NHS
North West Anglia
NHS Foundation Trust

Blood Transfusion Policy
Version 13

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Document Title:	Blood Transfusion Policy
Central Index Number:	C0160

Must be completed when reviewing existing published documents only

Before beginning the process of reviewing and updating an existing document, please take the below into consideration:

Considerations for all documents		Y/N	Action	
			"Yes"	"No"
1.	Is the document still required?	Yes	Please see question 2.	Arrange document removal with Exec Director/Chair of DLB and forward to the relevant compliance team.
2.	Has there been any change in guidance or national policy since the previous version?	Yes	Please see question 4.	Please see question 3.
3.	Where there has been no major[1] change to the document, can it be approved without having to go through all relevant committees (including those in chronological order)?	No	Exec Director/Chair of the DLB to approve new review date by email*. *(see version control summary/page 3)* The following information must be sent to the relevant compliance team: 1. Evidence of review date approval (*email). 2. Author's Checklist page only. Non-Clinical Compliance Team Clinical Compliance Team	Proceed with review and approval processes
4.	Can the document be approved at first-level only? (Please refer to section 6 of the Trust-wide Document Control Policy)	No	Proceed with review and **first-level only** approval processes.	Proceed with review and both first and second-level approval processes.

[1] As defined in section 7.4 of the Trust-wide Document Control Policy

VERSION CONTROL SUMMARY

Version:	Page/Section of Document:	Description of change: (List all amendments made to the document. "Review" or "Update" is not sufficient information.)	Date Exec Director/Chair of DLB approval given for change of review date only	Date approved:	Date published:
2		Review led by Dr M Sivakumaran	N/A	July 2004	
3		Review led by K Bowen (Transfusion Coordinator) and E Didsbury (Haematology Manager)	N/A	September 2006	September 2006
4		Review led by K Bowen (Transfusion Coordinator) and E Didsbury (Haematology Manager)	N/A	September 2009	September 2009
5		Telephone numbers changed to reflect move to PCH	N/A	September 2009	September 2009
6		Information on out of hospital transfusions added	N/A	September 2009	September 2009
7		Amendments to training responsibilities and addition of transfusion non participation notice. Changes to CMV negative/irradiated blood component indications. Addition of advice from National Comparative Audit of blood transfusion regarding recording of 15 minute observations. Addition of section 15. Additional advice for paediatric red cell transfusions (author: Dr D Yong, Consultant Paediatriciain)	N/A	20/09/2012	12/10/2012
8		Transfusion Operational Management Team roles and responsibilities added. Use of red boxes for internal transfer discontinued. Stamford Transfusion laboratory references removed. Advice on management of an acute transfusion reaction amended to reflect new guidelines, and flowchart for management of a transfusion reaction replaced with Eastern Region Transfusion Committee flowchart. Compliance monitoring table amended.	N/A	11/12/2013	January 2014
9		New national guidance. Amendment to Blood Product Request and Specimen Labelling (section 7)	N/A	12/05/2015	May 2015

10		NICE Guidelines incorporated on Iron deficiency anaemia, use of Tranexamic acid in surgical patients. Two registered healthcare professionals to check the blood at the bedside, one must hold a permanent service contract with the trust. Introduction of Hepatitis E Negative components by NHS Blood & Transplant. Extended post thaw timescale for FFP thawed for use in major haemorrhage. Transport box time amended from 3 to 2 hours maximum storage. Advice on observation for late reactions. Amended Regional Flowchart for dealing with Acute Transfusion Reaction	N/A	15/11/2016	23/11/2016
11		Merging of policies for all sites to harmonise policies under NWAFT	N/A	22/07/2020	14/08/2020
12		Addition of process for concessionary release of blood	N/A	14/07/22	22/07/22
13		NICE QS138 pg13. Updated patient information leaflets. Sample requirements amendment following ICE change. Changes to process following BloodTrack implementation including tracking and traceability processes. Further information on granulocyte transfusions	N/A	10/07/2025	21/07/2025

DOCUMENT CONTRIBUTORS

Please list the details of all who contributed to the development of this version of the document.

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1. INTRODUCTION

1.1 This policy has been produced to ensure the safe and effective use of blood and blood products in the Trust.

The policy is to be used in all clinical areas, and by all members of staff involved in the sampling, handling, prescription and administration of blood products and components.

It incorporates national and international guidelines and legislation, and directives from the Department of Health.

Transfusion of blood components and blood products is a vital element of care for many patients providing clinical benefits including those that are lifesaving. However the procedure is not without risk and errors can cause severe illness or even death. Under these circumstances, transfusion of blood components or blood products must only be undertaken if no alternative therapy is available. While the incidence of hazards of transfusion such as viral transmission has reduced dramatically, there are still significant risks associated with transfusion.

North West Anglia NHS Trust has two pathology departments; one at Hinchingbrooke hospital and one at Peterborough City Hospital. Both of these have a Blood Transfusion Service.

This policy has been developed with The Hospital Transfusion Committee.

2. OBJECTIVES/AIMS

2.1 The aim of this policy is to:

Provide a clear framework and guidance for safe transfusion practice.

Ensure a consistent safe approach to the prescribing, handling and administration of blood products and components throughout the trust.

Ensure that all members of staff involved in any stage of the process of transfusing blood components and blood products are fully conversant with their role and the legal aspects of this procedure.

3. DUTIES, ROLES and RESPONSIBILITIES

3.1 **Chief Executive Officer (CEO)**

The CEO, as the Accountable Officer, has responsibility for ensuring the quality and delivery of services provided by this Trust. The Chief Executive has delegated the responsibility of the implementation of this guidance to the Medical Director and the Chief Nurse.

3.2 Medical Director/Chief Nurse

The Medical Director and the Chief Nurse have the responsibility of ensuring the development of procedural documents Trust wide and at speciality level to manage the risks associated with blood transfusion.

3.3 Clinical Directors and General Managers (Clinical Divisional Management Teams)

Clinical Directors are responsible for implementing this guidance within their clinical divisions ensuring all clinicians involved in transfusion understand and adhere to this policy.

3.4 Head of Midwifery, Matrons/Service Managers

Head of Midwifery, Matrons and Service Managers have a responsibility to implement this guidance within their areas of responsibility.

Ward/Departmental Managers

Ward/Departmental Managers must ensure that all staff involved in transfusion are aware of this policy and their roles and responsibilities. They must ensure that staff have the relevant training and competency to fulfil their roles in transfusion.

Medical Staff

Medical Staff must ensure they are aware of their role in safe prescribing of transfusion including appropriate documentation, risk assessment and informed consent.

Non-Medical Authorisers (NMAs)

NMAs must ensure they are aware of their role in safe prescribing of transfusion including appropriate documentation, risk assessment and informed consent. They must ensure they have read, understood and follow the Trust Policy for Non-Medical Authorisers.

Registered Practitioners (RPs)

RPs may be involved in the movement of blood products, and the administration and care of patients receiving them. They must ensure the Trust Policy is followed and they have the relevant training and competency assessment.

Non-registered Practitioners

Non-registered practitioners may be involved in the movement of blood products. They must ensure that the Trust Policy is followed and they have relevant training and competency assessment.

Porters

Porters may be involved in the movement of blood products. This could be between storage locations, or to clinical areas in major haemorrhage activations. They must ensure they have completed training and competency assessment before undertaking the task.

Laboratory Staff

Laboratory staff are responsible for maintenance of blood stocks within the laboratory and blood fridges, testing of pre-transfusion samples and issue of blood products.

Transfusion Practitioners

Provide training and education on transfusion within the trust. Monitor traceability of blood products. Ensure transfusion related adverse incidents are reported appropriately and investigated. Develop policies and procedures in relation to transfusion.

Hospital Transfusion Committee

Oversees the Trusts policies and procedures in relation to blood transfusion.

4. TRAINING and COMPETENCY

4.1 All staff participating in transfusion must complete mandatory training as set out in the Trust's Training Needs Analysis. Where staff fail to complete this, the process to be taken is described in the trust Mandatory Training Policy.

Please refer to the Policy for training and competency for staff involved in transfusion (C0175) for guidance on transfusion related competency assessment.

Any members of staff who take blood samples for pre transfusion testing must complete the trust competency assessment in venepuncture, and staff who access intravenous devices must complete the trust competency assessment for administration of IV drugs. Policies for both of these assessments are available on the intranet.

5. BLOOD PRODUCTS AND THEIR STORAGE

5.1 This section contains details about the range of blood components available and their safe storage. For guidance on the use and prescribing of specific components, please see separate policies and guidelines, available on the intranet.

All products are subject to storage and handling regulations and must only be handled by trained and competent members of staff. They must never be left unattended under any circumstances.

5.2 Red cells

Red cells are supplied by NHS Blood and Transplant (NHSBT). Routine supply comes from the NHSBT centre in Cambridge. They have a 35-day shelf life from the day of donation and must be stored in a designated blood fridge between 2 and 6 ºC.

Red cells must only be removed from the fridge when carrying out laboratory tests, moving stock from one fridge to another storage location, or from a fridge to the patient's bedside.

A unit removed from the fridge can be returned to the fridge at any time up to and including 30 minutes from the time that it was removed. Return must be performed following correct procedures to ensure cold chain compliance is maintained.

After being out of controlled storage for over 30 minutes the unit will need to be placed in quarantine. It can be returned and scanned into a blood fridge, but the laboratory must also be contacted at the time of return. Laboratory staff will then manage quarantine procedures.

If there is any doubt as to whether a unit is safe for use, it MUST be returned to the transfusion laboratory immediately. The laboratory staff will assess the unit and if required either quarantine the unit or ensure its safe disposal. Unused units must not be disposed of by clinical staff.

Where red cells are required to be out of the fridge for longer periods of time, for example when being transported between hospitals, transport boxes are available with cool packs. If red cells need to be transported outside the hospital, the transfusion laboratory MUST be contacted to organise this. A label will be put on to the box to indicate when the red cells were placed inside.

DO NOT PACK A TRANSPORT BOX IN THE CLINCAL AREA.

Blood transfusion staff will inspect the fridge contents on a regular basis and verify that all units can be accounted for.

Red cell products must never be stored in a domestic, drug, or specimen refrigerator on the ward, in clinics or in theatre.

For information on the use of red cells, please refer to the separate guidelines available on the intranet.

5.3 Platelets

Platelets are stored at 22ºC in an approved incubator, with constant gentle agitation.

At Peterborough platelets can be collected from the issue agitator adjacent to the main blood issue fridge in the Blood Bank.

At Hinchingbrooke the platelet agitator is kept within the laboratory and thus to collect platelets please call the lab staff (bell is adjacent to the hatch).

Platelets must *NEVER* be stored in a refrigerator.

Platelets have a maximum shelf life of 7 days from donation to use/disposal. Because of their short shelf life they are not routinely kept in stock. When requesting platelets, consideration must therefore be given to allow adequate time for transport from the NHSBT centres, which will be a minimum of 2 hours, but may take longer, depending on availability.

A ‘blue light’ service is available for life threatening conditions which may be requested through the transfusion laboratory by the clinician in charge of the case.

For information on the use of platelets, please refer to the separate guidelines available on the intranet.

5.4 Fresh Frozen Plasma

Fresh frozen plasma (FFP) is stored at -30ºC for up to 36 months from the date of issue from NHSBT. It is available for the correction of coagulation deficiencies in specific situations, and comes as a single bag approximately 270ml.

FFP takes 20-30 minutes to thaw, and for maximum efficacy should be administered as soon as possible after thawing**.**

FFP packs are stored at 4ºC once thawed, they will be placed in the blood fridge for collection and must be used within 24 hours of thawing.

For FFP thawed to treat major haemorrhage, the shelf life may be extended up to a maximum of 120 hours for the same patient if stored at 4°C, however it should be borne in mind that extended post-thaw storage will result in a decline in the content of labile coagulation factors.

FFP is not to be used as a prophylactic measure**.** Other than in a massive haemorrhage, it will only be issued if a coagulation screen has been performed to assess the degree of deficiency. If any requests are deemed unsuitable these will be referred to a Consultant Haematologist.

Virally inactivated FFP, treated with methylene blue or solvent detergent, is no longer required for patients born after 1st January 1996.

For information on the use of FFP, please refer to the separate guidelines available on the intranet.

5.5 Cryoprecipitate

Cryoprecipitate is stored at -30ºC for up to 36 months from the date of issue from NHSBT.

Cryoprecipitate takes approximately 20-30 minutes to thaw, and for maximum efficacy should be administered as soon as possible after thawing**.**

Cryoprecipitate must be kept at room temperature once thawed. If not used within 4 hours of thawing, it must be returned to a member of staff in the laboratory for disposal.

One unit of cryoprecipitate contains 0.1 to 0.2 grams of fibrinogen and approximately 100 IU (international units) of Factor VIII. Currently, cryoprecipitate comes ready pooled and each bag is equivalent to 5 standard units.

For information on the use of cryoprecipitate, please refer to the separate policy available on the intranet.

5.6 Granulocytes

Granulocytes are occasionally required as supportive therapy in patients with (or who are at high risk of developing) life-threatening bacterial or fungal infection secondary to neutropenia caused by bone marrow failure or neutrophil dysfunction.

The decision to use these will be discussed between a Haematology Consultant and NHSBT Consultant.

A standard adult dose is two pools (derived from 20 donations), providing a dose of around $2x10^{10}$L which is considered to be an effective daily dose.

Sample and compatibility requirements for granulocytes are the same as for red cells, a new sample must be sent to the laboratory every 72 hours while the patient is receiving this product.

Granulocytes are irradiated prior to issue and expire at midnight following the day of donation. Storage is at 22ºC without agitation.

5.7 Other products supplied by the Blood Transfusion Laboratory

For example: Human Albumin Solution (HAS), Prothrombin Complex Concentrate (Octaplex), Praxbind, Factor VIIa (NovoSeven), Factor VIII, FEIBA, Riastap, and Anti-D.

The above products are stored in temperature controlled conditions, and issued by the transfusion laboratory. HOWEVER, some may not be immediately available at all hospital sites. They will be issued on demand for named patients.

6. THE DECISION TO TRANSFUSE

6.1 Transfusion of blood and blood products is a vital element of care for many patients providing clinical benefits, including those that are lifesaving. However, the procedure is not without risk.

There is an intrinsic risk from the blood itself, although small, of blood borne infections, and transfusion reactions, and an extrinsic risk of errors. Both of these factors can cause severe illness or even death. Thus, the decision to give blood must not be taken lightly and risk versus benefit should be considered and, where possible, discussed with the patient.

Transfusion of blood and blood components must only be undertaken if no alternative therapy is available.

Staff should make every effort to ensure the appropriate use of a limited resource, and always consider the use of alternatives where possible. See Section 7, Alternatives to Blood Transfusion for more information.

6.2 Indications, Triggers and Targets

The indications and contraindications for individual blood components are documented within the component specific Trust policies, found on the intranet.

These policies also contain information on appropriate thresholds and dosage.

6.3 Patient information leaflets

The NICE Guideline for Blood Transfusion (2015) states that patients who may have or who have had a transfusion, and their family members or carers (as appropriate), should be provided with verbal and written information explaining:

- The reason for the transfusion.
- The risks and benefits.
- The transfusion process.
- Any transfusion needs specific to them.
- Any alternatives that are available and how they might reduce their need for transfusion.
- That they are no longer eligible to donate blood
- That they are encouraged to ask questions.

The NHSBT has produced a patient information leaflet – 'Receiving a Blood Transfusion', which covers much of this information, and so this should be offered to the patient as appropriate.

In addition, there are several other patient information leaflets – all of which should be available in the relevant clinical areas or can be obtained from the Transfusion Practitioners.

These leaflets may also be downloaded from the following website:

https://hospital.blood.co.uk/patient-services/patient-blood-management/patient-information-leaflets/

6.4 Informed Consent

Consent from a patient is always needed regardless of the procedure, whether it is immediately before an urgent operation or prior to a planned procedure , such as childbirth. If it is not possible to obtain consent it must be clearly documented in the patient notes.

Consent can be formally written (usually as part of consent form for a procedure) or verbal, dependent on the situation. Verbal consent must always be documented, and preferably witnessed. Thus, any discussion must be documented in the patient's notes.

Occasionally a situation will arise where the need to transfuse is immediate, yet the patient is unable to give consent at that time, for example an unconscious patient. A lack of formal consent in this instance should not stop us from administering blood, as the transfusion is given in best interests of the patient in order to preserve life. However, after the event the patient should be informed of any transfusion episodes that have taken place and given appropriate patient information leaflets.

A patient reserves the right to change their mind at any time, and thus can withdraw consent, this also should be documented and any products already issued must be returned back to the laboratory as soon as possible.

Consent for blood transfusion in paediatrics should follow the same principles but may have to be obtained from guardians depending on the situation. In an emergency blood products can be administered in a life-sustaining situation or to prevent lasting disability without patient or parental consent.

Further guidance on gaining informed consent can be found in appendix E or in the Policy on Consent to Treatment C0412.

6.5 Patients who refuse blood & Advance Decision Notices

When a patient refuses a transfusion, the decision-making process should be fully documented in the patient's notes. Staff involved should discuss the reason for refusal of the proposed treatment and ensure that the patient understands the risks and benefits of transfusion, the alternatives, and the possible consequences of refusing transfusion, including possible death.

Patients may refuse blood/blood components for a variety of reasons; staff should enquire as to the wishes of the patient and identify aspects in which these will affect treatment. A detailed account of discussions should be documented in the patient's records with a clear management plan available to all staff involved in the patient's care.

A documented advanced decision for refusal of transfusion is vital in establishing specifically what a patient will and will not agree to. The reason for refusal may be very diverse, however the reason for refusal is irrelevant and discussion should be limited to acceptability of different treatments.

The general rule is that any adult (18 years of age or over) with mental capacity can refuse any form of treatment, including blood transfusion. It does not matter whether there is any logical reason for such a refusal.

If the patient lacks mental capacity and there is a valid advance decision or directive in existence which states that a blood transfusion is not to be given then this should be adhered to unless there is a proper reason not to do so. The Trust Policy on Advance Decisions (C0370) should be consulted.

It is possible that transfusion of a patient, without his or her informed consent will constitute an assault and battery. The legal services department must be consulted if there are any concerns as to whether transfusion may be performed.

It is important to remember that a patient can change their mind at any stage. Just because a patient may have refused a transfusion at an earlier stage does not mean that he/she is refusing a transfusion at all future times, especially in a life-or-death situation.

If the patient requires a procedure and all options have been explored to optimise the patient and utilise alternatives to transfusion, but either the surgeon or the anaesthetist is unhappy to proceed because of haemorrhagic risk, the patient must be referred to a team who is willing to take on the case.

If there is no time to take legal advice, the situation is life threatening and a delay in blood transfusion might be fatal; clinicians must act in the patient's best interests. Ideally the decision to give blood in these circumstances should be made by two consultants. The reasons for the transfusion must be fully documented in the medical records.

If anyone has any questions or concerns regarding consent to treatment, or withholding of consent, these must be discussed with the legal services department – contact details are available on the intranet.

The legal services department can be contacted out of hours via switchboard.

Where parents refuse blood transfusions for children:

- in non-urgent situations, legal advice should be sought and may require a Court order.
- in a life threatening situation the child's best interests override the parents and blood should be given. This decision should be taken by the Consultant caring for the child and ideally in conjunction with a second Consultant.

The legal services department must be contacted if a declaration from the Court is required.

The Trust has separate policies for:

Consent to Treatment (C0412) (including adults and children)

Policy for Treatment of Jehovah's Witnesses (C0413)

7. ALTERNATIVES TO BLOOD TRANSFUSION

7.1 Alternatives to Transfusion & Blood Conservation

The possibility of using an alternative to blood transfusion should be considered before making the decision to prescribe and administer blood products. The ability to do this will depend on individual patient factors such as cause of anaemia or bleeding, patient clinical symptoms and urgency of correction of anaemia.

The risks and benefits should be considered for each patient.

7.2 Haematinic Replacement

The cause for any documented anaemia found should be referred for investigation. . When iron deficiency or vitamin B12 deficiency is diagnosed, patient should receive appropriate haematinic replacement as the first line treatment unless they are otherwise compromised.

7.3 Iron therapy

Iron is the appropriate first line treatment for iron deficiency anaemia and red cell transfusion is not indicated unless iron treatment is contraindicated or unsuccessful.

The Department of Health recommends timely pre-operative assessment of iron status, in order to allow optimisation of haemoglobin levels prior to elective surgery.

NICE (2015) recommend that oral iron should be offered before and after surgery to patients identified to have iron-deficiency anaemia.

Patients with iron deficiency anaemia who have issues with intolerance or malabsorption of oral iron can be referred for intravenous iron therapy.

Therefore, consider intravenous iron before or after surgery for patients who:

- Have iron-deficiency anaemia and cannot tolerate or absorb oral iron, or are unable to adhere to oral iron treatment
- Are diagnosed with functional iron deficiency.
- Are diagnosed with iron-deficiency anaemia, and the interval between the diagnosis of anaemia and surgery is predicted to be too short for oral iron to be effective.

Intravenous iron can also be given in conjunction with erythropoietin to optimise haemoglobin pre-operatively in patients who refuse blood.

7.4 Erythropoietin

Human erythropoietin is a glycoprotein hormone produced in the kidney. It stimulates red cell production by the bone marrow (erythropoiesis).

Indications for erythropoietin include treatment to prevent and treat anaemia in cancer patients, and treatment for patients suffering with chronic renal disease. It is also used to optimise haemoglobin pre-operatively in patients who refuse blood. Further guidance on the indications and use of erythropoietin should be sought from a consultant haematologist.

7.5 Tranexamic Acid

Tranexamic Acid (TXA) is an anti-fibrinolytic drug and can be given IV or orally. Oral should be reserved for chronic bleeding (such as menorrhagia). Acute bleeding should be treated with IV TXA.

TXA should be considered with any expected blood loss of >500mls.

Additionally, TXA should also be considered for adults undergoing surgery who are expected to have at least moderate blood loss (greater than 500 ml).

Consider TXA for children undergoing surgery who are expected to have at least moderate blood loss (greater than 10% blood volume).

Consider intra-operative cell salvage in conjunction with TXA for patients who are expected to lose a very high volume of blood (such as cardiac surgery, complex vascular surgery, major obstetric procedures, pelvic reconstruction and scoliosis surgery).

One of the NICE QS138 Quality Statements is “Adults who are having surgery and expected to have moderate blood loss are offered tranexamic acid”. This is regularly audited to check compliance and has positive outcomes for patients.

7.6 Intraoperative Cell Salvage (ICS)

Intra operative cell salvage is a procedure where blood lost during surgery is collected, washed and then transfused back to the patient during or shortly after surgery.

Intra operative cell salvage can be used in different types of surgery.

The Guidelines for the Collection and Re-infusion of Blood (C0187) can be found on the intranet.

8. PRESCRIBING BLOOD COMPONENTS

8.1 Prescription of blood and blood products is the responsibility of a doctor or authorised non-medical prescribers (who have undertaken appropriate education and assessment as authorised by HTC). This must take into account Trust polices on use of the individual components and patients who refuse blood transfusion.

For each transfusion the following factors should be considered:

- Does the patient need a transfusion?
- Have we considered all other alternatives?
- Has the patient consented to transfusion?
- Does the patient have any special requirements? E.g. Irradiated components
- Is the patient at risk of fluid overload?
- Has the patient been assessed for TACO?
- Are diuretics needed and prescribed?
- Transfusion history. It is **vital that any recent transfusion history,** especially at another hospital, is communicated to the Transfusion Laboratory.

- Does the patient have any history of transfusion reactions?

It is recommended that routinely only 1 unit of red cells is prescribed at a time, and that we do not give 2 without review.

The stable patient should always be reviewed between each unit and only then the decision for any further units should be made – with exceptions for bleeding patients and those on a chronic transfusion programme.

This recommendation is included in the NICE Quality standard 138 –

"People are clinically reassessed and 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."

The review may be in the way of reviewing the patients' signs and symptoms or taking a repeat full blood count (FBC) sample. This review **must** be documented.

A FBC can reflect increments in haemoglobin (Hb) within approximately 30 minutes after the end of a transfusion.

8.2 All blood components MUST be prescribed using the Trust's blood component prescription chart. The prescription must be fully completed prior to administration of blood products and include the following details:

- The patients full name, date of birth and hospital number or NHS number
- Confirmation of consent
- Completed TACO risk assessment
- The product to be given
- Any special requirements (e.g. irradiated, CMV negative).
- The quantity to be transfused (i.e. either the number of units, or for children, neonates and patients of very low body weight, an accurate calculation of the volume required).
- Duration of transfusion of each unit
- Any special instructions (e.g. use of a 'blood warmer' for patients with cold agglutinin disease, medications required to 'cover' transfusion).
- The prescribers name and signature

It is important that ALL sections of the blood prescription are completed.

To ensure clarity of the prescription the following names of products and abbreviations are acceptable:

Name/ Abbreviation	Expansion
HAS	Human albumin solution
Platelets/PLT/PLC	Platelets
Blood/red cells/RBC/RC	Red cells
FFP/plasma	Fresh Frozen Plasma
Cryo	Cryoprecipitate
Anti-D	Anti D

8.3 **Prescription and administration of medications to 'cover' transfusion of blood products**

Doctors and Registered Practitioners with Nursing and Midwifery Council registration are responsible for the administration of any medications prescribed to be given at the time of transfusion e.g. hydrocortisone and antihistamine to prevent febrile transfusion reactions, diuretics to reduce risk of pulmonary oedema etc.

These must be prescribed on the patient's main prescription chart, in the 'as required' or 'once only' medication section.

9. SPECIAL REQUIREMENTS

9.1 When a patient's need for special requirements is first identified, the laboratory must be notified immediately.

See Policy for the use of Cytomegalovirus (CMV) Negative Blood Products C0661 and Policy for the use of irradiated blood components C0662.

A Blood Transfusion Share Care Form must be fully completed and sent to the laboratory to ensure the patient record is updated (Appendix B). This is usually completed by the Haematology Specialist Nurses however can be completed by other staff if the patient is being cared for in other areas. Once records are updated in the laboratory, the form will be returned as confirmation of receipt and completion.

The notification form is a shared care document and if the patient is also being treated at another hospital the name of this hospital should be included as the form will be sent on to the shared care hospital, by laboratory staff, for their records.

Details of the clinical condition that requires the special requirement should also be included on each transfusion request on ICE to ensure it is present at the time of issuing the blood product.

9.2 Irradiated blood products

Irradiated blood products are given to prevent a rare but very serious complication of transfusion called Transfusion associated graft-versus-host disease (TA-GvHD). This takes place when the residual donor lymphocytes in the transfused blood component can recognise the recipient as foreign, engraft onto patient's own cells and cause TA-GvHD. Patients develop skin rash, diarrhoea, abnormal liver function and deteriorate, often with bone marrow failure and death from infection usually within 2-3 weeks of transfusion.

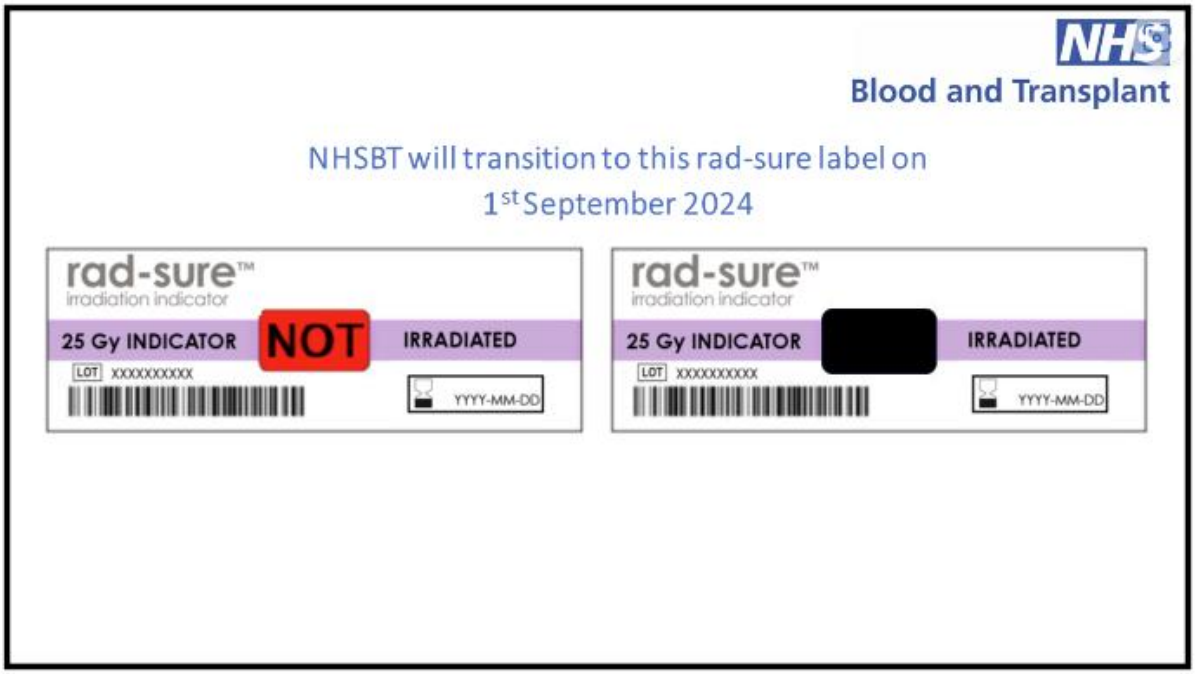
TA-GvHD can be prevented by giving irradiated cellular blood components because gamma- and X-rays, inactivate the donor leucocytes. Please note that irradiated blood may also be used for any transfusion patient in order to aid laboratory stock control.

Patients requiring irradiated blood should be given an information leaflet and a special requirements card informing them about their need for irradiated blood components and that they should make clinical staff aware of this.

Please refer to the Trust Policy for use of Irradiated Blood Products C0662, and the British Standards in Haematology (BSH) guidelines on the use of irradiated blood components for further advice.

When blood or platelets have been irradiated they will have a rad-sure sticker on the unit. The sticker should appear as the image on the right, with the word NOT obscured. If NOT is still visible it must be returned to the laboratory immediately and not transfused – this would indicate the product has not been effectively irradiated by NHSBT.

Irradiated products are safe for any patient and may on occasions be issued to patients who do not need these products to avoid wasting units of blood.



9.3 CMV seronegative blood components

Cytomegalovirus (CMV) is a member of the herpes virus group, which includes herpes simplex and varicella zoster. These share the ability to remain dormant within the body for long periods.

CMV is transmissible by transfusion of blood products. Severe impairment of the immune system by medication or disease may reactivate the virus from its latent state to cause clinical disease which may be fatal. All blood products apart from granulocytes are now routinely leucocyte depleted which effectively reduces CMV transmission.

The following patients should receive CMV negative blood products:

- All pregnant women
- All recipients of intra-uterine transfusions.
- All neonates up to 28 days post expected date of delivery.

For further information regarding CMV negative blood components please see the policy C0661 on the intranet.

9.4 Hepatitis E Negative components

All products provided by NHS Blood & Transplant are now HEV negative, and so there is no longer a need to notify of HEV negative requirements or order HEV neg products.

9.5 Blood Warmer

Blood warmers should be used in the transfusion of red blood cells to patients with clinically significant cold agglutinins (i.e., symptomatic cold haemagglutinin disease), in the management of major haemorrhage and in adults undergoing elective or emergency surgery.

Each patient should be individually assessed, and consideration should be given when rapidly transfusing large volumes to neonates, paediatric patients, elderly patients and patients susceptible to cardiac dysfunction (British Society for Haematology, 2017).

9.6 Monoclonal antibody therapy (e.g. Daratumumab)

Certain therapies that target CD markers on some blood cells can affect pretransfusion testing. Key examples are anti-CD38 (Isatuximab, Daratumumab) and anti-CD47 (Magrolimab).

Those drugs can interfere with compatibility testing, while the patient is taking them and up to six months post administration.

The laboratory must be notified – Group and Screen samples must be sent to the laboratory **before the drug therapy** is commenced as the drug will interfere with antibody screen results and crossmatches. They will need additional pre-drug testing in transfusion – please reach out to the Blood Transfusion Laboratory for advice.

It will take additional time to provide crossmatched blood for these patients.

Any request for blood products must clearly state the patient is on monoclonal antibody therapy.

In emergency situations blood can be provided under concessionary release after discussion with haematology consultant.

9.7 Sickle cell, thalassaemia and other rare inherited anaemias – HbS and extended phenotypes

Patients with Sickle Cell disease require HbS negative and extended phenotyped components. These components are more closely matched with the individual's blood type to minimise the risk of them developing antibodies.

Patients with thalassaemias and rare inherited anaemias should also have extended phenotyped components.

Always ensure that any transfusion testing or requests clearly identifies these patients.

10. BLOOD TRANSFUSION SAMPLE REQUIREMENTS

10.1 Specimen requirements

Blood transfusion testing is carried out on an EDTA sample.

The specific number and type of samples required for the range of tests carried out by the transfusion laboratory can be found in the Pathology Handbook. See below for a summary of the key tests.

In extreme circumstances, if the only option to obtain blood is through an intraosseous sampling method, the laboratory MUST be notified of the sample type. There is no guarantee that valid results will be obtainable from such samples, and blood issued will be on a group-compatible basis only.

10.2 Requesting tests for transfusion

Routinely these requests should be made on ICE.

It is imperative that the requests are made on the correct patient profile, all details should be checked when making this request.

Test requests

Test required	Test code on ICE	Container	
Group and Screen	GS	Transfusion EDTA	Tests patient blood group and antibody status. Available to use for issue of blood for 3-7 days.
Group and Screen (with X-Match)	GS	Transfusion EDTA	Tests patient blood group and antibody status and adds on a request for red cells –

			you will be asked for details of number of units and time required.
Neonatal Group and DAT	BGP	1.3ml EDTA Paediatric (or cord sample)	Tests baby group and DAT. Maternal sample may be required – discuss with Blood Transfusion Laboratory.
Neonatal Group and DAT (with XM)	BGP	1.3ml EDTA Paediatric	Tests baby group and DAT and adds on a request for red cells – you will be asked for details of volume and time required. Maternal sample may be required – discuss with Blood Transfusion Laboratory.
Kleihauer Screen	KL	EDTA (red top)	To identify potential FMH
Direct Antiglobulin Test	DATM	EDTA (red top) or Transfusion EDTA (blue top)	
Transfusion Reaction	TR	Transfusion EDTA (blue top)	One of the samples required to investigate a suspected transfusion reaction. Use Transfusion Related Adverse Events Report Form for further guidance.

10.3 Sample Acceptance Criteria

The Serious Hazards of Transfusion (SHOT) report highlights the danger of incorrectly labelled samples and has identified this as a particular area of concern. SHOT states that when labelling samples, it is essential to have positive patient identification (from the ID band and by verbal confirmation where possible) however familiar the patient, and that all sample tubes must be labelled at the patient's side by the person taking the sample.

Labelling of the specimen must be BY HAND. Printed labels will not be accepted by the transfusion laboratory.

NEVER pre-label bottles or take unlabelled samples away from the patient.

When in doubt, or if interrupted, start the venepuncture again.

Collect specimens of blood by venepuncture away from any intravenous infusion sites.

Sample details must match those on the request form, and, for inpatients, the patient ID band.

To be accepted for testing, the following information MUST be included:

On the Request form	On all Patient samples
Full Surname	Full Surname
Full Forename(s)	Full Forename(s)
Date of birth	Date of birth
Hospital/NHS number	Hospital/NHS number

Ward/Location/Consultant	Signature
Clinical details	Date and time bled
Special Requirements	
Signature and bleep/ext. number of requestor	

Unknown patients

In an emergency, patients who cannot be identified must be allocated patient demographics according to the Emergency Department's Standard Operating Procedure, using the phonetic alphabet (e.g.: Alpha Bravo) and have these applied to all request forms and samples. Ideally, this name should be continued to be used whilst the patient remains within the Emergency Department to enable continuity of care, without the need to retake samples.

The transfusion laboratory will reject any sample which is incorrectly labelled – Blood Transfusion regulations require a zero tolerance policy.

If the information provided is inadequate or ambiguous the sample will not be processed and will be reported as rejected. Additionally, a Datix clinical incident record may be generated so that the requesting area can investigate how the mislabelling has occurred.

If the sample is urgent the requesting location will be contacted to provide a repeat sample.

These measures are designed to protect the patient from dangerous consequences of lapses in established procedures. No difficulty should arise if the transfusion request form is filled in correctly and the sample is adequately labelled.

10.4 Group and Screen Samples

To ensure that the most suitable blood is issued to the patient, at least two Group and Screen (G&S) samples must be tested before the laboratory can issue crossmatched blood. The requirement for the separate samples will enable a double check of the patient's blood group.

The check sample must be taken on separate venepuncture to previous ones, and ideally by a separate member of staff.

It is important that the positive patient identification steps are performed on at least two separate occasions before crossmatched blood is issued.

Deviating from the patient identification and labelling procedures risks wrong blood in tube events and potential serious harm or death to the patient.

Urgent sampling

If clinical urgency dictates:

- Two samples can be taken by two **different** staff members, independently but at the same time (for example from different venous access points).
- Two samples can be taken by the same staff member by separate venepunctures at **different** times.

Two samples are not needed for every transfusion. Please check ICE or BloodTrack Enquiry. If there is a sample history on there then it is possible that one or no samples will be needed to issue blood.

The Laboratory Information Management System (LIMS) is a cross-site system, which means that any blood group history will be available for use at both Hinchingbrooke and Peterborough laboratories. However the most recent (current) sample must be tested at the laboratory the blood is issued from.

10.5 Timing of Sample Collection

Transfusion, transplant or pregnancy may stimulate the production of unexpected antibodies through either a primary or secondary immune response. The timing of samples selected for compatibility testing must take account of this, and it is not possible to predict when or whether such antibodies will appear.

Because of the above, it is important that the pre-transfusion assessment of patients includes their transfusion, transplant and pregnancy history.

Samples are valid for a maximum of 7 days.

BUT

If the patient has been pregnant or transfused in the past 3 months then a sample will only be valid for 72 hours.

Concessionary release

A formal deviation of the 72 hour rule, allowing samples to remain acceptable for up to 7 days, will be considered when blood is required on stand by for potential obstetric emergencies e.g. placenta praevia.

Fetomaternal haemorrhage (FMH) constitutes a smaller stimulus than transfusion, because the number of foreign antigens is limited, and in many pregnancies the volume of red cells transferred from foetus to mother is too small to stimulate a primary immune response. In such cases a concessionary release form (obtainable from the Blood Transfusion Laboratory), completed and signed by the consultant obstetrician caring for the patient, should accompany the transfusion request for blood.

Emergencies

In emergency situations group O blood can be used – but this must be limited to those situations where there is no time to wait for group matched blood.

11. REQUESTING BLOOD PRODUCTS

11.1 The general principles for requesting blood are described below, however please refer to the Trust Policy on the Management of Major Haemorrhage C0185 for more specific instructions on obtaining blood components for major haemorrhage.

- Ensure you are dealing with the correct patient
- Decide which product(s) they require and when they are required.
- Check whether the patient has any historical Group and Screen (G&S) samples and/or whether they have one already tested and available to issue blood (see below)
- Make a request via ICE giving clinical details and noting any special requirements (e.g. irradiated products, CMV negative). If ICE isn't available use a manual request form, ensuring all of the required information is completed.
- Send the request (and any required G&S(s)) to the laboratory. **One form per sample**.
- If the request is urgent/for an emergency contact the on call Biomedical Scientist (BMS) on:
  HH ext 1257
  PCH bleep 1151

Checking G&S status

- Use BloodTrack Enquiry to check G&S sample status, see Blood Track Procedure C0160b.
- Use ICE – if the patient has a G&S result on record only one more will need to be taken for blood to be issued. If the patient has at least 2 on record and the 2nd is within the past 3 days the lab will likely be able to issue blood without an additional sample.
- Ask the laboratory if you are unsure.

If your patient has a positive antibody screen preparation and issue of blood may take longer – ask the laboratory for guidance.

11.2 If the laboratory receives an urgent crossmatch request, for which a confirmatory sample is required but has not been received, the requesting area will be contacted to advise that a second sample is required.

If further testing is required for any reason (e.g. antibody identification) the laboratory may request the collection of further samples. These samples may be tested in-house, or may require referral to a specialist reference centre, depending on the complexity of the testing.

11.3 **Specialist Investigations & Concessionary Release of Blood Products**

Occasionally, the results of standard, hospital transfusion testing (G&S) results in the requirement to obtain further samples for referral to specialist testing laboratories for further investigations. Such results (i.e. the presence of antibodies in the patient's sample) can cause delays in provision of compatible blood components; the length of the delay is influenced by the antibody specificity/specificities present and the availability of suitable blood components on site.

Rarely, the presence of some antibodies (e.g. pan-reactive autoantibodies) can result in the situation where fully compatible units cannot be provided. In such cases, the hospital

laboratory will require samples for urgent referral to NHSBT for specialist investigations and crossmatching.

Should the urgency of the transfusion be such that the patient cannot wait for crossmatched units from NHSBT, units crossmatched locally and found to be “suitable” rather than “compatible” may be issued under concessionary release with authorisation from a Consultant Haematologist.

These units should only be transfused when the clinical benefit of the transfusion outweighs the risk of harm to the patient. The patient should be monitored particularly closely for signs and symptoms of a transfusion reaction during these transfusions.

12. BLOOD COMPONENT COLLECTION AND MOVEMENT

12.1 Pre collection checks

Before collecting the blood component, the following should be ensured by clinical staff:

- The patient is wearing an identification band.
- The reason for the transfusion has been documented in the medical notes.
- Wherever possible, that the risks benefits and alternatives to transfusion have been discussed with the patient (and/or for paediatric patients those with parental responsibility), that there is a record of this is in the notes and consent obtained.
- The blood component has been prescribed on an approved prescription chart and any special requirements noted.
- There is appropriate and patent intravenous access.
- There are suitably trained and competent staff available to care for the patient for the duration of the transfusion.
- The patient’s baseline clinical observations (temperature, pulse, blood pressure, and respiratory rate) have been completed.

Always use a Blood Transfusion Care Plan (SSF005/WZZ760) to demonstrate the correct checks are carried out, and to ensure policy is adhered to.

12.2 Access to blood components

Only staff trained and assessed as competent in using the electronic BloodTrack fridges are permitted to access blood storage locations. Policy for training and competency assessment for staff involved in transfusion C0175 details training information. Associated document C0160b gives full details on the BloodTrack procedure.

Access is controlled by use of individualised barcodes which will be attached to your Trust ID badge. Under no circumstances must ID cards be lent/borrowed between staff or given to untrained staff.

Blood components must only be collected for one patient at a time, and ordinarily only 1 unit at a time. Collection of more than one unit is permitted for major haemorrhage and dialysis patients only.

The person collecting the blood must have documentation specifying the patient identification details, and the product to be collected, which must be checked against the

patient ID displayed on the electronic BloodTrack kiosk. The ID will be one of the following:

- Blood prescription chart
- Blood collection slip

The following details must match:

- Surname
- Forename
- Date of birth
- DIS number/hospital number
- Blood product
- Any special requirements

When removed from the fridge the donation number on the unit must match the donation number on the compatibility label. Any discrepancy must be bought to the attention of the Blood Transfusion Laboratory staff.

All components must be removed by scanning the component unit number via BloodTrack. It is not permissible for any component to be removed from the fridge/storage location without first scanning through BloodTrack unless otherwise instructed by Laboratory Staff.

Blood should be transported in a red blood transport bag. Transfusion should be started as soon as possible on arrival in the clinical area. If the decision has been made to delay or not to transfuse then the blood/blood product must be returned to the storage location within 30 minutes.

12.3 Arrival and receipt of components

For all blood components, on arrival in the clinical area a trained member of staff must examine the unit and check the right product for the right patient has arrived. They must check the unit number corresponds to the compatibility label attached to the component.

Upon arrival to the clinical location use the Arrival transaction on BloodTrack Enquiry to document transport time.

Transfusion of components should commence within 30 minutes of removal of the storage location.

Blood must never be left unattended.

12.4 Return of blood components

If the transfusion of components cannot be commenced within 30 minutes or is no longer required for transfusion, the component should be returned immediately to the storage location by trained staff and scanned in through the BloodTrack kiosk.

BloodTrack will alert if the component has been out of temperature control for over 30 minutes. It will allow you to place in the drawer/on the shelf, but you must also contact Blood Transfusion Laboratory staff.

12.5 Collection of Emergency O Blood

IMPORTANT

The Blood Transfusion laboratory must be informed immediately if you are taking any emergency blood so that replacements can be organised.

Emergency O blood should only be used in **life threatening** situations, when the patient's condition indicates that there is no time to wait for group specific or crossmatched blood.

In situations of major haemorrhage, reference should also be made to the Trust guideline 'Management of major haemorrhage' (C0185).

Types of blood issue

- Group O RhD Negative or Positive blood is available for immediate use should the clinical need dictate this.
- Group specific blood is normally available within **15 minutes** of the laboratory receiving a sample/s,
- Fully crossmatched blood usually within **60 minutes**, if no significant antibodies are detected.

Samples for crossmatch should be taken before transfusion of the emergency O blood is commenced. This will enable the laboratory to switch to the patient's own ABO group once it is determined, thus minimising reliance on units of O blood.

There are units of emergency O blood available in the blood fridges at:

Hinchingbrooke Hospital
Main Blood Fridge – adult and neonatal units

Peterborough City Hospital
Main Blood Fridge – adult units
Theatre Blood Fridge – adult and neonatal units
Emergency Department Blood Fridge – adult units

Adult O RhD negative units MUST NOT be used for neonates, unless advised by laboratory staff.

RhD Negative vs RhD Positive - Selection of Emergency Red Cell units

RhD negative units must normally be used for:

- Patient with immune anti-D

- RhD negative females < 50 yrs.
- RhD negative adult males (<18)
- RhD negative multi-transfused patients or those who are likely to become transfusion dependent i.e. some haematology patients' e.g. aplastic anaemia, Thalassaemia.

RhD positive units should be used for:

- RhD positive patients.
- For transfusion of RhD negative adult males (>18) or females >50 yrs, where no anti-D is detected
- Any emergencies where RhD negative cells are unavailable – these will be via Concessionary Release with Consultant Haematologist authorisation.

Once administration of emergency blood is started

As soon as possible, confirm use of the unit by completing the traceability tag attached to the unit with the details below:

- patient's name
- date of birth
- hospital number
- time and date given
- name and signature of person confirming the details

Return the completed tag to the transfusion laboratory. This information is essential to ensure the laboratory can update the transfusion history for the patient, and to comply with the law on traceability of blood components.

Emergency O tags will be returned to the lab for fating

Stamford Hospital

In case of major haemorrhage at Stamford Hospital, arrangements should be made to transfer the patient to PCH immediately by emergency ambulance. Give crystalloid/ colloid fluids to support the patient's circulation. Transfusion at PCH should be contacted on 8451/2 or bleep 1151 out of hours to inform them that the patient is being transferred to PCH (they may need transfusion support on arrival).

12.6 Porters

Collection of units for immediate patient use is not a portering responsibility.

However, porters may move blood between satellite fridges and may transport blood to clinical areas a suitable transport box or bag when the MHP is activated. See C0185 Guideline for the Management of Major Haemorrhage for further details.

12.7 Movement of components between storage locations

If blood or blood products need to be moved between blood fridges they must be scanned out and in using BloodTrack Courier.

Full patient details must be checked when moving the units out to ensure the correct patient's blood is moved.

The blood/blood products must be transported in a red transport bag and scanned into the new storage location. This must be as soon as possible, and always within 30 minutes.

If a blood fridge is marked as "Out of Use" blood products MUST NOT be stored within it. If you reach a blood fridge and find this is the case, or it has an active temperature alarm, contact the transfusion laboratory immediately for advice. Furthermore, blood fridges are subject to strict temperature mapping rules, and areas within a working fridge may be isolated as unsuitable for component storage. DO NOT place any products within restricted areas of blood fridges.

12.8 Transport of Components outside the Hospital

This section covers both:

- The routine movement of blood components to sites that the PCH transfusion laboratory supply e.g. Stamford & Rutland Hospital, Thorpe Hall Hospice, Fitzwilliam Hospital, Healthcare at Home.
- The urgent provision of blood components to accompany a patient transfer to a specialist hospital.

If a patient is to be transferred out of the hospital with blood products, the transfusion laboratory must be contacted immediately to package and label the products to maintain viability in accordance with the Blood Safety and Quality Regulations. The relevant laboratory SOP will be used to guide this, and under no circumstances must components leave the hospital without prior secure packaging by the transfusion laboratory.

Only 2 units of Red Cells will be issued for transfer, providing that there is both a clinical need, and appropriately trained staff to check and administer the blood in transit. If the requesting doctor feels that there is a clinical need for more than 2 units of Red Cells, then authorisation must be obtained via the on-call Haematologist. The maximum number of units per transport box is 2, so if more than 2 units are requested, this will require use of multiple boxes.

To maintain the integrity of the cold chain, the transport boxes are sealed, and to avoid unnecessary waste of a precious resource, boxes must not be opened until the blood is to be used. Once opened, any units in the box not used will need to be disposed of.

In exceptional circumstances, or where atypical antibodies may delay the availability of blood at the receiving hospital, more than 2 units may be packaged and issued as deemed appropriate by the lab.

Transfer to another site with a blood fridge

When the unit(s) arrive at their destination, refrigerated products must be placed into the blood fridge, and the tracking log on the compatibility report must be completed (name, date and time of arrival, and location of the fridge). The compatibility report(s) and filed appropriately next to the blood fridge.

Non refrigerated products must be taken directly to the clinical area, and handed to an appropriate member of staff, who should sign the front of the compatibility report as a receipt.

Blood component transport boxes have a maximum transport time, which will be documented on the outside of the box and must be adhered to. If the storage time has been exceeded the components within MUST NOT be used. Seek advice from the transfusion laboratory.

Transfer to another site for immediate transfusion

Only open the seal on the box when the units are ready to be transfused.

Ensure that the unit is checked and signed out of the box.

All units of RBC packed must be used within 4 hours of opening the box.

Transfer with a patient to another hospital

Only open the seal of the box if the patient needs the blood.

Ensure each unit is checked and signed out.

All units of RBC packed must be used within 4 hours of opening the box.

If the sealed box reaches the receiving hospital then it can be transferred to the receiving Blood Transfusion Laboratory and units added to their stock providing cold chain has been maintained. If the seal is broken but the units are not used they will need to be disposed of – but this must always be by the Blood Transfusion Laboratory.

If any blood is transfused enroute it must be prescribed and fully documented, and traceability tags returned.

13. ADMINISTRATION OF BLOOD COMPONENTS

13.1 Pre transfusion checks -The ‘bedside check’

The Serious Hazards of Transfusion (SHOT) report has identified the final ‘bedside check’ as vital in preventing the incorrect component being transfused to the patient, which could have serious, even fatal, consequences. It is essential that the following checks are performed, before every unit of blood/blood component is commenced, **without exception**.

The Care Plan “Care of a Patient Having a Blood Transfusion” details the checks to follow throughout the transfusion process (order code SSF0053/WZZ760).

The bedside check must be completed **independently** by two registered healthcare practitioners, at least one of which has a permanent contract with the Trust and must have completed the Blood Transfusion Theory and Blood Transfusion Practical competencies for Registered Practitioners.

The registered healthcare practitioners must:-

- Confirm that the patient’s full name, date of birth and hospital number on the prescription chart, tag attached to the unit of blood and ID band match exactly.
- Check that any special requirements documented on the prescription chart (e.g.: irradiated, CMV) match those on the blood component collected.
- Conducted a visual inspection of the component for any leaks or discolouration and check its expiry and de-reservation date.
- If appropriate to the patient’s age or clinical condition use open questions (i.e. ask “what is your name” and “what is your date of birth”) to confirm the patient’s identity, and check this information against the prescription chart, ID band and tag attached to the unit.
- Check that the blood group of the unit is the same as, or compatible with, the patient’s own blood group (See Appendix C – Compatibility of Blood Products).
- Check that the unique component pack donation number on the unit matches that on the tag attached to the unit.
- Check the product type to ensure that the correct component was being given e.g.: platelets, FFP etc.
- Check the rate and volume of the infusion and whether any medications are to be administered alongside the transfusion. Please see the table in Appendix D for information on component infusion rates. If an infusion pump is being used to administer the component, the device and settings must also be checked.
- Checked that the component had been commenced within 30 minutes of removal from temperature-controlled storage. If the component has been out of temperature-controlled storage for greater than 30 minutes contact the transfusion laboratory for advice.

If any discrepancies are found during the above checks, DO NOT commence the transfusion, but contact the Transfusion Laboratory immediately. Any inconsistencies must be clarified prior to proceeding with the transfusion.

If all the details are confirmed, both registered healthcare practitioners should sign the prescription chart to confirm the bedside check has taken place.

The date and time that the transfusion commenced and the unit number should also be entered on the prescription chart and care plan.

13.2 Administering Blood Products

Blood products must only be administered by a Registered Healthcare Practitioner, who has completed the trust IV drug administration assessment appropriate to their area and also the Blood Transfusion Practical Competency for Registered Practitioners.

For information on the care of intravenous infusion sites, and the administration of intravenous drugs, please refer to the Trust document C0019 Intravenous (IV) drug administration: policy and assessment for clinicians, available on the intranet.

Although most transfusions are given through a peripheral venous cannula, venous access via central venous catheters may also be used (short term or long term CVC can be used). When multi-lumen central venous access devices are used it is safe to use other lumens at the same time for administration, as they all have separate lumens and the infusate do not mix. Once the infusate exits the catheter in the large central vein, rapid haemodilution occurs and the drugs do not mix..

Please note – wherever possible drug administrations should be timed between transfusions, or administered via alternative venous access.

Peripherally inserted central catheters (PICC lines) with narrow lumen diameter may lead to slower flow rates. If this occurs a volumetric infusion pump can be used to administer transfusions provided a dedicated blood transfusion administration set is used.

In exceptional circumstances an intraosseous transfusion may be necessary.

It is essential that blood products are NEVER removed from the donor bag, but remain within a closed system for infusion, to prevent contamination.

There is no recommended gauge of cannula to be used for blood transfusion. The size of the cannula chosen depends on the size of the vein, and the speed at which the blood is to be transfused.

Giving sets

- All blood components should be transfused through a blood component administration set with an integral mesh filter (170-200 micron). The administration set should be changed at least every 12 hours or after every second unit of red cells. This is intended to reduce the risk of bacterial growth occurring.
- A new giving set must be used for each unit of platelets.
- Human Albumin Solution (HAS) may be given via a standard IV fluid administration set.

Please see the table in Appendix D for further information.

It is unnecessary to use any other intravenous fluid to prime the line; the intended blood/blood product should be used. It is also not necessary to ‘flush’ the blood administration set after transfusion.

A new giving set should be used if blood components are followed by another infusion. This is intended to reduce the risk of incompatible fluids or drugs causing haemolysis of residual red cells in the administration set or drip chamber.

The British Standards in Haematology (BSH) guidelines state that drugs must not be added to units of blood under any circumstances. In normal circumstances separate intravenous access should be established for blood and blood products if other I.V. therapy is to occur concurrently. Glucose solution 5%, or Hartmanns solution, should never be used before or after blood as it causes lysis of red cells. Solutions containing calcium can cause citrated blood to clot.

The unit should be gently inverted and inspected for any leaks, clots or signs of deterioration prior to connecting to the giving set.

Any units that are inadvertently pierced when being prepared for transfusion MUST NOT be used but returned to the transfusion lab for replacement. If there are any concerns about the condition or appearance of the unit, it must be returned to the transfusion laboratory for inspection by a biomedical scientist.

Either gravity, or electronic infusion devices verified as safe for administration of blood components may be used to administer blood.

Electronic infusion devices allow a precise infusion rate/ volume to be specified and must be used for all paediatric and neonatal transfusions.

If an infusion device is used:

- The member of staff using the device should be able to demonstrate competency in its use.
- Only use a blood component administration set that is compatible with the infusion device (check manufacturers recommendations).
- The pre-administration checking procedure should include a check of the device and device settings.
- The device should be visually monitored throughout the transfusion and there shouldn’t be a reliance on audible alarms.
- Response to any alarm should be actioned by an appropriate member of staff.

Blood Warmers

The warming of blood is only indicated in certain circumstances:-

- Patients receiving large volume or rapid transfusion
- Infants undergoing exchange transfusion.
- Transfusing a patient who has significant cold agglutinins.

Blood must never be warmed by improvisations such as putting the pack into warm water, in a microwave, or on a radiator. Please contact the equipment library if use of a blood warmer is indicated.

External Pressure Devices

External pressure devices make it possible to administer a unit of red cells within a few minutes. They should only be used in an emergency situation together with a large gauge venous access cannula or device.

External pressure devices should:

- Exert pressure evenly over the entire bag.
- Have a gauge to measure the pressure which must not exceed 300mm Hg.
- Be monitored at all times when in use.

13.3 Blood Administration rates

Please see the table in Appendix D for further information on rate of administration.

If transfusion is delayed or units are not used

If the decision is taken not to start the transfusion then INTACT units can be returned to a BloodTrack fridge if done so **within 30 minutes**.

If the decision not to transfuse is made **after 30 minutes** of the unit being removed from the storage location, or after the unit has been opened or 'spiked', it must be returned directly to a member of laboratory staff, and NOT placed back into a blood fridge or disposed on the ward.

In all cases, please contact the transfusion laboratory, as soon as possible, for advice.

If the transfusion has not been started within 30 minutes of removal, but the patient the blood is allocated to still needs the unit, the unit can be transfused but must be stopped by the maximum transfusion time. E.g. RBC were removed from the fridge at 12:00 they can be transfused up until 16:00. If any blood remains in the bag at 16:00 the transfusion must be stopped and patient assessed to see if they require a further unit.

13.4 Overnight transfusion (defined as between 20:00 to 08:00)

Transfusions must be administered with the same attention to patient observations whatever the time of day or night.

Overnight transfusions must only proceed where there is a clear clinical indication that it is necessary to transfuse at night, and as long as the staffing is sufficient to permit the patient to be cared for according to the standards defined in the BSH guideline on administration of blood components (2017). These standards include adequate pre-transfusion assessment, observations at 15 minutes after the start of each component and regular visual observation throughout the transfusion.

Decisions to transfuse should not be made simply on the basis of the haemoglobin result, but considering the full medical history, the patient's current medical condition and the wishes of the patient. Junior medical staff should review the patient, consult the case notes and take advice from senior medical staff before deciding to transfuse at night, particularly when the team concerned are not familiar with the patient's case and are not responsible for the overall management plan.

Consideration should be given to transfusion of 1 unit to allay symptoms, with any remaining units being given the next day.

The reason for making the decision to transfuse at night, beneficial effects and any adverse incidents must be recorded in the medical notes.

Clinicians must also ensure that any blood results are reviewed in good time to enable products to be requested and transfused within daytime hours whenever possible.

13.5 Location

Transfusion must only take place when there are enough staff available to monitor the patient and where the patient can be readily observed.

If it is planned to transfer a patient between care settings (e.g. to another ward, department or hospital) a risk assessment must be performed to assess whether the transfusion should be delayed until the transfer is complete.

If the patient has to be transferred with a transfusion in progress, they must be accompanied by a Registered Healthcare Professional, in case of adverse reaction during transfer.

13.6 Monitoring and Clinical Observations

Observation and monitoring of the patient during a transfusion is essential if adverse reactions to the transfusion are to be quickly identified and managed.

Regular visual observation of the patient must take place throughout the transfusion episode.

Patients should be informed of potential side effects to transfusion that they may experience. It is important to ensure that patients know to report feeling unwell or any potential symptoms of an adverse reaction (e.g. shivering, rashes, flushing, shortness of breath, pain at transfusion site, loin pain or feeling generally unwell) to the person caring for them immediately.

A means of attracting attention (i.e. a call bell) should be readily available for use by the patient as appropriate.

Special care should be taken for patients who are unable to report symptoms that would raise suspicion of a developing transfusion reaction, because they are unconscious / sedated, too young, confused or there is a communication barrier. For these patients, more frequent observations may be required.

A regular check should be made on the rate of transfusion to ensure that this is proceeding as prescribed.

As a **minimum**, the patient's temperature, pulse, blood pressure and respiratory rate must be measured and recorded:

Before the start of each unit (no more than 1 hour before the unit commences)

15 minutes after the start of each unit **and then as frequently as clinically indicated.**

This standard is based on British Standards in Haematology (BSH) guidelines which state that the first set of observations after the start of the unit being transfused should be carried out at 15 minutes. However in clinical practice there is potential for neither the timing of, nor the recording of the timing of, the observations to be that precise. Therefore observations taken no more than 30 minutes after the start of transfusion, while outside the BSH guideline, are considered acceptable.

At the end of each unit (no more than 1 hour after the unit finishes).

If another unit is to follow, and there is no break in transfusion, these readings can be used as the pre transfusion observations check for the next unit.

Patients who are on continuous electronic monitoring must have the pre transfusion, 15 minute and post transfusion observations noted.

Inpatients should be observed for late reactions over the next 24 hours. Day care patients must be advised to report symptoms developing after discharge from hospital and given a contact number for clinical advice. It is important not to disregard the potential of delayed transfusion reactions.

13.7 Documentation of transfusion

The transfusion episode must be documented in the patient's notes. The blood product given, volume transfused, and commencement and completion times must be recorded on the blood prescription chart SSF052.

The outcome, or any adverse incidents associated with the transfusion should also be documented.

The care plan must also be completed for each unit given.

BloodTrack Enquiry must be updated as the unit arrives in the clinical area, and to confirm the transfusion. See Associated Document C0160b.

Proof of transfusion is required by law (Blood Safety & Quality Regulations 2005) and must be retained for 30 years.

If any or all of a unit is used the return section of the traceability tag must be completed and returned to the laboratory to provide this record. In the absence of the tag, a photocopy of the prescription and administration record must be provided.

13.8 Disposal of units on completion of the Transfusion

Transfusion complete	Remove tag and place this in a confidential waste bin but PLEASE check the lower half has been removed and returned to Transfusion. - Empty bags without giving set - place in the red transfusion transport bag. - Empty bags with giving set - leave giving set attached and place everything in the red transfusion transport bag.

	Keep all empty bags for 24 hrs then dispose of in an orange or yellow waste bag
Suspected reactions	Return all bags and tags to Transfusion
Transfusion stopped part way through (no suspected reaction)	Remove the tag and place this in a confidential waste bin, but PLEASE check the lower half has been signed and returned to Transfusion. Leave giving set attached Keep bag 24 hrs then dispose of into a sharps bin
Full bags out of fridge for >30 minutes	Return to Transfusion For reporting purposes, inform Transfusion why the unit was not administered (for example, out of fridge too long/ cannula problems/ patient refused)

14. TRANSFUSION REACTIONS

14.1 To minimise the risk of harm, early identification of transfusion reactions and rapid clinical assessment and treatment is essential. Please refer directly to the East of England Regional Transfusion Committee (RTC) flowchart on “Management of Acute Transfusion Reactions” which is associated document 1 alongside the Blood Transfusion Policy on the Trust document library.

Acute Transfusion reactions (ATRs) vary in severity from minor febrile reactions to life-threatening allergic, haemolytic or hypotensive events. Allergic and febrile non-haemolytic transfusion reactions (FNHTR) are those most commonly reported.

The initial clinical picture is also often obscured by factors related to the patient’s underlying medical condition, such as febrile septic episodes in neutropenic patients who also happen to be receiving a blood component transfusion so it is important to focus on initial recognition and general management of the clinical problem, guided in the main by symptoms and clinical signs and assessment of the severity of the problem. This allows appropriate investigation, specific treatment and prevention, where possible, of future episodes.

Anaphylactic and haemolytic reactions can present after only a small volume of blood has been transfused however reactions can also present much later, sometimes several hours or days after completion of the transfusion. Therefore, observation and monitoring is required throughout the transfusion episode and patients should be asked to report symptoms which develop during the following days, particularly fever, dark urine, jaundice or symptoms suggestive of anaemia (BSH, 2023).

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

(BSH 2023). Unconscious patients, or those unable to report symptoms, require direct monitoring.

14.2 Recognition and immediate management of acute transfusion reactions (ATR)

Signs and Symptoms of acute transfusion reactions:

- Fever and related inflammatory symptoms or signs such as chills, rigors, myalgia, nausea or vomiting.
- Cutaneous symptoms and signs including urticaria (hives), other skin rashes and pruritus
- Angioedema (localised oedema of the subcutaneous or submucosal tissues), which may be preceded by tingling
- Respiratory symptoms and signs including dyspnoea, stridor, wheeze and hypoxia
- Hypotension
- Pain – loin pain, chest pain, muscle pain, pain at IV site
- Severe anxiety or feeling of impending doom
- Bleeding diathesis with acute onset
- Rapidly developing features of airway, breathing or circulation problems, usually associated with skin and mucosal change would suggest anaphylaxis.

If ANY of the above signs are observed:

- **STOP THE TRANSFUSION** and inform medical staff.
- Maintain venous access – do not remove the cannula.
- **Assess** – rapid clinical assessment of the patient (Airway Breathing Circulation).
- **Check** The patient's identity must be rechecked against the blood.
- **Inspect** the unit for turbidity, clots, or discolouration.

Management of a MILD acute transfusion reaction

This is defined as an isolated temperature of 38-39°C or rise of 1-2 °C from baseline, or pruritus/a rash only.

- Consider symptomatic treatment (e.g.: paracetamol/antihistamine).
- Monitor patient more frequently (temp, pulse, RR, BP, O_2 sats, urine output).
- Continue transfusion, but if symptoms worsen manage as for moderate transfusion reaction.
- Document in patient notes. Report to transfusion laboratory only if recurrent.

Management of a MODERATE acute transfusion reaction

This is defined as a temperature of 39°C or above or a rise of 2°C or more above baseline and/or other symptoms –but not pruritus/rash only (see Management of Acute Transfusion Reactions which is an associated documents to this policy on the Trust Intranet)

- Monitor the patient more frequently (temp, pulse, RR, BP, O_2 sats, urine output).
- Review patients underlying condition and transfusion history.

If **consistent** with the patient's history or condition, consider continuation of transfusion at a slower rate, and appropriate symptomatic treatment.

If signs and symptoms are **not consistent** with the patient's condition or transfusion history, discontinue the transfusion and **report urgently to the transfusion lab**. Avoid further transfusion of any blood product until the reaction has been investigated unless absolutely necessary.

- If bacterial contamination is suspected undertake appropriate investigations

(E.g. blood cultures).

- Consider the possibility of pulmonary complications such as Transfusion Associated Circulatory Overload (TACO), Transfusion Related Acute Lung Injury (TRALI) OR Transfusion Associated Dyspnoea (TAD). See Appendix F for the characteristics of these pulmonary complications.
- Complete a transfusion adverse events form (see Transfusion Related Adverse Events Report form which is an associated document to this policy on the Trust Intranet).
- Return required samples and the remains of all donor bags to the transfusion lab.
- Complete a Datix Adverse event form.

Management of a SEVERE or life threatening acute transfusion reaction

If there is evidence of life threatening problems (Airway Breathing or Circulatory problems), and/or wrong blood given and/or evidence of a contaminated unit the following actions should be taken:

- Stop the transfusion. Maintain venous access.
- Call for urgent medical help- use 2222 as necessary.
- Initiate resuscitation – ABCDE.
- Assess the patient, check patient ID and inspect the unit.
- Monitor the patient (temp, pulse, RR, BP, O2 sats, urine output).
- Fluid resuscitation (normal 0.9% saline) as appropriate guided by BP, pulse, urine output (catheterise if necessary).
- Avoid further transfusion of any blood product until the reaction has been investigated, unless absolutely necessary.
- **Report urgently to the transfusion lab.** Complete a transfusion adverse events form and return required samples and remains of all donor bags to the transfusion laboratory.
- If likely anaphylaxis/severe allergy, follow anaphylaxis treatment pathway.
- If bacterial contamination suspected, follow sepsis pathway.
- If haemorrhage likely to be causing hypotension, fluid resuscitate/continue transfusion.
- Consider the possibility of pulmonary complications such as TACO or Transfusion Related Acute Lung Injury (TRALI). See Appendix F for a flowchart for assessing Respiratory symptoms during transfusion
- Complete a DATIX Adverse event form.

14.3 Once the patient has been managed and all above actions followed there may be further investigation needed, and therefore further input from the clinical team. See section 15 on adverse events in transfusion.

15. ADVERSE EVENTS IN TRANSFUSION

15.1 Reporting of Adverse Events and Reactions

This section of the policy outlines the reporting of transfusion related incidents and is in accordance with the Blood Safety and Quality Regulations (2005).

The objectives of adverse event reporting are:

To ensure that correct action is taken to highlight any adverse event following or concerned with blood transfusion and report it to the correct body.

- To ensure such events are appropriately investigated or audited.
- To allow implementation of required actions in order to prevent re-occurrence.

The aim is **not** to apportion blame but rather to learn from experience and improve practice accordingly.

The Trust is committed to reducing errors in the administration of blood and blood components and supports the guidelines set out by British Standards in Haematology (BSH) and the recommendations of Serious Hazards of Transfusion (SHOT) report.

In the event of a serious adverse transfusion incident, an open and honest culture must be maintained between the Trust and the patient/relatives. Furthermore, in addition to investigating the root cause, the Trust also has a duty to offer support for the employee(s) involved.

Any serious adverse reactions observed during or after transfusion which may be attributable to the quality or safety of blood or blood components issued for transfusion must be reported to the Blood Transfusion Laboratory who will report the incident to the Medicines & Healthcare products Regulatory Agency (MHRA), as is required by law.

15.2 Responsibilities for reporting adverse events

All staff have a duty to report any transfusion incidents/near misses regardless of the impact of the incident on the person directly involved.

Transfusion incidents/near misses must be reported to the laboratory, as soon as possible after the incident is identified, and a trust adverse event form must be submitted via Datix.

All Datix logged adverse events will be reviewed by the Transfusion Operational Management Team (TOMT). Any suggested corrective and preventative actions must be implemented in order to reduce the possibility of a similar occurrence.

Where appropriate, the near-miss, adverse reaction or adverse event will be reported by the TOMT to the relevant external bodies e.g. SHOT/SABRE.

Any recurring or significant adverse events will also be discussed at the Hospital Transfusion Team (HTT) meeting and the Hospital Transfusion Committee (HTC) as required.

15.3 National reporting of adverse effects of transfusion

SHOT – Serious Hazards of Transfusion.

This is a confidential reporting system for serious adverse events during or following transfusion, and also 'near misses'. This data is collated, and an annual report is published. To view reports and further information, please visit the SHOT website www.shotuk.org

SABRE - Serious Adverse Blood Reactions and Events

This is a mandatory reporting agency, to which all serious adverse reactions and events must be reported to comply with the trust legal responsibilities under the Blood Safety & Quality Regulations 2005.

Reporting to both of these agencies is made via the Transfusion Operational Management Team (TOMT) and so it is ESSENTIAL that the Blood Transfusion laboratory is informed **immediately** of any actual/suspected Blood Transfusion adverse event and a Datix is completed.

Adverse events associated with the administration of licensed fractionated plasma derivatives e.g. albumin, immunoglobulin and coagulation factor concentrates, should be reported to the MHRA using the 'Yellow Card' system.

15.4 Types of incidents to report nationally

SHOT Reportable Near-miss Incident (SHOT NM)

Near-miss incidents are reportable by the transfusion laboratory to the Serious Hazards of Transfusion Scheme. These include, but are not restricted to:

- Any error which, if undetected, could result in the determination of a wrong blood group.
- The issue of the incorrect component (e.g.: non irradiated red cells to a patient who requires these).
- The collection of an incorrect, inappropriate or unsuitable component, but which was recognised before transfusion took place.

Serious Adverse Reactions (SAR)

This constitutes 'an unintended response in a patient that is associated with the Collection or transfusion of blood or blood components that is fatal, life threatening, disabling or incapacitating, or which results in or prolongs hospitalisation or morbidity' (MHRA 2005)

This can include:

- Immunological haemolysis due to ABO incompatibility.
- Immunological haemolysis due to other allo-antibody.
- Non – immunological haemolysis.
- Transfusion transmitted bacterial infection.
- Anaphylaxis/hypersensitivity.
- Respiratory symptoms such as TACO or TRALI.
- Transfusion transmitted viral infection, prion infection or parasitic infection (i.e. Malaria).
- Post transfusion purpura (PTP).
- Graft versus host disease (GVHD).
- Other serious reaction(s) (i.e. transfusion related circulatory overload).

Any of the above would require submission via SABRE (Serious adverse blood reactions and events) to the MHRA (Medicines and Healthcare products Regulatory Agency). Both SHOT and the MHRA would analyse the data submitted.

Serious Adverse Events (SAE)

This constitutes 'any untoward occurrence associated with the collection, testing, processing, storage and distribution, of blood or blood components that might lead to death or life threatening, disabling or incapacitating conditions for patients or which results in, or prolongs hospitalisation or morbidity.' (MHRA 2005)

These include (but are not restricted to):

- Incorrect group given (e.g. RhD positive to RhD Negative patient).
- Incompatible ABO group given, but no adverse reaction.
- CMV or Irradiated Blood requested but not given.
- Expired unit transfused.
- Cold chain failure- blood out of temperature control.

- Unit mislabelled.
- Fate of unit not recorded, or transfusion tag not returned.

16. ADDITIONAL ADIVCE FOR PAEDIATRIC AND NEONATAL TRANSFUSIONS

16.1 Children on regular transfusion programmes

There are only small numbers of local children on regular transfusion programmes. They should all be under a shared care arrangement with a tertiary paediatric haematology centre – most often Addenbrookes Hospital. The most likely diagnoses are thalassaemia major and bone marrow failure syndromes e.g. Diamond Blackfan syndrome.

16.2 Pre transfusion blood tests

Children on regular transfusion programmes require a FBC and crossmatch. The timing of their crossmatch will depend on their previous transfusion history. National guidelines state that to ensure that the specimen used for compatibility testing is representative of a patient's current immune status; serological studies should be performed using a blood sample collected no more than 3 days in advance of the actual transfusion when the patient has been transfused or pregnant within the preceding 3 months.

16.3 Prescription of red cells

Children with thalassaemia major require their Hb to be maintained above 95 to 100g/L to optimise normal growth and development and inhibit bone marrow expansion. Transfusion frequency is usually every 3-4 weeks.

Children with other diagnoses may have different target Hb depending on their diagnosis. Check for any guidance from their notes or ask their local consultant if unsure. If their local consultant is not available or if uncertainty exists, contact their tertiary centre haematology team for advice.

Transfusion should be prescribed carefully in mls, not units, using the formula below to determine the volume to be transfused

Weight (kg) x Hb rise required (g/L) x 0.4 = Volume of red cells to be transfused (mls)

For example: 20kg child with current Hb of 70g/L and target Hb of 110g/L

20 x (110-70) x 0.4 = 320 mls red cells to be transfused

The transfusion is given at a rate of 5ml/kg/hour (up to a maximum of 150mls/hour).

According to hospital policy, transfusion should be avoided at night, unless there is an acute clinical need and sufficient staffing.

16.4 Other expected standards

As these children will have long term attendance at hospital for transfusions, every attempt must be made to have them seen and cannulated promptly by an experienced doctor or nurse.

Good transfusion practice should be followed as per hospital transfusion policy. They should have pre transfusion observations recorded – minimum of pulse, temperature, blood pressure and respiratory rate. These should be repeated 15 minutes after the transfusion is commenced and at the end of each unit. The patient must be observed throughout the transfusion for signs of reaction. If any signs occur, the blood must be stopped immediately and medical advice sought.

A Blood Transfusion Care Plan must be used to document the transfusion checks and observations. A note of the benefit or lack of benefit of the transfusion should be made in the patient notes.

Each attendance for transfusion should be documented in the notes, and a discharge letter given. Advice must be given regarding how to contact the hospital if there are any signs of reaction when discharged from hospital.

A post-transfusion Hb check is not routinely required after each transfusion but should be done if the patient's consultant or haematologist requests. Check the notes for individual plans.

16.5 Paediatric Red Cell Transfusions in Homozygous Sickle Cell Anaemia

Most children with homozygous sickle cell disease are not receiving regular transfusions. From the age of 2 years onwards patients with homozygous sickle cell disease should be referred for transcranial Doppler studies. Some children with raised cerebral blood flow velocities are considered for a regular transfusion programme.

Since 2006 there has been a national neonatal screening programme for sickle cell anaemia, so babies born in the UK after then should have been identified in the neonatal period.

The parents should have received advice on general measures to reduce the frequency and severity of sickling, which is avoidance of cold, dehydration, hypoxia and aggressive treatment of intercurrent infections. They should all have received pneumococcal vaccination (prevenar at 2, 4 and 13 months then pneumovax at 2,7,12 and 17 years). They should have an annual flu vaccination from 6 months of age and be offered a course of Hep B immunisation if not immune. By age 3 months they should be receiving regular prophylactic penicillin.

The most common reason for hospital admission in sickle cell anaemia is due to a painful crisis. The management is analgesia, hydration and treating any precipitating infection. Such children should have open access to their local paediatric ward.

Complications requiring top up or exchange transfusion

Transfusions should not be undertaken without careful consideration of the benefits and risks. There is an incidence of about 18% of alloimmunisation following blood transfusion in the sickle population-two thirds of the antibodies described are in the Rh or Kell

systems. There is an incidence of delayed haemolytic transfusion reactions in sickle cell disease of between 4 and 22%-significantly higher than in other patients. Informed consent from the parents, or child where appropriate, should always be obtained prior to transfusion.

There are certain situations where an acute blood transfusion will be necessary:

- **Acute splenic sequestration**- i.e. acute fall of haemoglobin of more than 20g/L below steady state, markedly elevated retic count together with an acute increase in spleen size. This is a serious complication of sickle cell disease, and if unrecognized causes significant mortality. Mortality rates can be reduced substantially by parental education, regular palpation of the abdomen at home to detect early signs of splenic enlargement and prompt intervention with transfusion. **Target Hb is to the steady state Hb level.**

- **Temporary red cell aplasia** (usually due to parvovirus B19 infection). This is characterized by a drop in haemoglobin over about 1 week, often to levels as low as 30g/L It may be associated with fever, headache and abdominal pain. In contrast to acute splenic sequestration the retic count will be very low, and IgM for parvovirus B19 will be present. Recovery may be spontaneous, but a top up transfusion is usually indicated. **Target Hb is to steady state Hb level.**

- **Acute sickle chest syndrome.** This is characterized by pleuritic chest pain, fever, abnormal chest examination and new pulmonary infiltrates on X-ray. Early intervention with analgesia, oxygen, physiotherapy, antibiotics and blood transfusion can significantly reduce morbidity and mortality. **Aim to achieve HbS level below 30% and Hb 100-110g/L** Consideration should be given to exchange transfusion.

- **Acute neurological complications**. Cerebrovascular disease, particularly proximal vessel stenosis predisposes children to acute cerebral infarction. Occasionally older children present with subarachnoid or intracerebral bleeds related to cerebral artery aneurysms. Acute ischaemic events require urgent investigation with CT and/or MRI scan to define the extent and exclude a haemorrhagic component. This should be followed by **exchange transfusion as soon as possible** to reduce the risk of progression of the lesion. Aim to achieve HbS level below 30% and Hb 100- 110g/L. Royal College of Paediatrics and Child Health Guidelines on the management of acute stroke in childhood should be followed.

- **Prior to a surgical procedure.** A minor procedure such as circumcision or tooth extraction can usually be done safely without a transfusion. (Extra oxygen may be required). With other elective procedures a blood transfusion may be necessary as a day case a few days prior to the surgery, particularly if the child is prone to complications. If an emergency surgical procedure is required a pre-op transfusion is likely to be required.

Indications for regular long-term transfusion in sickle cell disease

Decisions about regular long-term transfusions should be made in consultation with the patient/carers and Paediatric Haematologist:

- Primary and secondary stroke prevention.

- Recurrent acute chest syndrome not prevented by hydroxyurea.
- Progressive organ failure.

Please discuss with seniors and have a low threshold for discussion with the tertiary team.

Our patients will usually be having shared care with Addenbrookes Consultant Paediatric Haematologists – contact via Addenbrookes switchboard.

16.6 Guidelines for Preterm Neonates

This summary guidance should be used in conjunction with the 2016 BSH Guidelines transfusion for foetuses, neonates and older children.

Studies support restrictive transfusion thresholds.

Transfusion need can be reduced in preterm neonates by delayed cord clamping and intact cord resuscitation.

16.7 Red cells for top up transfusions

The table below applies to very preterm babies (<32 weeks); for later preterm/term babies the values for babies off oxygen may be used.

- Generally transfuse 15 mL/kg for non-bleeding neonates.
- Where the term or preterm neonate does not require resuscitation, undertake delayed cord clamping.
- Minimise phlebotomy where possible, using small volume samples.

Transfusion rate: 5mL/kg/hr.

Postnatal age	**Suggested transfusion threshold Hb (g/L)**		
	Ventilated	**On oxygen/ NIPPV (non-invasive positive pressure ventilation)**	**Off oxygen**
1st 24 hours	<120	<120	<100
≤ week 1 (day1-7)	<120	<100	<100
week 2 (day 8-14)	<100	<95	<75*
≥week 3 (day 15 onwards)	<100	<85	<75* *It is accepted that clinicians may use up to 85 g/L depending

			on the clinical situation.

16.8 Platelet transfusion in neonates

For preterm neonates with platelets <25 x10^9/L, transfuse platelets and treat the underlying cause of thrombocytopenia.

Suggested transfusion thresholds for preterm neonates:

Platelet count (x10^9/L)	**Indication for platelet transfusion**
<25	Neonates with no bleeding – including neonates with neonatal alloimmune thrombocytopenia (NAIT) if no bleeding and no family history of intracranial haemorrhage (ICH)
<50	Neonates with bleeding, current coagulopathy, before surgery, or infants with neonatal alloimmune thrombocytopenia (NAIT) if previously affected sibling with intracranial haemorrhage (ICH).
<100	Neonates with major bleeding or requiring major surgery (e.g. neurosurgery).

Table applies to preterm babies; clinicians may also choose to use for term babies.

Typical transfusion volume: 10-20 mL/kg; rate 10-20 mL/kg/hr.

16.9 Plasma products in neonates

Fresh Frozen Plasma and Cryoprecipitate

Routine coagulation screening is generally inappropriate: results are difficult to interpret in neonates and routine testing may lead to increased FFP transfusion without benefit. However, in very sick neonates or neonates with HIE being considered for cooling, coagulation screening should be taken.

- FFP should not be used routinely to try to correct abnormalities of the coagulation screen alone in non-bleeding neonates.
- FFP may be of benefit in neonates with clinically significant bleeding or prior to invasive procedures with risk of significant bleeding, and who have abnormal coagulation (PT/APTT significantly above the gestational and postnatal age-related range).
- FFP should not be used for simple volume replacement or routinely for prevention of intraventricular haemorrhage.

- Cryoprecipitate should not be used routinely for nonbleeding neonates with decreased fibrinogen. It may be considered for fibrinogen <1g/L for surgery at risk of significant bleeding or to critical sites.

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

Rate 10-20 mL/kg/hr.

17. ASSOCIATED DOCUMENTS

17.1 Trust documents

- Guidelines for Red Cell Transfusion in Adults (C0162)
- Platelet Transfusion – Guideline for Practice (C0331)
- Fresh Frozen Plasma Transfusion – Guideline for Practice (C0329)
- Cryoprecipitate Transfusion – Guideline for Practice (C0330)
- Guidelines on the use of OCTAPLEX® (Prothrombin complex concentrate/PCC) for rapid reversal of warfarin in association with life threatening bleeding (C0254)
- Policy for the use of Cytomegalovirus (CMV) Negative Blood Products (C0661)
- Policy on Consent to Treatment (C0412)
- Policy for Treatment of Jehovah's Witnesses (C0413)
- Policy on Advance Decisions (C0370)
- Policy for the use of irradiated blood components (C0662)
- Policy for training and competency assessment of staff involved in transfusion (C0175)
- Guideline for Management of Major Haemorrhage (C0185)
- Intravenous (IV) drug administration: policy and assessment for clinicians (C0019)
- Peripheral Cannulation for Adult and Paediatric Patients: Guideline and Assessment for Clinicians (C0022)
- Policy for the authorisation of Blood Components by Non-medical Practitioners (C1081)
- Human Albumin Solution Infusion Guideline (C0659)
- Emergency Blood Stock Management Procedure (C0186)
- Guidelines for the Management of Anticoagulant Reversal in Adults (C0161)

17.2 References

British Society for Haematology (BSH) (2016) Guidelines on transfusion for fetuses, neonates and older children. Available at: http://www.b-s-h.org.uk/guidelines/guidelines/transfusion-for-fetuses-neonates-and-older-children [Accessed 29/10/24].

British Society for Haematology (BSH) (2023) Guideline on the investigation and management of acute transfusion reactions. Available: https://doi.org/10.1111/bjh.18789

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NHSBT Portfolio of Blood Components and Guidance for Their Clinical Use SPN223 Version 12
SPN2233/12- NHSBT Portfolio of Blood components and guidance for their clinical use [Accessed 18/02/25]

SaBTO (Advisory committee on the Safety of Blood Tissues & Organs (2012) Position statement:- Cytomegalovirus tested blood components Available at: http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_133086.pdf [Accessed 29/10/24].

Serious Hazards of Transfusion *Annual Report*
Available at: http://www.shotuk.org [Accessed 29/10/24].

18. MONITORING COMPLIANCE

Document Section		Control	Checks to be carried out to confirm compliance with the policy	How often the check will be carried out	Responsible for carrying out the check	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting
Page	**Section**	**WHAT?**	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	10	Process for requesting and testing samples for pre-transfusion compatibility testing	Review of transfusion adverse events / laboratory error log including labelling and requesting errors	As a standing agenda item at Transfusion Operational Management Team (TOMT) meetings (1 per month)	Transfusion Operational Management Team	Hospital Transfusion Committee	3 times per year
	15	Management and reporting of transfusion adverse events / reactions	Review of adverse events reported via Datix	As a standing agenda item at Transfusion Operational Management Team (TOMT) meetings (1	Transfusion Operational Management Team	Hospital Transfusion Committee	3 times per year

				per month). Significant incidents taken to Hospital Transfusion Committee meetings.			
	12 and 13.8	Maintaining traceability records for units, as required by the Blood Safety and Quality Regulations (2005)	Review of traceability tag return and adherence to BloodTrack procedures	12 times a year (monthly)	Transfusion Practitioners	Hospital Transfusion Committee	3 times per year
	13	Care given to patients having a transfusion	Check of care plan and prescription completion to ensure all relevant sections are completed.	Random spot check – at least 5 per month	Transfusion Practitioners	Hospital Transfusion Committee	3 times per year

APPENDIX A: DEFINITIONS OF TERMS

Blood product - Any therapeutic substance prepared from human blood.

Blood component - Red cells, Platelets, Fresh frozen plasma, Cryoprecipitate

Plasma derivative - proteins prepared from large pools of human plasma under pharmaceutical manufacturing conditions, e.g. coagulation factors, immunoglobulin, human albumin solution.

SHOT - Serious Hazards of Transfusion reporting system.

MHRA - Medicines and Healthcare products Regulatory Authority –agency with responsibility for standards of safety, quality and performance

SABRE - Serious Adverse Blood Reactions & Events, a MHRA reporting scheme.

TOMT - Transfusion Operational Management Team comprising of the Transfusion Laboratory Manager, Transfusion Practitioner and Laboratory Senior Biomedical Scientist and Lead Consultant for Transfusion.

MGC Pathology - Management and Governance Committee, the Committee exists to provide leadership on Pathology and Pathology related issues by providing multi-disciplinary input into the operational management of Pathology driven services and to ensure appropriate standards of care delivered are assured through Clinical Governance, finance and performance mechanisms.

APPENDIX B: SHARED CARE FORM

NHS
East of England Regional Transfusion Committee

BLOOD TRANSFUSION SHARED CARE FORM: IRRADIATED / SPECIALIST BLOOD COMPONENTS & SPECIALIST TREATMENT COMMUNICATIONS DOCUMENT

Section A: To be completed by a Senior member of the Clinical Team and then sent to the Transfusion Laboratory for completion of the form.			
Affix addressograph here or complete the following details:	Referring hospital: Specialist treatment hospital:	**Transplant details:**	**Specialist requirements:**
Patient First and Family Name:	Other hospitals involved in patients care:	Donor Group:	Irradiated: Yes / No
Date of Birth:	Diagnosis:	Patient Group:	CMV Neg: Yes / No
NHS / Hospital Number:	Specialist Treatment required or received **(see overleaf*)**:	Date of transplant:	Alert added to electronic patient record Yes / No
Address	Phenotype determined prior to treatment?* Yes/No	Allogeneic transplant ☐ Autologous transplant ☐	Patient Informed of Specialist Requirements? Yes / No
	Signed:..... Print Name:..... Date: / / Contact number / Bleep:.....		

Sections B & C are ONLY to be completed by the Transfusion Laboratories

Section B: Please document below the ABO and D (where applicable) group of the blood components that the patient currently requires		
Red cells:	Platelets:	Plasma products:
Special requirements		
Historical antibodies:	RBC phenotype:	HLA / HPA platelets required: Yes / No
Current antibodies:		Washed RBCs required: Yes / No
DAT:	Other:	Washed platelets required: Yes / No
Signed: ..... Print name: ..... Date: / /		
Section C: Please document below the audit trail for receipt & transfer of data		
I confirm all special requirements requested in section A have been entered on the LIMS as requested	**Copy of completed form to be sent by secure fax or scanned copy emailed by laboratory of identifying hospital to shared care hospital laboratory**	**Confirmation of receipt by shared care hospital laboratory.** To confirm receipt & action of this form please sign, print name, and date below and fax/email back after entering information on shared care hospital LIMS
Date entered on LIMS: / / Signed: ..... Print name:	Date Fax / email sent: / / Signed: ..... Print name: ..... Lab email:.....	Date entered on LIMS: / / Signed: ..... Print name: .....

V7.1 ratified by the East of England RTC 17.06.2021 reviewed 12.03.2024

BLOOD TRANSFUSION SHARED CARE FORM: IRRADIATED / SPECIALIST BLOOD COMPONENTS & SPECIALIST TREATMENT COMMUNICATIONS DOCUMENT

Irradiated blood components

Indication	Duration of requirement
Patients receiving transfusions from a first- or second-degree relative	For each transfusion episode
For intrauterine transfusions (IUT) and neonatal exchange blood transfusions (EBT) For neonatal top-up transfusions of red cells and platelets following IUT	Until 6 months post expected delivery date (40 weeks gestation)
Patients with known or suspected severe congenital T-lymphocyte immunodeficiency syndromes, such as DiGeorge or CHARGE syndrome	Once a diagnosis of severe T-lymphocyte immunodeficiency has been suspected, irradiated components should be given while further diagnostic tests are undertaken
Recipients of allogeneic haemopoietic stem cell transplantation (HSCT) If chronic GvHD is present or the patient is taking immunosuppressants	From the start of conditioning therapy until all the following criteria is met: 1. >6 months post-transplant, 2. Lymphocyte count is >1.0 x 10^9/l, 3. Patient is free of active chronic GvHD and 4. Patient is off all immunosuppression Indefinitely
BMT/PBSCT donors (for allogeneic transplantation)	For 7 days prior to and during the harvest
Recipients of autologous stem cell transplantation (ASCT)	For 7 days prior to and during the harvest From the start of conditioning therapy until 3 months post-transplant (6 months if total body irradiation was used in conditioning)
Patients with Hodgkin lymphoma, at any stage of the disease	Indefinitely
Patients receiving, or who have previously received, purine analogues (e.g. fludarabine, cladrabine, bendamustine and pentostatin)	Indefinitely
Patients with a haematological diagnosis receiving alemtuzumab Patients with aplastic anaemia receiving ATG or alemtuzumab Patients with rare types of immune dysfunction conditions receiving ATG	Indefinitely
CAR-T cell treatment including peripheral blood lymphocyte collection and infusion	For 7 days prior to and during the harvest and until 3 months post-infusion

Cytomegalovirus (CMV) negative blood components

Indication	Duration of requirement
IUT and neonates	Up to 28 days post expected delivery date
Elective transfusions during pregnancy	Where possible for duration of pregnancy (not during labour or delivery)

Notes on completion of form overleaf:

- Under 'Specialist treatment required or received' please give details of treatment resulting in need for special requirements
- Under 'Specialist requirements' please circle yes or no
- If a patient's requirements change, please complete another form

Information on irradiated products derived from BSH Guidelines on the use of irradiated blood components, 2020 . Information on CMV negative components from SaBTO.

***Monoclonal antibody therapy:**

Patients with relapsed or refractory multiple myeloma (MM), relapsed or refractory acute myloid leukaemia (AML) or myelodysplastic syndrome MDS) may be treated with monoclonal antibody therapies, currently **Daratumumab** (Darzalex), **Isatuximab** (both anti-CD38) and **CAMELLIA** (anti-CD47). However, these therapies have the potential to interfere with serological investigations and compatability testing in blood banks. Where possible, the patient's extended phenotype should be tested prior to the commencement of therapy and transfusion laboratories **must** be notified of patients receiving these treatments, including finish dates, as interference can last for up to 6 months after the last infusion.

V7.1 ratified by the East of England RTC 17.06.2021 reviewed 12.03.2024

APPENDIX C: COMPATIBILITY OF BLOOD PRODUCTS

Transfusion Compatibility

When performing the pre-transfusion bedside check, it is good practice to check that the component issued is compatible with your patient's blood group. The BloodTrack and Laboratory IT systems have inbuilt safety mechanisms to help ensure that compatible blood is issued but it is always worth another check.

If the laboratory have to manually issue a component that is of a different ABO or RhD group to your patient's group, but is compatible to your patient, they will note this on the paperwork.

The table below will assist you in checking compatibility, but if you have any concerns or questions please contact the Transfusion Laboratory for advice.

PCH Lab ext. 8541 (bleep 1151 out of hours)

Hinchingbrooke Lab ext. 6157 (bleep 1257 out of hours)

Patient ABO/RhD Group	Compatible **Red Cells** – in order of preference	Compatible **Fresh Frozen Plasma /Octaplas /Cryoprecipitate** – in order of preference	Compatible **Platelets** – in order of preference
Unknown	O	AB, A, B	AB, A, B, O
O	O	O, A, B, AB	O, A, B, AB
A	A, O	A, AB, B	A, AB, B, O
B	B, O	B, AB, A	B, AB, A, O
AB	AB, A, B, O	AB, A, B	AB, A, B, O
RhD Positive	Positive or Negative	RhD group not applicable	Positive or Negative
RhD Negative*	Negative*	RhD group not applicable	Negative*

*Please remember that RhD positive red cells and platelets may be issued to RhD negative women over 50 years and adult males according to availability and urgency of transfusion. Ask transfusion for further advice.

Only patients who are group O may have group O FFP/Octaplas/Cryoprecipitate

APPENDIX D: GIVING SETS AND ADMINISTRATION RATES

Component	Giving set to be used	Suggested Infusion Rate *(depending on the volume to be given and the clinical status of the patient)*	Comment
Red Cells	Blood giving set (170–200 micron filter)	**Adults** 2-3 hours per unit (more rapidly in severe haemorrhage) **Paediatrics** 5ml/kg/hr (usual max rate 150ml/hr)	• Either gravity or infusion pumps may be used. • Infusion pumps should only be used if the manufacturer verifies them as safe for that purpose. • The transfusion must be completed **no more than 4 hours** removal from the Blood Bank. • In neonatal transfusion, if a syringe driver is used for administration, an appropriate filter must be incorporated.
Platelets	Blood giving set (170–200 micron filter)	**Adults** 30 minutes per unit **Paediatrics** 10-20ml/kg/hr	• Use a new giving set for each unit of platelets • Use immediately after collection. **Do not refrigerate** • In neonatal transfusion, if a syringe driver is used for administration, an appropriate filter must be incorporated.
FFP (Fresh Frozen Plasma)	Blood giving set (170–200 micron filter)	**Adults** 30 minutes **Paediatrics** 10-20ml/kg/hr	• Once thawed, FFP must not be re-frozen and should be transfused as soon as possible as post-thaw storage will result in a decline in the content of labile coagulation factors. • In neonatal transfusion, if a syringe driver is used for administration, an appropriate filter must be incorporated.
Cryoprecipitate	Blood giving set (170–200 micron filter)	**Adults** as prescribed (rapid infusion may increase risk of acute reaction) **Paediatrics** 10-20ml/kg/hr	• Use immediately after collection from blood bank. **Do not refrigerate** • In neonatal transfusion, if a syringe driver is used for administration, an appropriate filter must be incorporated.
Human Albumin Solution (HAS)	Standard IV giving set	As prescribed	Using a vented giving set will allow the fluid to flow out of the glass bottle
Granulocytes	Blood giving set (170–200 micron filter)	As prescribed by Consultant Haematologist	Whole dose should be infused over 1-2 hours
Prothrombin Complex Concentrate (PCC) e.g. Octaplex	Please refer to the Guidelines for administration of Octaplex PCC (C0254) on the intranet		
	For advice on giving other products (e.g.: Anti D or individual clotting factors) please refer to the relevant policy or product information insert		

APPENDIX E: GUIDANCE ON CONSENT

Consent for Blood Transfusion
Guidance for Healthcare Practitioners in the UK

Informed consent discussion

This is a generic list covering the SaBTO guidance recommendations – discussions should cover what is important to individual patients.

☐ BENEFITS

Red cells: Relieve symptoms of anaemia;
Prevent complications of anaemia (tissue ischaemia, organ damage);
Earlier mobilisation/ quicker recovery after illness or surgery

Platelets/plasma: Stop or prevent bleeding

☐ RISKS and actual or potential consequences

- Wrong blood/wrong patient
- Febrile non-haemolytic reaction
- Allergic reaction
- Pulmonary complications:
  - Transfusion-Associated Circulatory Overload (TACO)
  - Transfusion-Related Acute Lung Injury (TRALI)
- Haemolytic Transfusion Reaction - acute or delayed
- Transfusion Transmitted Infection - bacterial, viral, other
- Antibody formation
- Iron overload
- Other complications
- The patient can no longer donate blood

See reverse for explanation of these risks

☐ ALTERNATIVES as relevant/appropriate to the clinical situation

Red cells: IV/Oral iron; Other haematinic replacement (B_{12}, folate); Erythropoietin; Cell salvage (surgery)

Plasma: Factor concentrates if applicable

Platelets: Tranexamic acid

☐ INFORMED PATIENT

Provide patient information sheets, allow time to read and an opportunity to ask questions. There may be particular considerations to take into account for specific patient groups, such as paediatrics, multi-transfused, etc.

☐ CONSENT (or REFUSAL)

Document your discussion and outcome in the patient's care records. If the patient refuses the proposed treatment (transfusion), try to explore why; contact a transfusion expert if required. Ensure the patient understands the possible consequences of declining the transfusion; ensure any Advanced Directive is applicable and valid.

Developed on behalf of the United Kingdom and Ireland Blood Transfusion Network (UK&IBTN); Version 1, October 2022

Wrong blood/wrong patient – where a patient is transfused with a blood component of an incorrect blood group, or which was intended for another patient. This could potentially lead to an ABO incompatible transfusion, which could be fatal.
Frequency: Very Rare (< 1/10,000) thanks to safety checks at all stages in the transfusion process.
Reducing the risk: All staff involved in transfusion should be appropriately trained; they will only be involved in one transfusion at a time; they will undertake essential patient identification checks at each stage of the transfusion process (includes taking a blood sample, authorisation and administration). The patient should expect to be asked their full name and date of birth at the least, and has a right to ask if this does not happen. Safety checks built into laboratory IT systems ensure the patient's current sample is consistent with their previous blood group results and help prevent an incorrect unit being issued.

Febrile non-haemolytic reaction is characterised by a rise in temperature and/or other inflammatory symptoms such as rigors, myalgia or nausea. In some cases they may require medical intervention. The cause is not fully understood, but may be due to residual white cells in the unit or cytokines built up during storage. Usually a reaction to a specific unit of blood component, it is difficult to mitigate against and often unpredictable.
Frequency: *Mild:* Common (≥1/100 to <1/10), *Moderate & Severe:* Rare (≥1/10,000 to <1/1,000).
Reducing the risk: Since the introduction of leucodepleted blood components febrile reactions have become less common. Transfusing over a longer period or temporarily stopping the transfusion and/or giving paracetamol may help. Only a small proportion of patients will experience recurrent febrile reactions. In such cases, giving prophylactic paracetamol may reduce the incidence.

Allergic reaction to plasma proteins in the donor unit (often against a specific donor); difficult to avoid and usually unpredictable. Range from mild to severe (including anaphylaxis), with symptoms including flushing, urticaria or rash, wheeze, bronchospasm, stridor, angiodema and circulatory problems (not typically associated with fever type symptoms).
Frequency: *Mild:* Common (≥1/100 to <1/10), *Moderate & Severe:* Rare (≥1/10,000 to <1/1,000).
Reducing the risk: A small number of people may have recurrent allergic reaction to transfusion. Measures to mitigate this include use of platelets in additive solution, prophylactic antihistamine, 'washed' red cells, solvent-detergent treated plasma. Treatment as per local protocol (using antihistamine, adrenaline or steroids as indicated).

Transfusion-Associated Circulatory Overload (TACO) – pulmonary oedema/ respiratory compromise due to volume overload - develops within 12 hours of transfusion. Can occur after transfusion of relatively small volumes if there are patient risk factors.
Frequency: Rare (≥1/10,000 to <1/1,000), however it is thought to be under-reported. Leading cause of morbidity & mortality related to transfusion.
Reducing the risk: Ideally all patients (particularly those >50 years) should have a TACO risk assessment before transfusion. Mitigating measures include prescribing by volume (mL) rather than in units **[essential in neonatal/paediatric patients]**, use of diuretics, transfusing slowly with closer monitoring.

Transfusion-Related Acute Lung Injury (TRALI) – acute dyspnoea and pulmonary infiltrates developing within 6 hours of transfusion, in the absence of circulatory overload or other causes. May be due to antibodies in the donor which react against recipient white blood cells.
Frequency: Very Rare (<1/10,000). Most cases reported are in patients already unwell with a pre-existing inflammatory insult (e.g. sepsis, trauma).
Reducing the risk: As anti-leucocyte antibodies are most likely to form following pregnancy, plasma components (FFP, cryoprecipitate) in the UK are only sourced from male donors. Female platelet donors are screened for these antibodies.

Haemolytic Transfusion Reaction (HTR) occurs when antibodies in the patient's plasma react with antigens on transfused allogeneic red blood cells, causing haemolysis. HTR occurring during, or within 24 hours of, transfusion is classed as *acute*; a *delayed* HTR can occur days to weeks after the transfusion. Symptoms include fever, rigors, chills, hypotension, pain, dyspnoea, tachycardia, nausea, or restlessness; acute HTR can be life-threatening.
Frequency: Rare (≥1/10,000 to < 1/1,000). Patients with haemoglobinopathies are at a higher risk of HTR.
Reducing the risk: Patients are encouraged to report any unusual sensation experienced during or after their transfusion; they should also be discharged with information about signs/symptoms to look out for and who to contact. Historical antibodies should be clearly documented in clinical notes and transfusion records including the transfusion laboratory information system, and compatible blood should issued.

Transfusion Transmitted Infection – an infection following a transfusion, where there was none before and no alternative source of infection, and at least one component transfused came from a donor with the same transmissible infection, or was shown to contain the agent of infection. Transfusion-Transmitted Infection (TTI) may be bacterial, viral, or other such as prions, protozoa and filaria.
Frequency: Variable depending on type of infection but most are Extremely Rare (<1/1,000,000). In the last 10 years, between 0-5 TTIs have been confirmed each year, in the context of over 2 million units of blood components issued per year from the UK blood services to hospitals.
Reducing the risk: *Bacterial:* visual inspection of component for contamination at issue and at administration, administration using aseptic non-touch technique, temperature-controlled storage, adherence to expiry date and time, bacterial monitoring (for platelets). *Viral:* donor health check, screening of donations: HIV, HBV, HCV, Syphilis, HTLV, HEV; not all blood components have been screened for cytomegalovirus (CMV): if your patient requires CMV negative components, make sure this is identified on the blood request, transfusion instruction, and patient's records.

Antibody formation – atypical antibodies can form when the patient's immune system has been exposed to blood group antigens that they do not have themselves. This can happen following a blood transfusion or a pregnancy. Consequences: clinical significance varies from insignificant to harmful if a patient is subsequently transfused with red cells (or platelets) that have the corresponding antigen; can lead to delays in providing suitable blood components; in people of childbearing potential, can cause complications with future pregnancies (potentially causing HDFN).
Frequency: Common (≥1/100 to <1/10). [HDFN - haemolytic disease of the fetus and newborn]
Reducing the risk: People of childbearing potential are routinely transfused D-negative and K-negative red cells if they lack these antigens (as anti-D and anti-K antibodies are most likely to cause HDFN). Additional testing is done on patients who need to go on to long term transfusion programmes.
Avoiding unnecessary transfusion is the best way to reduce chances of antibody formation.

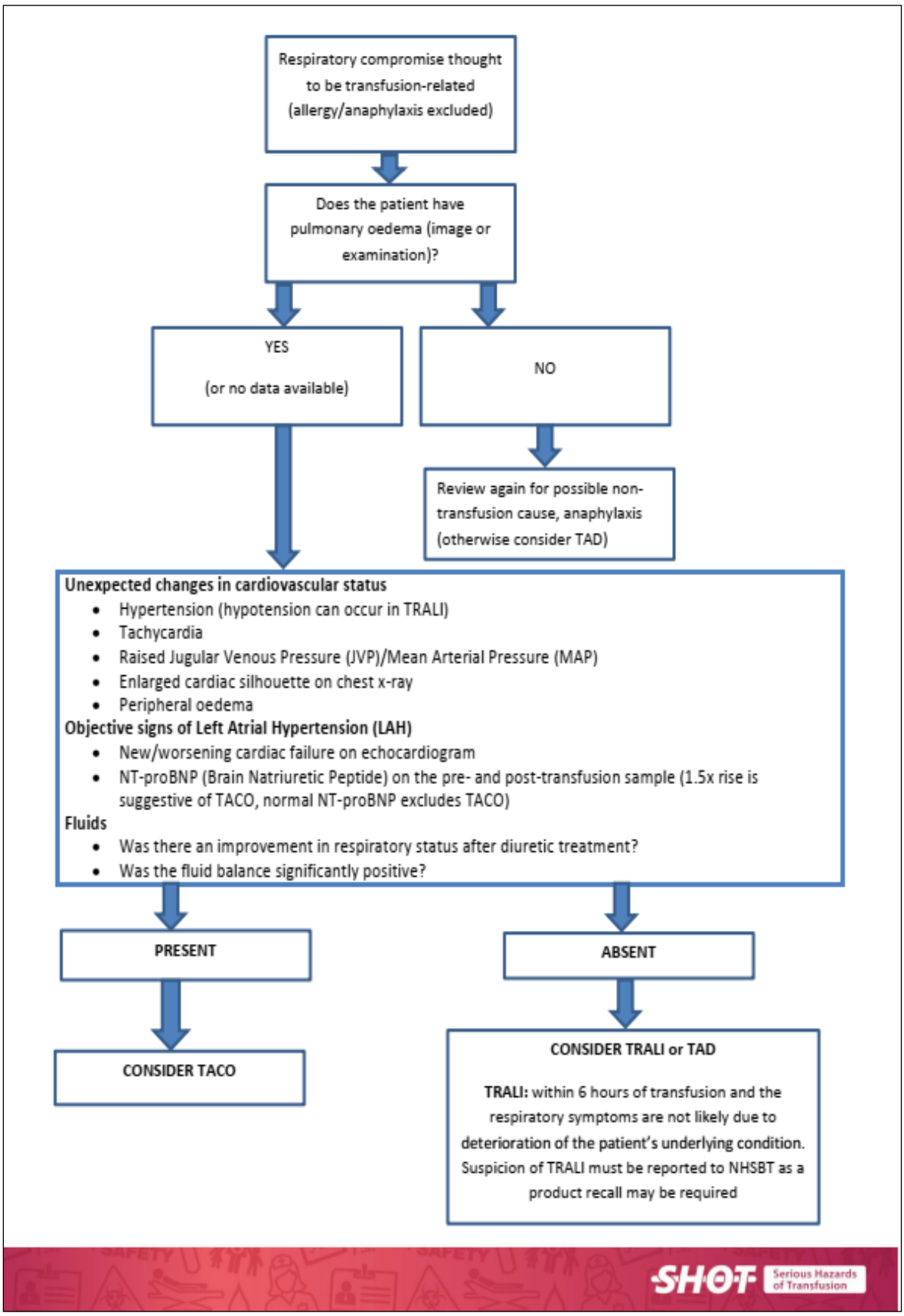
Iron overload – non-bleeding patients who receive multiple units of red cells (>10) are at risk of having excess iron stored in their body tissues leading to iron toxicity. This can damage organs such as the heart and liver. Each unit of red cells contains about 200-250 mg of iron.
Frequency: Very Common if repeatedly transfused (≥1/10).
Reducing the risk: Patients on long term red cell transfusion plans should be considered for iron chelation therapy, plus regular iron studies performed.

Other complications

Transfusion-Associated Necrotising Enterocolitis (TANEC) – necrotising enterocolitis (a serious neonatal gastrointestinal condition associated with significant morbidity and mortality) occurring within 48 hours of a blood transfusion.
Frequency: Not known; some clinicians do not believe the cause of the NEC is transfusion, but instead that it is related to the hypoxia of tissues in the gut due to anaemia; however SHOT state that it appears to be under-reported.
Reducing the risk: Some clinicians advocate withholding enteral feeds to neonates for a period of time prior to, during & after transfusion.
Transfusion-Associated Graft versus Host Disease (TA-GvHD) – engraftment and clonal expansion of viable donor lymphocytes in a susceptible host, characterised by fever, rash, liver dysfunction, diarrhoea, pancytopenia and bone marrow hypoplasia occurring less than 30 daysafter transfusion.
Frequency: Very Rare (<1/10,000).
Reducing the risk: In most cases TA-GvHD is fatal. Irradiation of cellular blood components (red cells, platelets, granulocytes) greatly reduces occurrence - if your patient might be at risk of TA-GvHD you must ensure the need for irradiated blood components is clearly communicated. Since 1999 all allogeneic blood components produced in the UK have been leucodepleted, with very few stated exceptions (e.g. granulocytes). No cases of TA-GvHD have been reported in patients receiving leucodepleted components. However, as it cannot be assured that leucodepletion is fully protective, irradiation is still required.
Unknown risks – there is an established network in the UK which continually collates and analyses reports of adverse reactions and events related to transfusion (the SHOT haemovigilance system). This enables any new emerging safety concerns or trends to be identified and addressed promptly.

APPENDIX F: PULMONARY COMPLICATIONS OF TRANSFUSION

(Acknowledgment to Serious Hazards of Transfusion SHOT 2019)



APPENDIX G: QR LINKS TO RESOURCES

APPENDIX H: EQUALITY AND FREEDOM TO SPEAK UP IMPACT ASSESSMENT (EQFSUIA)

The Equality and Freedom to Speak Up Impact Assessment (EFSUIA) process is a key function to identify and mitigate inequality in policies and processes adopted by the organisation.

The Trust has introduced an automated system that is simple to use and utilises co-production where issues cannot be easily resolved.

All policies and processes agreed by formal committee must include an EqFSUIA form which is completed by the author or process lead, this enables a rapid identification of inequality. If no significant inequalities are identified in the **Stage 1** process, this is the end of the EqFSUIA process. If unsure about the likelihood and limitations please see example table Stage 1 – Equality and Freedom to Speak Up Matrix Key and Examples.

If moderate or greater inequalities (*highlighted in yellow, amber or red in the **Stage 2 Matrix Calculation Example table***) are identified the EqFSUIA will automatically calculate and initiate a Stage 2 advance impact assessment, creating a work programme to reduce the inequality to its minimum level.

- Stage 1 follow the link and answer the assessment questions
- You will receive an email showing the generated score in numbers
- If the individual scores are below 7 – place the generated numbers into the Stage 1 assessment and copy/paste into your document. No further action required
- If any individual generated score is 7 and above for a characteristic an advanced impact assessment will be initiated.
- Follow the Stage 2 Process Mapping
- Use the Stage 2 Action Plan to record how the inequalities will be implemented and the dates of completion.

Please refer to the EqFSUIA Toolkit and Process for more detailed information.

In many cases, a discussion with the Equality, Diversity, Inclusion and Armed Forces team and/or the Freedom to Speak Up Guardian will provide an immediate solution, enabling the EqFSUIA to be resubmitted with no further action required.

Contact: Equality, Diversity, Inclusion and Armed Forces Team
Telephone 01733 673436 or 678089
Email: nwangliaft.edi@nhs.net

Contact: Freedom to Speak Up Guardian, Sally Mumford
Telephone 01733 678026 or 075171 32592
Email: sally.mumford1@nhs.net

In a few cases, where inequalities cannot be solved by revising the document, an Advanced EqFSUIA should be introduced.

The Equality Impact Assessment Stage 2 (*see Stage 2 Matrix Calculation Example table*) uses a matrix to identify the level of detriment the inequality will have upon the affected protected groups and guide the author to the level of action needed as a result. The process includes the forming of co-production groups to develop solutions to the inequality and a means by which unsolvable inequalities can be reviewed periodically if no solution becomes available.

APPENDIX I: EQUALITY AND FREEDOM TO SPEAK UP IMPACT ASSESSMENT STAGE 1

Indicate in the table below what kind of impact this policy will have upon the protected groups or how it is likely to influence the Trust's ability to comply with the Public Sector Equality Duty, which is to;

a) Eliminate discrimination, victimisation, harassment or other unlawful conduct that is prohibited under the Equality Act 2010 and/or;
b) Advance equality of opportunity between people who share a characteristic and those who do not and/or;
c) Foster good relations between people who share a relevant protected characteristic and those who do not.

Consider this in the context of the whole policy being updated. The easiest means of approaching this is to consider the following questions;

- **Would the adaptation meet my needs or ensure I had equal opportunities if I had any of the protected characteristics?**
- **Is there anything about the policy that would have a detrimental impact on me if I had one of the protected characteristics?**
- **Does it affect our ability to comply with the Public Sector Equality Duty?**

Please check the appropriate boxes relating to the impact of the policy or adaption:

Age	○ Positive	◉ None	○ Negative	○ Unknown
Disability	○ Positive	◉ None	○ Negative	○ Unknown
Gender Reassignment	○ Positive	◉ None	○ Negative	○ Unknown
Marriage/Civil Partnership	○ Positive	◉ None	○ Negative	○ Unknown
Pregnancy and Maternity	○ Positive	◉ None	○ Negative	○ Unknown
Race	○ Positive	◉ None	○ Negative	○ Unknown
Religion or Belief	○ Positive	◉ None	○ Negative	○ Unknown
Sex (Gender)	○ Positive	◉ None	○ Negative	○ Unknown
Sexual Orientation	○ Positive	◉ None	○ Negative	○ Unknown

If any boxes are checked as Negative, please escalate to a stage 2 assessment by emailing nwangliaft.qualitygovernance@nhs.net or nwangliaft.corporategovernance@nhs.net

If any boxes are checked as Unknown, please contact nwangliaft.edi@nhs.net

APPENDIX J: PHARMACY QUALITY ASSURANCE CHECKLIST

Pharmacy Quality Assurance Checklist for all Medicine-Related Clinical Policies, Procedures and Guidelines

This form must be completed by the appropriate designated pharmacist for all policies, procedures and guidelines relating to medicines prior to being submitted to the Drugs and Therapeutics Committee.

Title of Document:			**Central Index Number:**
1.	**Document particulars:**	**Yes / No / N/A**	**Comments (as necessary)**
	Is the document written in clear, unambiguous language?		
	Does the document also apply for Hinchingbrooke Hospital/ Peterborough City Hospital/ Stamford Hospital?		
	If the answer to the above question is YES, has the relevant pharmacist at the cross site location been contacted for their input? **(Please indicate name of person contacted in comments)**		
2.	**Evidence Based**		
	Are the product(s) on the Formulary? If non-formulary then please submit Formulary request/Business case.		
	Have indications been clearly reviewed?		
	Are the medicines, hospital supply only?		
	Have doses of medication been clearly reviewed?		
	Are definitions in the document clearly explained?		
	Are roles and responsibilities in the document clearly explained?		
	Are the products listed in the document licensed, unlicensed or off license? If unlicensed then please complete unlicensed form.		
	Are there any Patient Safety Alerts/MHRA Alerts/NICE guidance associated with the document?		
	Is there any specific ordering or storage requirements with the product(s) in the document?		
	Are there any cost implications with the product(s) in the document?		
	Is there any supporting evidence to support the document? **(References should be checked and updated)**		
	Are there measurable standards to support the monitoring of compliance? **(Audit table applicable to policies only)**		
3.	**Pharmacist Compliance Approval:**		
	Name:		
	Signature:		
	Role:		
	Date:		

Please return completed form to the Pharmacy Medicines Governance Team.

Pharmacy Medicines Governance – updated December 2022

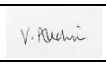
APPENDIX K: QUALITY ASSURANCE CHECKLIST

CORPORATE GOVERNANCE COMPLIANCE OFFICER'S USE ONLY

		Y/N/ n/a	COMMENTS (to author for any amendments)
1	**Title of the document**		
	Is the title clear and unambiguous	Y	
2	**Type of document (e.g. policy, guidance)**		
	Is it clear whether the document is a policy, guideline, procedure?	Y	
3	**Introduction**		
	Are reasons for the development of the document clearly stated?	Y	
4	**Content**		
	Are all sections of the front cover completed correctly?	Y	
	Is the document in the correct Trust approved format?	Y	
	• Paragraphs numbered consecutively	Y	
	• Headers: only on front page to contain logo	Y	
	• Footers: on every page except front page	Y	
	Has the Author's Checklist been fully updated?	Y	
	Are the Version numbers correct in the title, summary and the footers?	Y	
	Has the Version Control Summary been fully updated with changes?	Y	
	Has the Document Contributors section been completed?	Y	
	Is the introduction of the document clear?	Y	
	Are the objectives/aims clearly stated?	Y	
	Are the duties, roles and responsibilities clearly explained? **(policies only)**	Y	
	Are the definitions of terms clearly explained?	Y	
	Have recommendations from Counter Fraud/Internal Audit been included? **(policies only)**	N/A	
	Does this document concern the handling, moving or storage of personal identifiable or commercially sensitive information? If yes, has a Summary Privacy Impact Assessment been completed?	N/A	
5	**Evidence Base**		
	Is the type of evidence to support the document explicitly identified?	Y	
	Are associated documents referenced?	Y	
6	**Monitoring Compliance and Effectiveness (policies only)**		
	Has section 'Compliance Monitoring' been completed?	Y	
7	**Equality and Diversity (policies only)**		
	Is the Equality Impact Assessment completed?	Y	
8	**Approval Route**		
	Has email approval been received for change of review date only?	N/A	
	Does the document identify which committee(s)/group(s) will approve it?	Y	
	Does the document meet the criteria for Second Level approval or Information Only?	Y	Full approval

If answers to any of the above questions is 'no', then this document is not ready for approval, it needs further review.

It is vitally important that documents are forwarded to the Corporate Governance Team after every amendment and approval meeting to ensure the most up-to-date version is held by the team at all times.

COMPLIANCE TEAM:		
1.	Date Comments returned to author by Compliance Lead	
2.	Date of Compliance Team approval	02.04.2025
3.	Name of Compliance Lead	Viv Allchin 

Please do not delete any of the below approval sections.
If certain sections are not applicable to the document's journey please enter 'N/A'

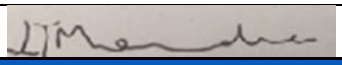
SPECIALTY APPROVAL MEETING: Pathology MGC

On approval, Chair to sign below and send the document and the minutes from the approval committee to the Corporate Governance Compliance Team. **To aid distribution all documentation should use electronic signatures and be sent electronically wherever possible.**

Chair's Name	Ashraf Ibrahim – Chair's Action	**Date**	30/06/2025
Signature	ASHRAF IBRAHIM		

CBU APPROVAL MEETING: Hospital Transfusion Committee

On approval, Chair to sign below and send the document and the minutes from the approval committee to the Corporate Governance Compliance Team. **To aid distribution all documentation should use electronic signatures and be sent electronically wherever possible.**

Chair's Name	Dr Lynda Menadue	**Date**	30/06/2025
Signature			

ADDITIONAL APPROVAL MEETINGS: Complete all that apply

On approval, Chair to sign below and send the document and the minutes from the approval committee to the Corporate Governance Compliance Team. **To aid distribution all documentation should use electronic signatures and be sent electronically wherever possible.**

Select Meeting.		Select Meeting.	
Chair's Name		**Chair's Name**	
Date	Enter date	**Date**	Enter date
Signature		**Signature**	

Select Meeting.		Select Meeting.	
Chair's Name		**Chair's Name**	
Date	Enter date	**Date**	Enter date
Signature		**Signature**	

FIRST-LEVEL APPROVAL: FISS Divisional Management Board

On approval, Chair to sign below and send the document and the minutes from the approval committee to the Corporate Governance Compliance Team. **To aid distribution all documentation should use electronic signatures and be sent electronically wherever possible.**

Chair's Name	James Hender – Chair's Action	**Date**	10/07/2025
Signature	JAMES HENDER		

Please confirm if document requires Second-Level **approval** or it is to be submitted for **information only**. Please see section 6.4 of the Trust's Document Control Policy.	✓ **APPROVAL** ☐ **INFORMATION ONLY**

SECOND-LEVEL APPROVAL: Quality Governance Oversight Committee

On approval, Chair to sign below and send the document and the minutes from the approval committee to the Corporate Governance Compliance Team. **To aid distribution all documentation should use electronic signatures and be sent electronically wherever possible.**

Chair's Name	Aber Eaqub	**Date**	10/07/2025
Signature