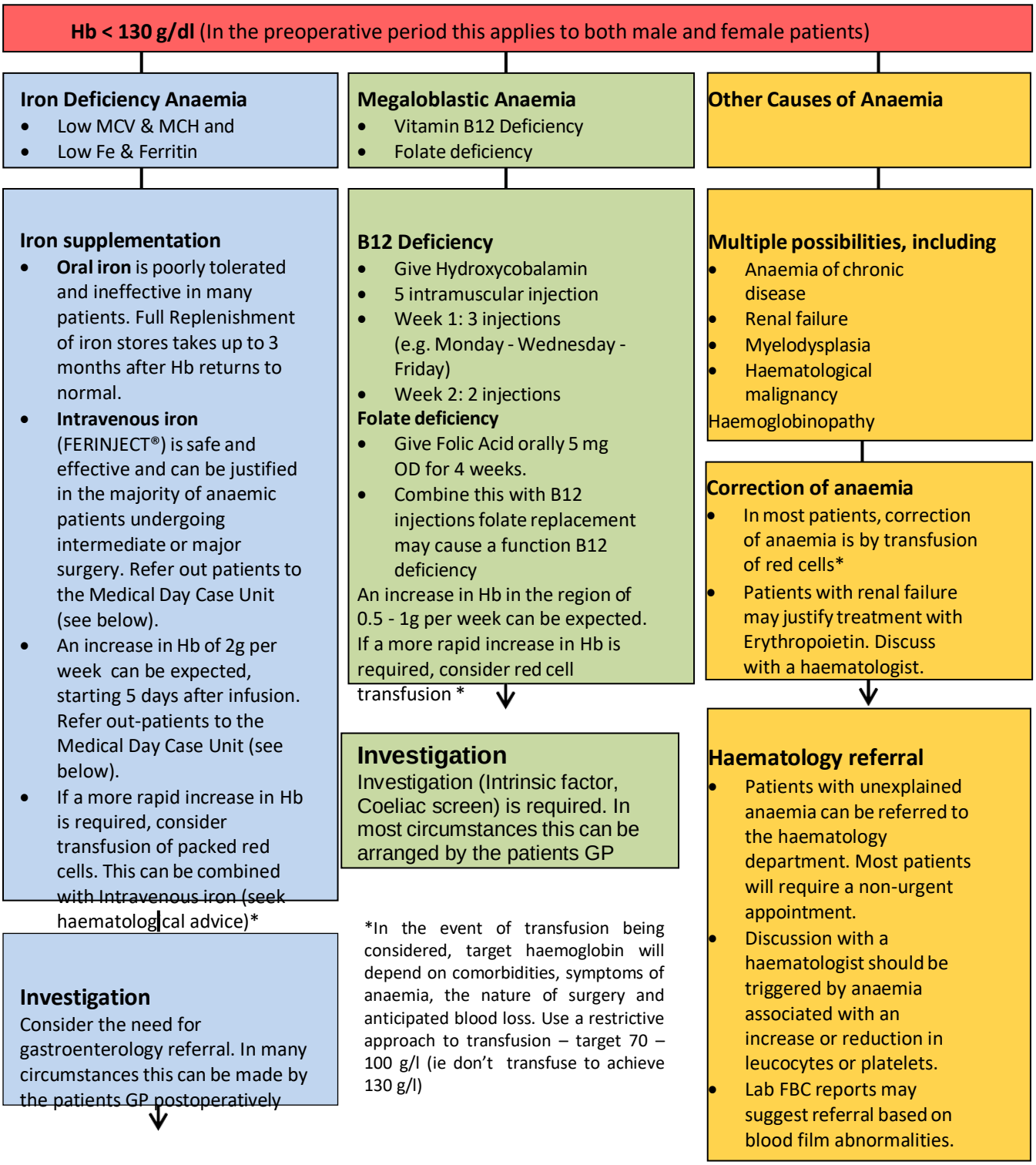
**Inform Clinicians**
Enter a Special Indicator/alert “irradiated blood” (If appropriate, enter an alert for Major Organ Transplant). If irradiated components are not available, the laboratory staff will contact the ordering department to discuss the urgency.

**Blood Bank Requires the Following Information;** (e-mail - uhdb.bloodbank@nhs.net)
- Patients full name
- Patient B number
- Patient date of birth
- State irradiated blood is required
- Reason for requiring irradiated blood
- Your name/title

**Appendix D**

## THE DETECTION AND MANAGEMENT OF PREOPERATIVE ANAEMIA (QHB)

Preoperative anaemia and perioperative allogenic red cell transfusion are independent predictors of increased perioperative morbidity and mortality. Even mild anaemia increases perioperative risk. Full blood count, Ferritin, iron, vitamin B12 and folate should be measured in all patients scheduled for major or intermediate surgery. For patients at increased risk of anaemia this should be arranged at the time of listing for surgery.



**Referral for administration of Intravenous Iron (FERINJECT®) in the Medical Day Case Unit**

- Book a one hour slot with MDCU. The referrer will be asked to prescribe Ferinject when an appointment has been arranged.
- Usual dose is 1000mg (in 250ml over 30 mins), reduced to 500mg in frail/ elderly/ low body mass patients. A further dose may be considered after 5-7 days (maximum total dose 2000mg).
- In time critical circumstances where iron deficiency is the likely cause of anaemia (e.g. known bleeding, bowel carcinoma etc.), use of Ferinject may be appropriate before haematinics results are available.

**Appendix E**

# Blood Transfusion in the Community Hospital (QHB)

## 1. Introduction

Sometimes patients attending St. Giles Hospice will require transfusions of red blood cells. The blood for transfusion will be provided by Queens Hospital Burton. Refer to the Blood Transfusion Policy (QHB) when administering blood transfusions within the Community Hospital.

## 2. Service Provision

Patient attending St. Giles Hospice Whittington may require blood transfusion and blood components are provided by Queens Hospital Blood Bank. Transfusions at St. Giles are planned in advance. This allows for the Blood Bank to be informed of the need for the transfusion at least one day before the planned transfusion date to allow the blood to be delivered to St. Giles by 08.30am on the day of transfusion.

Blood components will normally be provided between Monday to Friday. Transfusions on a Saturday may be possible, but this needs to be discussed and agreed with Blood Bank. In exceptional circumstances, unplanned transfusions or components other than red blood cells may be possible, but again, this needs to be discussed with Queens Hospital Blood Bank.

## 3. Providing Samples for Blood Bank

Blood samples for group and screen (G&S) or cross-match must be sent to Queens Hospital Blood Bank (Pathology Department) before the proposed day of the transfusion. Blood Bank provides a service to East Staffordshire. Due to laboratory regulations, they are not able to act on Blood Bank results from another Trust e.g.
Heartlands. The planned day for the transfusion must be documented on the order form to ensure the blood is provided on the correct day**.**

## 4. Delivery of Blood for Transfusion

.

Queen's Hospital Burton Transfusion Laboratory will be responsible for the transportation of blood components to St. Giles hospice. St. Giles Hospice will be responsible for receiving the blood components and completing the appropriate transfer of blood documentation according to the SOP.

If a unit of red cells has been out of the transport box for more than 30 minutes and there is no prospect of its imminent transfusion, Queen's Hospital, Burton Blood Transfusion Laboratory must be informed immediately. St. Giles Hospice will be responsible for sending the transport box back to Queen's Hospital Blood Transfusion laboratory as soon as the transfusion is complete

## Appendix F

### Patient Blood Management in Transgender Patients

**Definitions**

| | |
|---|---|
| Transgender | Denoting or relating to a person whose sense of personal identity does not correspond with the gender assigned to them at birth. |
| Non-binary | Describes any gender identity which does not fit within the binary of male and female.<br>Have an androgynous (both masculine and feminine) gender identity.<br>Have an identity between male and female, such as inter-gender. |

It is recognised the overwhelming majority of patients are not transgender, therefore the vast major of the health care system and associated IT platforms are binary male/female ordinated. This can lead to problems and potential errors when trying to provide patient centred care.

Gender related transfusion guidelines are designed to protect 'female' patients from developing red cell antibodies that can cause Haemolytic Disease of the Fetus and Newborn (HDFN). Therefore application of these guidelines must be considered in any individual with child bearing potential, these individuals may be;

- Female to Male transitioning patients
- Non-binary patients

**Implications at Phlebotomy**
Samples bled for Transfusion MUST contain the patients' handwritten demographics as they appear in the patients' hospital record. The use of preferred name or gender identity cannot be used on the bottle label.

**Implications in the laboratory**
Nothing can be placed on the individuals LIMS record denoting transgender status without their informed consent. Disclosing a person as transsexual is classed as direct discrimination under the 2010 Equality Act and could result in criminal charges under the Gender Recognition Act 2004. In this circumstance the individual is personally liable (5K fine or 6 month prison sentence)

A patient's gender is attached to their NHS spine number and those transitioning are counselled by their GP as to the decision to change gender on the NHS spine. The patients documented gender in all other systems should reflect the gender attached to the NHS spine number.

Assumptions regarding a patient's gender should not be made by laboratory staff, particularly where the documented gender does not traditionally correlate with the requesting area or clinical information. For example a patient with a male or Unisex name with the clinical detail 'PV bleed'. Laboratory staff should book sample in with the provided information, if this is inconsistent with previous information then it is appropriate to make enquires with the clinical area.

**Implications for Blood Transfusion**

**In an emergency situation**
O D negative red cells (Flying Squad) are appropriate for all patients regardless of gender.
Platelets are not stored at QHB and can be ordered once the patients' D status is confirmed as D negative and their gender and preference has been established.

**Routine Transfusion**

If the patient is listed in Meditech as female they must receive K antigen negative red cells and if they are group D negative, they should receive D negative platelets.
For patients listed in Meditech as male but who have childbearing potential, the clinical area should communicate the individual patients' wishes regarding Blood transfusion, so the required components can be issued.

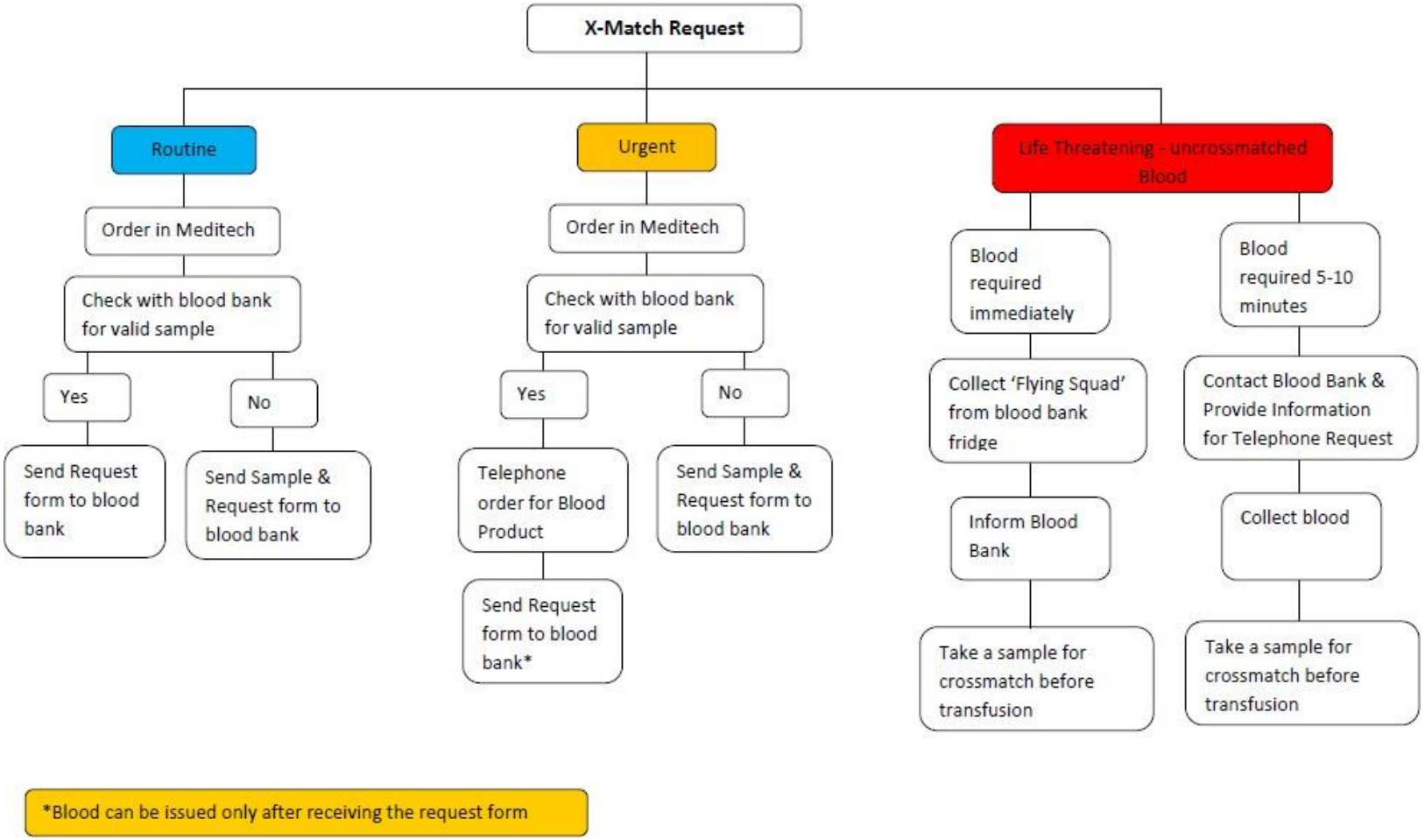
**Prophylactic Anti-D**
Any D negative patient with child bearing potential is eligible for Prophylactic Anti-D pre and postnatally or following a TOP. Individuals should be counselled on their choice to receive the product. Blood Bank will fulfil any request for Prophylactic Anti-D regardless of the patients' gender.

**Pre Transfusion checks**
All blood components and products issued to a named patient will have an attached compatibility (Traceability) tag containing the patients' demographics as they appear on Meditech. This information must match that which is on the patients' wristband, the use of preferred name or gender identity cannot be used in this instance.

The current national IT systems and guidelines do not currently accommodate data fields for preferred names, gender identity or gender beyond traditional male/female. Until national guidance is in place trusts must strive to inform patients of their treatment options and ensure patients are treated with respect and sensitivity.

**Appendix G**

# Blood Product Request Process




Blood Bank Telephone (office hours) 4087. Bleep out of hours 367.
Refer to the Major Haemorrhage Policy for further guidance on requesting blood in life-threatening situations.

**Appendix H - TACO Checklist**

Figure 18b.1: TACO pre-transfusion checklist

| TACO Checklist | Patient Risk Assessment | YES | NO |
|---|---|---|---|
|  | Does the patient have any of the following: diagnosis of 'heart failure', congestive cardiac failure (CCF), severe aortic stenosis, or moderate to severe left ventricular dysfunction? | | |
| | Is the patient on a regular diuretic? | | |
| | Does the patient have severe anaemia? | | |
|  | Is the patient known to have pulmonary oedema? | | |
| | Does the patient have respiratory symptoms of undiagnosed cause? | | |
|  | Is the fluid balance clinically significantly positive? | | |
| | Is the patient receiving intravenous fluids (or received them in the previous 24 hours)? | | |
| | Is there any peripheral oedema? | | |
| | Does the patient have hypoalbuminaemia? | | |
| | Does the patient have significant renal impairment? | | |

| If Risks Identified | YES | NO |
|---|---|---|
| Review the need for transfusion (do the benefits outweigh the risks)? | | |
| Can the transfusion be safely deferred until the issue is investigated, treated or resolved? | | |

| If Proceeding with Transfusion: Assign Actions | TICK |
|---|---|
| Body weight dosing for red cells | |
| Transfuse a single unit (red cells) and review symptoms | |
| Measure fluid balance | |
| Prophylactic diuretic prescribed | |
| Monitor vital signs closely, including oxygen saturation | |

| | |
|---|---|
| **Name (PRINT):** | |
| **Role:** | |
| **Date:** | **Time (24hr):** |
| **Signature:** | |

**Due to the differences in adult and neonatal physiology, babies may have a different risk for TACO. Calculate the dose by weight and observe the notes above.**

*TACO=transfusion-associated circulatory overload*