Blood Transfusion Policy

Department / Service:	Blood Transfusion, Pathology.
Originator:	Gill Godding, Lead Transfusion Practitioner
Accountable Director:	Suneil Kapadia Chief Medical Officer
Approved by:	Safe Patient Group Clinical Governance Group
Date of approval:	4th September 2018
First Revision Due:	4th March 2021
Target Organisation(s)	Worcestershire Acute Hospitals NHS Trust Worcestershire Health & Care Trust
Target Departments	All
Target staff categories	All staff involved in the transfusion process

Key amendments to this policy

Date	Amendment	Approved by:
June 2018	Clinical director changed. No longer approved by CEC, now safe patient group. New terms of reference. Amalgamation of the paediatric policy into the adult policy. The addition of the criterion for specialist nurses authorising blood components. Updated national indication codes and criterion for special requirements	Gill Godding/Safe patient Group
July 2020	Document extended for 6 months whilst review and approval process takes place	Gill Godding

Policy Statement

The policy details key messages relating to all stages of the transfusion process.

The Trusts must provide patients with accessible, authoritative and comprehensive information about transfusion therapy and its intended benefits, risks and any available transfusion alternatives. All patients must give informed verbal consent to transfusion where possible.

The prescription of blood and blood components must be based on a full clinical evaluation of the patient and follow recognised national guidelines.

Safe transfusion phlebotomy practise involves following the Positive Patient Identification procedure and hand labelling samples at the patient's side.

The collection of blood and blood components must only be done by staff that are competency assessed in this process. This is to ensure they understand the correct checking procedures and transport options available.

The administration of the blood is a critical step. Positive Patient Identification is essential to ensure the correct patient receives the correct blood and/or blood component. The patient must be monitored appropriately to ensure they do not come to harm as a result of the transfusion.

The trust has a legal responsibility to document the final fate (destination) of each unit of blood and blood component we receive, it is essential that the transfusion is documented correctly in the patient records (Blood Safety & Quality Regulations 2005).

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BLOOD TRANSFUSION POLICY

Introduction and Scope of Policy

Introduction

This policy pathway aims to promote and support safe and effective transfusion practice in Worcestershire Acute Hospitals NHS Trust and Worcestershire Health & Care Trust, thereby provide our patients with timely and appropriate transfusion therapy while minimising their exposure to the potential hazards.

Scope of this document

This policy pathway covers all aspects of the transfusion process. The procedures which support the policy are covered in the appendices.

This policy pathway applies to all patients including children and young people (excluding neonates*) receiving transfusion irrespective of their location and applies to all healthcare professionals involved in the transfusion process.

There are additional guidelines for certain situations and patient subgroups which apply in addition to this policy but not instead of it. These can be found within the Blood Transfusion Pathway.

- Major Haemorrhage Protocol
- Procedure for Blood Collection and transfer to satellite fridges
- Procedure for the administration of blood components and management of transfusion reactions
- Procedure for sample collection and blood transfusion requests
- Blood Transfusion on the Neonatal Unit (WAHT-PAE-015)
- Policy for Emergency Management for Red Cell and Platelet Shortages
- Refusal of blood transfusion in obstetric haemorrhage

* Neonate = up to 28 days after due date

Definitions, Responsibilities and Duties

Definitions

These are given throughout the text.

Responsibility and Duties

The Trust Board

The Trust Board is ultimately responsible for ensuring that the Trust has effective Policies, Procedures and arrangements in place to manage Transfusion issues.

The Safe Patient Group

The Clinical Governance Group (CGG) will receive quarterly reports from the Trust Transfusion Committee (TTC) on the effectiveness of transfusion provision, and on associated risks. The CGG will consider the risks raised, and will manage or escalate them in accordance with the arrangements set out in the Risk Management Strategy.
The CGG is responsible for overseeing the implementation of the Trust's Transfusion policies, procedures and processes.

The Trust Transfusion Committee (TTC) will (Terms of Reference):

This Committee will act as an expert forum of the Clinical Governance Group and has been established to ensure safe and appropriate transfusion practice within the organisation.

The TCC duties are:

- To promote and monitor Patient Blood Management (PBM) including blood conservation strategies (pre-operative assessment, cell salvage and point of care testing).

- Ensure compliance with the trust transfusion policies through annual audit of the treatment care pathway.

- Lead multi-professional local and national audit of the use of blood, blood components and blood products within the Trust. Act upon the audit findings by creating action plans which are monitored through to completion.

- Provide feedback on audit of transfusion practice and the use of blood to all Trust staff involved in blood transfusion

- Review and develop the practice of blood transfusion against national guidelines, focusing on critical points for patient safety and the appropriate use of blood. Modify and improve blood transfusion protocols and clinical practice based on new guidance and evidence.

- Develop and implement a robust strategy for the education and training for all staff involved in blood transfusion, ensuring staff are competent to carry out their role.

- Promote patient education and information on blood transfusion including the risks of transfusion, blood avoidance strategies and the need to be correctly identified at all stages in the transfusion process. Consult with local patient representative groups where appropriate.

- Develop contingency plans in case of blood shortages.

- Ensure compliance with Blood Safety and Quality Regulations 2005.

- Ensure 100% compliance with full vein to vein Traceability of all blood components in accordance with BSQR 2005

- Produce a quarterly Transfusion Report for Clinical Governance group on the effectiveness of the Trust's Transfusion provision (and control of the risks associated with it).

- Support the Hospital Transfusion Team and Clinical Directorates in the implementation of Trust Transfusion-related policies, procedures and PBM recommendations.

- Promote collaboration and communication between all staff involved in blood transfusion activities.

- Comply with MHRA inspection and reports

- Monitor blood usage and wastage within the trust and benchmark against other trusts usage and wastage

Membership of the TTC

The following members provide user interaction and clinical feedback, as well as disseminating information and changes to clinical colleagues:

- Consultant haematologist
- Blood bank manager
- Lead Transfusion Practitioner
- Consultant physician
- Consultant anaesthetist
- Consultant surgeon
- Consultant paediatrician
- Consultant Obstetrics and Gynaecology
- A&E consultant
- Worcester Health and care trust (HACW) representative

In attendance:
The Forum may request the attendance of members of staff to assist it in meeting its terms of reference.

Trust Transfusion Team

The Trust Transfusion Team (TTT) is a subgroup of the TTC. The membership consists of the lead consultant for transfusion, Hospital Blood Transfusion Laboratory Manager, hospital transfusion practitioners. Other members of the TTC and interested parties are encouraged to attend.

The main duties of the TTT are to:

- implement objectives set by the TTC
- promote Patient Blood management and the safe and appropriate use of blood
- promote patient education & awareness
- actively promote the use of transfusion alternatives
- provide and monitor training programmes for all staff involved in transfusion
- review and implement recommendations by Serious Hazards of Transfusion Organisation and other professional groups, providing feedback to TTC
- monitoring adverse events / incidents and acting on review findings
- develop and review policies, procedures and protocols based on National Guidelines
- audit compliance with transfusion policy, publish findings, feedback to affected areas and ensure corrective action
- meet monthly and report to the quarterly Transfusion Committee meetings

All Staff involved in the transfusion process must

- Maintain competency and undertake Continuing Professional Development relevant to their role in transfusion.
- Comply with the requirements of this policy including Positive Patient Identification as detailed in Policy to identify all patients WAHT-CG-019.
- Report all incidents regarding transfusion practise according to the Trust Incident Reporting Policy WAHT-CG-008.
- Take part in audits of transfusion practise as required

Medical / Prescribing Staff

The prescription of blood (including autologous blood) and blood components is the responsibility of a medical doctor or clinical nurse specialists who have successfully completed the non-medical authorisation of blood components course.

It is the duty of the person making the decision to prescribe blood or blood products to consider the potential risks and intended benefits of the transfusion for the individual patient.

The prescriber has a duty to ensure the patient receives information about the risks, benefits and alternatives to transfusion therapy.
They must gain informed consent from the patient prior to them receiving a transfusion and this should be documented on the documentation for transfusion. This standard of consent is expected in all but the most urgent situations (please refer to the Trust's consent to examination or treatment policy WAHT-CG-075.

For long term repeated transfusions (usually haematology patients) the e-consent system under Haematology should be used to obtain written consent. This comes with a trust information leaflet about the risks of long term transfusion. This consent needs only to be signed once at the start of the regular transfusions.

Patients who received transfusion without knowing it must be informed retrospectively. This is to prevent them from donating blood in the future.

The prescriber must clearly indicate the reason for transfusion on the request form and check the patient notes to ensure any special requirements are identified.
The prescription for transfusion should be written on the Documentation for transfusion of blood components. WR2151.
The indications for use of irradiated and CMV negative blood components are given in appendix 2.

It is a medical responsibility to ensure documentation of the transfusion episode is in the clinical notes.
The indication for transfusion is documented in the Documentation for transfusion of blood components.
The efficacy of each unit given should be monitored within the medical notes

Medical Staff and Registered Nursing Staff, Midwives, Perfusionists and Operating Department Practitioners:
Actions and responsibilities providing that staff have been ***trained & competency assessed*** to do so:

- Explain the intended benefits, risks and any suitable alternative to transfusion therapy to the patient (patient information leaflets are available in all clinical areas and also obtainable from the transfusion practitioners or downloadable from the intranet site - A to Z - Blood Transfusion Site).
- Request blood and blood components from Blood Bank, clearly indicating the reason for request
- Take blood samples for cross-match.
- Collection of blood and components
- The administration of blood and components to patients following prescription.
- Monitoring patients during transfusion.
- Taking appropriate action in the event of adverse effects.
- Reporting transfusion reactions or other clinical incidents related to transfusion according to the Trust Incident Reporting Policy.

Phlebotomists
Responsibilities are restricted to the taking of blood samples for cross-matching when trained and competency assessed to do so. Please refer to the procedure for sample taking for transfusion.

Non-Registered Staff including Porters, Ward Receptionists, Health Care Assistants and Nursing Auxiliaries
Responsibilities are restricted to the collection of blood and components on completion of training and competency assessment.

Laboratory Staff
Responsibilities for non–state-registered staff are restricted to general clerical and supportive duties.

State-registered staff working in the transfusion laboratory, has responsibility for:

- Maintenance of sufficient and suitable stock
- Selection, testing and issue of suitable blood, blood components and blood products requested by medical staff
- Ensuring correct storage conditions for blood, components and products are maintained
- Monitoring cold-chain and traceability

- Investigation and monitoring of adverse reactions and events associated with blood transfusion and reporting incidents appropriately to the Trust and external bodies
- Co-ordinating, planning and reporting of relevant audits
- Review the appropriateness of the request for blood components/ products and ask for clarification if not deemed suitable.
- Refer staff to the haematology clinical staff for advice when appropriate.
- Report any incidents related to transfusion according to the Trust Incident Reporting Policy and Procedures.

Ward/Departmental Managers

Ward/Departmental Managers are responsible for:

- Ensuring that all of their staff members involved in the transfusion process have received training, and are assessed as competent in all aspects of blood administration relevant to their role.
- Ensure the ward area has trained NPSA SPN 14 competency assessors with time available for staff assessments as and when required.
- Ensuring incidents are reported as per Trust Incident Reporting policy.
- Ensuring prompt return of Transfusion Record Sheets to the Transfusion Department to meet 100% traceability requirements.
- Ensuring compliance with this policy in their area of responsibility.

Transfusion Decisions

The decision to transfuse blood or components must balance the need to provide adequate tissue oxygenation or effective haemostasis against the potential risks of transfusion and the appropriate use of blood (a limited resource).

Decisions must be made in accordance with the patient's wishes. Where possible, all patients must give informed verbal consent for transfusion. Consent should be obtained from the parent/guardian if the child is unable to verbally consent.

Please refer to the "Management of patients who refuse blood transfusion" in the Blood Transfusion pathway.

The National Blood Transfusion Committee "Indication Codes for the use of blood components in adults" and the "Transfusion of Blood components for infants and Children" are given in appendix 1.The indication codes and guidance are to assist medical staff in the prescribing of blood and blood components and should be used in conjunction with the 2016 BSH guidelines.

Decisions must always be based on clinical judgement, according to individual patient need and specific clinical circumstances. All reasonable effort must be made to avoid transfusion where possible i.e. by use of a robust pre-operative anaemia screening programme.

Blood transfusion should not take place between the hours of 22:00 to 08:00, except in clinically urgent/emergency situations.

Routine, non-emergency transfusions should not be based solely on point-of-care testing results (i.e., HemoCue, ABG, etc.). Unless it is an emergency these results should be confirmed by standard laboratory testing before transfusion.

Sample Collection and Blood Transfusion Requests

All requests for blood or blood components / products must be made on a **fully completed** Blood Bank request form. NOTE requests for blood cannot be made electronically however an addressograph label can be attached to the form.

The accompanying blood sample must be fully hand written. The details must correspond to those on the request form; otherwise the sample will be rejected. Patient ID labels must **not** be used on the sample.

Positive Patient Identification

The patient's identification must be checked by asking them to state their name and date for birth (as per Policy for Identifying All Patients WAHT-CG-019). This information must be checked against the patient's identification band and then against the request form immediately before taking the sample. The identification must specify the patient's surname, first name, date of birth, gender and NHS number. Where the patient is not able to partake in this process, the identity must be confirmed with a second member of staff.

In the event of an unknown patient being admitted via accident and emergency, the patient will be supplied with a unique A&E number. This number is not the NHS number or the hospital number. This is the only exception to positive patient identification described above.

It is essential that the person taking the sample labels the tube at the bedside immediately after venepuncture. NEVER use pre-labelled sample tubes.

In a life-threatening situation Group O Rh Negative blood will be issued until a correctly labelled sample is provided.

All samples required for transfusion must be no more than 72 hours old.

Please refer to the 'Procedure Pathway for Sample Collection and Blood Transfusion Requests' in the Blood Transfusion Treatment Pathway.

Collection of Blood/Components

The collection of the wrong blood has been identified as a major site of "First Error" in UK incidents where patients have been given the wrong blood.

Collection must only be undertaken by staff that have been trained and assessed as competent for this task. The importance of correct identification procedures and of the potential consequences of identification errors must be fully understood by all staff involved in this process.

All staff must be aware of the correct transport methods and the time limits which apply to blood movement. This is to ensure cold chain compliance as required by the Blood Safety and Quality Regulations 2005.

See the "Procedure pathway for Blood collection and transfer to satellite sites" within the treatment pathway.

Administration of Blood and Components

A transfusion care pathway (WR2151 Documentation for Transfusion of Blood Components) must be used for transfusion of all components, the only exception being massive haemorrhage situations and patients IN the operating room - in these cases the transfusion must be recorded on the anaesthetic observation chart.

Blood must only be transfused in recognised clinical areas with available resuscitation facilities. When a patient is transferred between clinical areas they must be accompanied by a registered practitioner who has completed their transfusion training and competency assessment.

Patients must, where possible, be informed in advance of their need for transfusion and its risks and benefits discussed with them. Confirmation of the patient's consent must be recorded on the Documentation for transfusion of Blood Components.
A patient information leaflet should be provided. A parents' guide is available for children requiring transfusion.

For planned transfusion, suitable intravenous (I.V.) access must be secured **before** collection of component/product from Blood Bank.

All patients receiving transfusions must wear an identification band.
The identification band must specify the patient's surname, first name, date of birth, gender and NHS number.
In circumstances where the patient's name is not known, the identification band must state "Unknown Male/Female/child" and state the unique A&E emergency number. Remember:
No ID Band No Transfusion!
Please refer to the Major Haemorrhage Protocol for further guidance.

The primary checker must follow the positive identification of patient's procedure by using the formal bedside checklist in the "Documentation for transfusion of Blood Components". The patient should be asked to state their name and date of birth (where possible) and checking the details on the patient identification band.

The details on the ID band and the compatibility label on the blood product/component must also be identical and confirmed. If there is any discrepancy, return the units to the transfusion laboratory and investigate the reason for this.

A second checker must repeat the checking procedure (carried out by the primary checker) before the administration of the transfusion to ensure correct patient identification. It must be done at the patient's bedside, immediately prior to starting the transfusion.

The care and monitoring of patients during transfusion are described in detail in the "Procedure Pathway for the Administration of Blood Components and Management of Transfusion Reactions".

Post transfusion increment for red cells can be measured after 30 minutes.
Post transfusion increment for platelets is 10 minutes.

Blood Transfusion Reactions and Incidents

Some transfusion-related adverse events may be unavoidable and unpredictable but many are the result of avoidable errors.

All suspected moderate and severe adverse transfusion events or reactions, whether acute or delayed, must be reported to Blood Bank by telephone. A Datix incident must also be completed. All acute events must be reported to blood bank immediately.

All transfusion-related incidents, reactions and "near misses" must be reported in line with the Trust Incident Reporting Policy.

Blood Bank will report all significant adverse events nationally to Serious Hazards of Transfusion (SHOT) and also to Medicines & Healthcare Regulatory Agency's (MHRA) Serious Adverse Blood Reactions & Events (SABRE), and to the NHS Blood and Transplant (when appropriate).

A flow chart which details how to deal with a suspected transfusion reaction is incorporated into the Documentation for Transfusion of Blood Components (WR2151).
Further information on the recognition, management and follow up of transfusion reactions is given in the "Procedure Pathway for the Administration of Blood Components and Management of Transfusion Reactions"

Management of Massive Blood Loss

Massive blood loss is defined as the loss of 50% of blood volume in 3 hours or blood loss at the rate of ≥150ml/min.

Patients with massive blood loss are not a homogenous group. They present in a range of specialties, and the definitive treatment to arrest the bleeding will depend on the clinical situation.

Priorities for treatment are:

- restoration of circulating volume to maintain tissue perfusion and oxygen delivery
- achieving haemostasis through surgical or other interventional procedures and/or correction of coagulopathy with blood component therapy as indicated

A successful outcome requires prompt action and good communication between various clinical specialties, diagnostic laboratories and Blood Bank staff.

Early involvement of senior clinical staff is essential.

Early consideration should be given to the use of Cell Salvage.

Please refer to the Major Haemorrhage Protocol in the Blood Transfusion Treatment pathway for further information.

Patients Refusing Transfusion

Any adult who has the capacity to consent (Consent to examination or treatment policy WAHT-CG-075) is entitled to accept surgical or other interventions but to specifically exclude certain aspects of clinical management such as a blood transfusion. The patient must be fully informed of (and understand) the

potential consequences of the refusal and this must be documented clearly in the patient's notes. Health care professionals must ensure that they continue to provide any other appropriate care to which the patient has consented, and that the patient realises they are free to change their mind and accept transfusion treatment if they later wish to do so.

Please refer to the Management of Patients who Refuse Blood Transfusion in the Blood Transfusion pathway WAHT-KD-001.

Use of autologous Blood

The use of autologous blood is a recommended and valid alternative to that of homologous or banked blood. Please refer to guidelines on the use of cell salvage.

The use of pre-deposit autologous transfusion (PAD) is not utilised in this Trust.

Cell salvage is a way of collecting a patient's own blood lost during or after surgery. This blood can then be recycled by infusing it back to the same patient. If this process occurs during the operation, it is called intraoperative cell salvage. If the blood is collected after the operation, it is called post-operative cell salvage.

The equipment and process for intraoperative and post-operative cell salvage are different. Patients having a surgical procedure where significant blood loss is expected may be eligible for cell salvage. As a general rule, significant blood loss is about 20 per cent of the patient's total blood volume, which is around one litre of blood loss in adults. The blood collected for cell salvage must be 'clean', which means it is not contaminated (for example with infection, urine and bowel content, or bone chips).

Intra operative cell salvage

The surgeon suctions blood lost during surgery. This blood is collected into a reserve and anticoagulants are added to the blood to stop it from clumping/clotting together. It is also filtered to remove any large particles. The blood then undergoes a process to separate the red cells from other parts of the blood into a bag to be reinfused back to the same patient.

Post-operative cell salvage

After surgery, blood can be collected from the patient and, for a limited time, can be reinfused back to the patient. This technique involves the collection of a patient's post-operative blood loss into a wound drain. It is then returned to the patient via a filter, either washed or unwashed depending on the equipment used.

Implementation

Plan for implementation
This policy will be implemented immediately upon authorisation.

Dissemination
The policy will be entered onto the Trust Intranet web site and a global email will be sent – also a message on the Trust notice Board. The policy will be discussed at all Induction sessions and during staff training sessions to ensure awareness of the policy.

Training and Awareness

All staff involved in the process of transfusion should be trained bi-annually for the function that they perform.

A training needs analysis for the different staff groups is held with the training and development department.

License to Practice

Once the member of staff has completed their blood transfusion training and competencies they issued a “license to practice”. The license is valid for two years. The license number is to be used on all transfusion documentation and on request forms for grouping.

The authoriser/prescriber of blood components should be a qualified doctor.

Clinical Nurse Specialists are permitted to authorise blood components providing they have attended the “Non-Medical Authorisation of Blood components course”.
To attend the course they are required to have completed the relevant post graduate health assessment and prescribing masters modules.
Once the course is completed, they are also required to complete and maintain a portfolio of evidence/audit. This portfolio of evidence should be signed off by a Consultant clinical mentor. Once complete the portfolio should be submitted to the Trust Transfusion Committee for final approval.

Appendix 1: Indication Codes for Transfusion

The indications for transfusion provided below are taken from national guidelines for the use of blood components. 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. Consider the size of the patient; assume an increment of 10g/L per unit for an average 70kg 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

Use an Hb threshold of 70g/L and a target Hb of 70-90g/L to guide red cell transfusion. Follow local/specific protocols for indications such as post cardiac surgery, traumatic brain injury, acute cerebral ischaemia.

R3. Hb ≤ 80g/L if cardiovascular disease

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 ≥110g/L

There is limited evidence for maintaining an Hb of 110g/L in patients receiving radiotherapy for cervical and possibly other tumours.

R6. Exchange transfusion

Fresh Frozen plasma

Dose – 15ml/kg body weight, often equivalent to 4 units in adults.

F1. Major haemorrhage

Early infusion of FFP is recommended in a ratio of 1 unit FFP:1 unit red cells for trauma and at least 1 unit FFP:2 units red cells in other major haemorrhage settings. Once bleeding is under control, FFP use should be guided by timely tests for coagulation as indicated below.

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.

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 with risk of clinically significant bleeding.

F4. Liver disease with PT Ratio/INR >2 and pre-procedure

FFP should not be routinely administered to non-bleeding patients or before invasive procedures when the PT ratio/INR is ≤2.

F5. TTP/plasma exchange

F6. Replacement of single coagulation factor

Cryoprecipitate

Dose – 2 pooled units, equivalent to 10 individual units, will increase fibrinogen by approximately 1g/L. Cryoprecipitate is usually used with FFP unless there is an isolated deficiency of fibrinogen.

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

C2. Fibrinogen <1g/L and pre procedure

C3. Bleeding associated with thrombolytic Therapy

C4. Inherited hypofibrinogenaemia, fibrinogen concentrate not available

Platelet concentrates

Prophylactic platelet transfusion:

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 109/L reversible bone marrow failure Not indicated in chronic bone marrow failure
- P2. Plt 10 – 20 x 109/L sepsis/haemostatic abnormality

Prior to invasive procedure or surgery

- P3. To prevent bleeding associated with invasive procedures.

Platelets should be transfused if:

- P3a Plt <20 x 109/L central venous line
- P3b Plt <40 x 109/L pre lumbar puncture/spinal anaesthesia
- P3c Plt <50 x 109/L pre liver biopsy/major surgery
- P3d Plt <80 x 109/L epidural anaesthesia
- P3e Plt <100 x 109/L pre critical site surgery e.g. CNS.
- 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 109/L
- P4b Critical site bleeding e.g. CNS/traumatic brain injury Plt <100 x 109/L
- P4c Clinically significant bleeding Plt <30 x 109/L.

Specific clinical conditions

- P5a DIC pre procedure or if bleeding.
- P5b Primary immune thrombocytopenia (emergency treatment preprocedure/ severe bleeding).

Platelet dysfunction

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

Prothrombin complex concentrate

Dose should be determined by the situation and INR.

- PCC1. Emergency reversal of VKA for severe bleeding or head injury with suspected intracerebral haemorrhage.
- PCC2. Emergency reversal of VKA pre emergency surgery

2016 National Blood Transfusion Committee Indication Codes
http://www.transfusionguidelines.org.uk/uk-transfusion-committees/national-blood-transfusion-committee/responses-and-recommendations

Appendix 2:
Transfusion of Blood Components for infants and Children

Red cells

Acute paediatrics

Studies support restrictive transfusion thresholds

- Use Hb threshold of 70 g/L in stable non-cyanotic patients.
- In non-bleeding infants and children, generally aim for a post-transfusion Hb of no more than 20 g/L above the threshold.
- Minimise blood sampling and use near patient testing where possible.

Surgery (non-cardiac)

- Treat pre-op iron deficiency anaemia.
- Use a peri-op Hb threshold of 70 g/L in stable patients without major comorbidity or bleeding
- Consider tranexamic acid in all children undergoing surgery at risk of significant bleeding
- Consider cell salvage in all children at risk of significant bleeding where transfusion may be required

Transfusion volume calculation and prescribing

Volume to transfuse (mL) =

$$\frac{\text{desired Hb (g/L)} - \text{actual Hb (g/L)} \times \text{weight (kg)} \times 4}{10}$$

The formula provides a guide to the likely rise in Hb following transfusion for non-bleeding patients.

- Prescription should be in millilitres not units.
- Normal maximum volume for red cell top-up transfusion is 1 unit.

Transfusion rate: 5 mL/kg/hr (usual max rate 150 mL/hr).

Fresh frozen plasma and cryoprecipitate

Correction of minor acquired abnormalities in non-bleeding patients (excluding DIC)

- FFP should not be administered to non-bleeding children with minor prolongation of the PT/APTT (including prior to surgery unless to critical sites).
- Cryo should not be routinely administered to non-bleeding children with decreased fibrinogen (including pre-op unless fibrinogen <1.0 g/L for surgery at risk of significant bleeding or to critical sites).

Disseminated intravascular coagulation

- FFP may be beneficial in children with DIC who have a significant coagulopathy (PT/APTT >1.5 times midpoint of normal range or fibrinogen <1.0 g/L) associated with clinically significant bleeding or prior to invasive procedures.
- Cryo may be given if the fibrinogen is <1.0 g/L despite FFP, or in conjunction with FFP for very low or rapidly falling fibrinogen.

Make sure that patients are vitamin K replete.

Typical transfusion volumes: FFP 15-20 mL/kg, cryo 5-10 mL/kg; rate 10-20 mL/kg/hr.

Platelets

- For most stable children, transfuse prophylactic platelets when platelet count <10 x 109/L (excluding ITP, TTP/HUS and HIT where platelets are only transfused for life-threatening bleeding).

Suggested transfusion thresholds for platelets

Platelet count (x 109/L)	Clinical situation to trigger platelet transfusion
<10	Irrespective of signs of haemorrhage (excluding ITP, TTP/HUS, HIT)
<20	Severe mucositis Sepsis Laboratory evidence of DIC in the absence of bleeding* Anticoagulant therapy Risk of bleeding due to a local tumour infiltration Insertion of a non-tunnelled CVL
<40	Prior to lumbar puncture**
<50	Moderate haemorrhage (e.g. gastrointestinal bleeding) including bleeding in association with DIC Surgery, unless minor (except at critical sites)– including tunnelled CVL insertion
<75–100	Major haemorrhage or significant post-operative bleeding (e.g. post cardiac surgery) Surgery at critical sites: CNS including eyes

** Avoid routine coagulation screening without clinical indication;*

*** Prior to lumbar puncture some clinicians will transfuse platelets at higher or lower counts (e.g. 20-50 x 109/L) depending on the clinical situation.*

Typical transfusion volume 10-20 mL/kg (single pack for children ≥15 kg, normal maximum 1 pack); rate 10-20 mL/kg/hr.

Reference:

2016 Guidelines on transfusion for fetuses, neonates and older children.
http://www.b-s-h.org.uk/guidelines/guidelines/transfusion-for-fetuses-neonates-and-older-children

Appendix 3:
Indications for Special Requirements and Blood Groups Post Bone Marrow Transplant

Special requirements are required for a certain patients, either temporarily or permanently, for one or more types of blood components.

Special requirements refers to HLA matched, CMV negative, Irradiated, Hepatitis E negative or Washed

The requirement must be communicated to the laboratory prior to transfusion, and this requirement recorded in the patient notes.

Once the patient is registered for this requirement this will remain in place indefinitely unless the clinician cancels it.

HLA Matched platelets

HLA matched platelets are indicated for patients that have thrombocytopenia and have demonstrated CCI values consistent with immune refractoriness on at least 2 occasions. All other potential causes must have been excluded and the presence of HLA antibodies confirmed.

The requirement for HLA matched platelets needs to be discussed with the NHS Blood & Transplant consultant and then the blood bank informed.

Immediate (10-60 minutes) and 24 hour post transfusion platelet increments should be measured. If a satisfactory response is seen, HLA matched platelet transfusion should be continued as long as compatible donors are available. It is advisable to repeat the HLA antibody screen at monthly intervals during treatment.

Washed Components

Washed red cells are indicated for patients with recurrent or severe allergic or febrile reactions to red cells, as severely IgA deficient patients with anti-IgA antibodies for whom red cells from an IgA deficient donor are not available. Once washed red cells are only viable for 24 hours.

Washed platelets are re-suspended in Platelet Additive Solution and are indicated for patients with recurrent or severe allergic or febrile reactions to standard platelet transfusions. Once washed platelets are only viable for 24 hours.

CMV Negative Blood Components

Current SaBTO guidance states that CMV negative blood components are now only required for intrauterine transfusions and the transfusion of neonates and pregnant women.

Irradiated Blood Components

These are indicated for patients at risk of transfusion associated graft versus host disease (TA-GvHD) given in the list below. Gamma- or X-irradiation is used to inactivate residual donor lymphocytes in blood components which otherwise have the potential to engraft in patients bone marrow.

Irradiated blood products have radiation-sensitive labels on the pack which indicate if the minimum required radiation dose was applied. They have a shelf life of 14 days after irradiation.

Irradiation is only necessary for the following blood products:

- Red Blood Cells
- Platelets
- Granulocytes

Patient groups requiring irradiated blood products:

Patient Group	Irradiated blood components
Adults or children with acute leukaemia	Not required (except for HLA-selected platelets or donations from first or second degree relatives)
Recipients of allogeneic (donor) HSC transplantation	From the start of conditioning chemo-radiotherapy. Continue while receiving GvHD prophylaxis (usually 6 months post-transplant) If chronic GvHD or on immunosuppressive treatment, continue irradiated blood components.
Bone Marrow and Peripheral Blood Stem Cell Donors	Provide irradiated cellular components during and for 7 days before the harvest.
Bone Marrow or Peripheral Blood HSC Harvesting for future autologous reinfusion	Provide irradiated cellular components during and for 7 days before the harvest.
Autologous HSC Transplant Patients	From the start of conditioning chemo-radiotherapy until 3 months post-transplant (6 months if total body irradiation was used)
Adults and children with Hodgkin Lymphoma at any stage of the disease	Irradiated cellular components indefinitely
Patients treated with purine analogues (fludarabine, cladribine & deoxycoformicin)	Irradiated cellular components indefinitely
Patients treated with alemtuzumab (anti-CD52 therapy)	Irradiated cellular components indefinitely
Aplastic anaemia patients receiving Anti-Thymocyte Globulin (ATG) therapy	Irradiated cellular components during course of treatment with ATG.
Intrauterine transfusions	Irradiated cellular components for transfusion for up to 6 months post IUT
Neonatal exchange transfusion	Irradiated cellular components

The need for irradiated blood products should be documented in the following places:

- In the computer system of the blood bank
- Sticker on the patient's noted / electronic warning in electronic notes
- Supply the patient with information leaflet and warning card

Recommended ABO blood groups post Bone Marrow Transplant

	DONOR	RECIPEINT	RED CELLS	PLATELETS	FFP
Major ABO	A	O	O	A	A

incompatibility	B AB AB AB	O O A B	O O A* B*	B A A B	B AB AB AB
Minor ABO incompatibility	O O O A B	A B AB AB AB	O O O A* B*	A B A A B	A B AB AB AB
Bidirectional ABO incompatibility	A B	B A	O O	B A	AB AB
*Group O Red Cells may also be used					

Appendix 4: Blood Products

The transfusion laboratory issues the following blood products:

- **Albumin 4.5%**

Human albumin solution (HAS) 4.5% is used for protein and volume replacement mainly in burns cases, pancreatitis or trauma. This solution can also be used as a replacement fluid in plasma exchange. Albumin is fractionated from pools of human plasma and heat treated to virally inactivate the product. Bottles of 500ml, 100ml and 50ml are stocked by the department.

- **Albumin 20%**

20% human albumin solution is used to correct hypoalbuminaemia and oedema in patients with liver cirrhosis or nephrotic syndrome; to replace fluid during ascites drainage in patients with portal hypertension and to reduce bilirubin levels by exchange transfusion in newborns.100ml and 50ml bottles are available.

- **Anti-D**

All RhD negative women are eligible for anti-D prophylaxis during pregnancy routinely, following a potentially sensitising event and post-delivery if delivered of an Rh D positive infant. This regime has been shown to dramatically reduce the incidence of Haemolytic Disease of the Foetus and New-born. The laboratory stocks 250 IU, 500 IU and 1500 IU vials.

Anti-D can also be given post-transplant when the recipient is Rh D negative and donor Rh D positive, and if large volumes of Rh D positive blood components are given to an Rh D negative patient in emergency situations.

- **Prothrombin Complex Concentrate (PCC – Beriplex)**

Currently the brand name in use is 'Beriplex' .The product is used for emergency reversal of warfarin overdose when intracranial haemorrhage is likely. The product contains Factors II, VII, IX & X and is available in 500 IU vials. The dose is calculated taking into account the body weight of the patient and the INR result:

Initial INR	**2- 2.5**	**2.5- 3**	**3- 3.5**	**>3.5**
Approximate dose ml/kg body weight*	0.9 - 1.3	1.3 - 1.6	1.6 - 1.9	>1.9
Approx dose IU (factor IX)/kg body weight*.	22.5 - 32.5	32.5 - 40	40 – 47.5	>47.5

- **Benefix (recombinant coagulation factor IX)**

Used for patients with Haemophilia B, seek advice from haematology consultant.

- **Refacto AF (recombinant factor VIII)**

Used for patients with Haemophilia A, seek advice from haematology consultant.

- **Haemate*P (factor VIII:vWF)**

Used for patients with von Willebrand disease, seek advice from haematology consultant.

- **Fibrinogen Concentrate (factor I)**

Used for the treatment of congenital hypofibrinogenaemia

Requesting products from the laboratory

Requests for all of these products must be made on a transfusion request card.
Anti-D will be issued based on the results of a kleihauer test.

Recording administration

The administration of these products to the patient should be recorded on the drug administration chart and the completed traceability slip return to the transfusion laboratory.

MONITORING AND COMPLIANCE				
This section should identify how the Trusts plan to monitor compliance with and the effectiveness of these documents. It should include auditable standards and/or key performance indicators (KPIs) and details on the methods for monitoring compliance				
What	**How**	**Who**	**Where**	**When**
These are the 'key' parts of the process that we are relying on to manage risk.	*What are we going to do to make sure the key parts of the process we have identified are being followed?*	*Who is responsible for the check?*	*Who will receive the monitoring results?*	*Set achievable frequencies.*
The key parts of the transfusion processes are: • The decision to transfuse • Patient information and consent • Appropriate prescribing of blood • The request for transfusion • Collection and delivery of blood components • The administration of blood • Monitoring the patient throughout the process • Completion and documentation of the event • Management of transfusion reactions	An Audit will be completed to establish if the key parts of the process are being followed	Transfusion practitioners	Trust Transfusion committee	yearly

CONSULTATION	
This Treatment pathway has been circulated to the following individuals for consultation	
Name	**Designation**
Dr Thomas Skibbe	Consultant Haematologist
Dr Alyson McClung	Consultant physician
Dr Nick Turley	Consultant A&E
Dr Shiju Mathew	Consultant anesthetist
Dr Baylon Kamalarajan	Consultant paediatrician
Mr Steve Goodyear	Consultant surgeon - vascular
Catherine Hilman-Cooper	Consultant Obstetrics
Manon Van Setters	Consultant gynaecologist
Jane Brown	Clinical Governance facilitator
Cathy Lim	National blood service liaison
Rebecca Thompson	Community IV therapy lead
Camran Khan	Transfusion Laboratory manager
Juliette Stone	Senior Sister Theatres
Debra Clinton	Assistant Transfusion practitioner
Jon Dickens	Charge Hand A&E
This Treatment pathway has been circulated to the chair(s) of the following committee's / groups;	
Trust Transfusion Committee	
Safe Patient group	

IMPLEMENTATION
Plan for implementation
How are you going to implement and ensure all relevant staff are aware of this pathway?
The individual members of the transfusion committee will be responsible for informing their relevant clinical directorate
The updated pathway will be presented at the link nurse day. The link nurses will cascade the information to the ward teams

DISSEMINATION
A link of the blood transfusion treatment pathway will be forward to all matrons, and ward managers once the pathway has been ratified

TRAINING AND AWARENESS
This section should refer to training as identified in the Trusts Training Needs Analysis Appendix A of the Trusts Mandatory Training Policy
All staff involved in the transfusion process should be trained and competent in the process they are taking part in. The training is described in the Trusts Training Needs Analysis Appendix A of the Trusts Mandatory Training Policy

SUPPORTING DOCUMENT ONE – EQUALITY IMPACT ASSESSMENT TOOL		
To be completed by the Treatment pathway owner and submitted to the appropriate committee for consideration and approval.		
		Yes/No
1.	Does the treatment pathway affect one group less or more favourably than another on the basis of:	**no**
	Race	**no**
	Ethnic origins (including gypsies and travellers)	**no**
	Nationality	**no**
	Gender	**no**
	Culture	**no**
	Religion or belief	**no**
	Sexual Orientation	**no**
	Age	**no**
2.	Is there any evidence that some groups are affected differently?	**no**
3.	If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?	**no**
4.	Is the impact of the policy/guidance likely to be negative? If so can the impact be avoided?	**no**
5.	What alternatives are there to achieving the policy/guidance without the impact?	**no**
6.	Can we reduce the impact by taking different action?	**no**
7.	Other comments	**none**

If you have identified a potential discriminatory impact of this key document, please refer it to Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact Human Resources.

SUPPORTING DOCUMENT TWO – FINANCIAL IMPACT ASSESSMENT		
To be completed by the Treatment pathway owner and submitted to the appropriate committee for consideration and approval.		
		Yes/No
1.	Does the implementation of this document require any additional Capital resources	**no**
2.	Does the implementation of this document require additional revenue	**no**
3.	Does the implementation of this document require additional manpower	**no**
4.	Does the implementation of this document release any manpower costs through a change in practice	**no**
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	**no**
6.	Other comments	**none**

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval