

## Blood [Red Cells (RC)] ~ Clinical use

Subject:	Blood, red cells – clinical use
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Designation of Author:	Transfusion Laboratory Manager
Name of Assurance Committee:	Hospital Transfusion Committee
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Target Audience:	All clinical staff involved in the prescription of blood (Red Cells)
Key Words:	Blood, red cells

Version Control Sheet

<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Status</b>	<b>Comment</b>
2.0	Nov 2009	J Dalton, Transfusion Laboratory Manager	OFF LINE	Approved at Hospital Transfusion Committee
3.0	July 2015	S Marston (Transfusion Laboratory Manager) A Thomas (Haematology Registrar)	LIVE	Reviewed with minor amendments

## ➤ **Criteria for use**

For use by clinicians that are responsible for patients who require red cell transfusions owing to haemorrhage or anaemia.

## ➤ **Background/ introduction**

This document sets out the Red Cell (**RC**) requirements in different clinical situations. However, there is the need to recognise that deviations will occur from time to time based on the clinical requirements of the patient.

**NB: Requests that are outside of these guidelines will be referred to the consultant haematologist for guidance on clinical management of the patient.**

Adherence to these guidelines ensures appropriate requesting and transfusion and also helps reduce unnecessary workload. This creates a more efficient and effective service by allowing the laboratory to concentrate on those patients with the greatest need.

**RCs are indicated** for the treatment of haemorrhage and anaemia.

**Risks** associated with **RC** transfusion include transmission of pathogens, allergic reactions, transfusion associated circulatory overload, anaphylaxis and transfusion related acute lung injury. The patient should be informed about possible complications of transfusion, and the importance of reporting any adverse effects.

### **Potential risks of transfusion:**

- Viral infection: Hepatitis (B,C), HIV, HTLV, Parvovirus B19.
- Bacterial contamination
- Haemolytic transfusion reactions
- Transfusion associated circulatory overload (TACO)
- Transfusion associated acute lung injury (TRALI)
- Transfusion associated graft vs host disease

**Benefits** include reducing morbidity/mortality resulting from bleeding and anaemia.

## Contents:

1. Inclusion / exclusion criteria
2. Storage of Red Cells
3. Dosage and rate of transfusion
4. Response to red cell transfusion
5. ABO and Rh (D) compatibility
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### ➤ 1. Inclusion / exclusion criteria

**It is strongly recommended by the Serious Hazards of Transfusion (SHOT) report that transfusions overnight are avoided wherever possible. This is to circumvent the increased risk of transfusion error during this period.**

The codes R1 to R7, used below, are the recommended national shorthand that are planned to be used on request forms and laboratory information systems to aid requesting and local, regional and national audit.

#### **See Appendix 1 - Algorithm for the use of Red Cells in an Adult**

##### **A. Acute blood loss. (R1)**

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

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

##### **B. Peri-operative transfusion**

- Manage patient so that transfusion is avoided wherever possible.
- Pre-operative measures are important: treat anaemia (haematinics),

- reverse anticoagulant therapy, and discontinue antiplatelet drugs.
- Use of pharmacological agents to reduce surgical bleeding.
- Consider autologous transfusion (peri-op and post-op salvage).
- Manage surgical bleeds as for acute blood loss (see A above).
- *Potential transfusion should be discussed as part of consent for surgery.*

Many patients undergoing elective surgical operations should not require transfusion support if their Hb concentration is normal before surgery.

**Assuming normovolaemia has been maintained**, the **Hb** can be used to guide the use of red cell transfusion.

**i. Hb concentration below 7g/dL (R2)** – transfusion likely

**ii. Hb concentration below 8 g/dL (R3)** – transfusion likely in a patient with known cardiovascular disease, or those with significant risk factors for cardiovascular disease (e.g. elderly patients, and those with hypertension, diabetes mellitus, peripheral vascular disease).

**C. Critical care**

Transfuse to maintain the **Hb above 7g/dL, and 8g/dL** in elderly patients and those with known cardiovascular disease (**R4**)

**D. Post-chemotherapy (R5)**

There is no evidence-base to guide practice. Most hospitals use a transfusion threshold of a **Hb of 8 or 9g/dL**.


**E. Radiotherapy (R6)**

There is little evidence-base to guide practice. Suggest transfuse to maintain Hb **above 10g/dL**.

**F. Chronic anaemia (R7)**

Transfuse to maintain the haemoglobin just above the lowest concentration, which is not associated with symptoms of anaemia. Many patients with chronic anaemia may be asymptomatic with a haemoglobin concentration **above 8g/dL**.

**G. Neonatal top up transfusion (R8)**

	<p>Please see Whittington Hospital NHS Trust Guideline: <b><i>'Neonatal Blood Transfusion'</i></b></p>
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**H. Neonatal Exchange Transfusion (R9)**



Please see Whittington Hospital NHS Trust Guideline:  
***'Neonatal Exchange Transfusion'***

## 2. Storage of Red Cells:

Red cells are only to be stored in approved blood bank refrigerators. These are calibrated, validated, continuously monitored and alarmed to ensure that Red cells are stored at the correct temperature for optimum benefit to the recipient.



Please see Whittington Hospital NHS Trust Guideline:  
***'Blood Policy ~ prescription to administration'***

## 3. Dosage and rate of RC transfusion:

Should be evidence based - monitor Hb (see A – H above).

Red Cell Haematocrit of pack ~0.7 ie 3mL/Kg will raise Hb ~1g/dL

**RC** = approximately 250 mL per pack.

In the absence of cardiovascular disease the following rates of RC transfusion apply. If in doubt, discuss with the clinical haematologist:

**RC** = 2 – 4 mL/minute (up to a maximum of 4 hours per unit)

**RC** are issued on a named patient basis. The standard products are normally held as stock items and are obtained through the blood transfusion laboratory (ext 5766).

For requesting and administration of blood components see Clinical Management Guideline:



Please see Whittington Hospital NHS Trust Guideline:  
***'Blood Policy ~ from prescription to administration'***

#### 4. Response to RC transfusions:

Monitor by assessing the effect on the clinical situation and by measuring the Hb indices after each unit transfused. This will help guide further treatment.

#### 5. ABO & Rh D compatibility for Red Cells:

##### ABO IDENTICAL UNITS SHOULD BE USED WHENEVER POSSIBLE

##### ABO Group of patient:

- O (46%) ← Must only receive group O
- A (43%) ← Receives group A, rarely may receive O
- B (8%) ← Receives group B, rarely may receive O
- AB (3%) ← Receives group AB, rarely may receive A, B or O

##### Rh D Group of patient:

- Rh D Pos (85%) ← Receives Rh D Pos, occasionally Rh D Neg
- Rh D Neg (15%) ← Receives Rh D Neg, occasionally Rh D Pos

It is acceptable to give electively Rh D positive red cells to all adult males and female patients over the age of 60 years, who have no anti-D detected in pre-transfusion testing.

##### EMERGENCY:

If there is insufficient time to group the recipient and provide ABO/Rh D identical red cells, **O Rh D negative blood** should be used until the patient's blood group has been established. **O Rh D positive can be given to all males and females >60 years.**

A switch to the patient's own ABO/Rh D group can be made once a group has been performed by the laboratory and a 2<sup>nd</sup> confirmatory blood group checked.

**NB.** Except in life threatening emergency, **Rh D Neg females of child bearing potential MUST receive Rh D Neg red cells** to prevent sensitisation that may affect any future pregnancies.

## ➤ 6. Contacts

- Clinical haematologists – bleeps, 3037, 3060
- Transfusion Practitioner – bleep 2953
- Blood transfusion laboratory – ext 5766
- Out of hours on-call haematologist – bleep 2686

## ➤ 7. References

- The clinical use of red cell transfusion: British Committee for Standards in Haematology (BCSH )
- The management of massive blood loss: BCSH
- Handbook of Transfusion Medicine: HMSO 5<sup>th</sup> edition
- Transfusion guidelines for neonates and older children: BCSH
- Compatibility testing in hospital blood banks: BCSH
- A National Blood Conservation Strategy: National Blood Transfusion Committee and National Blood Service

## ➤ 8. Compliance with this guideline

This will be audited as part of national and regional red blood cell usage audits.

Haemovigilance reporting (SHOT)

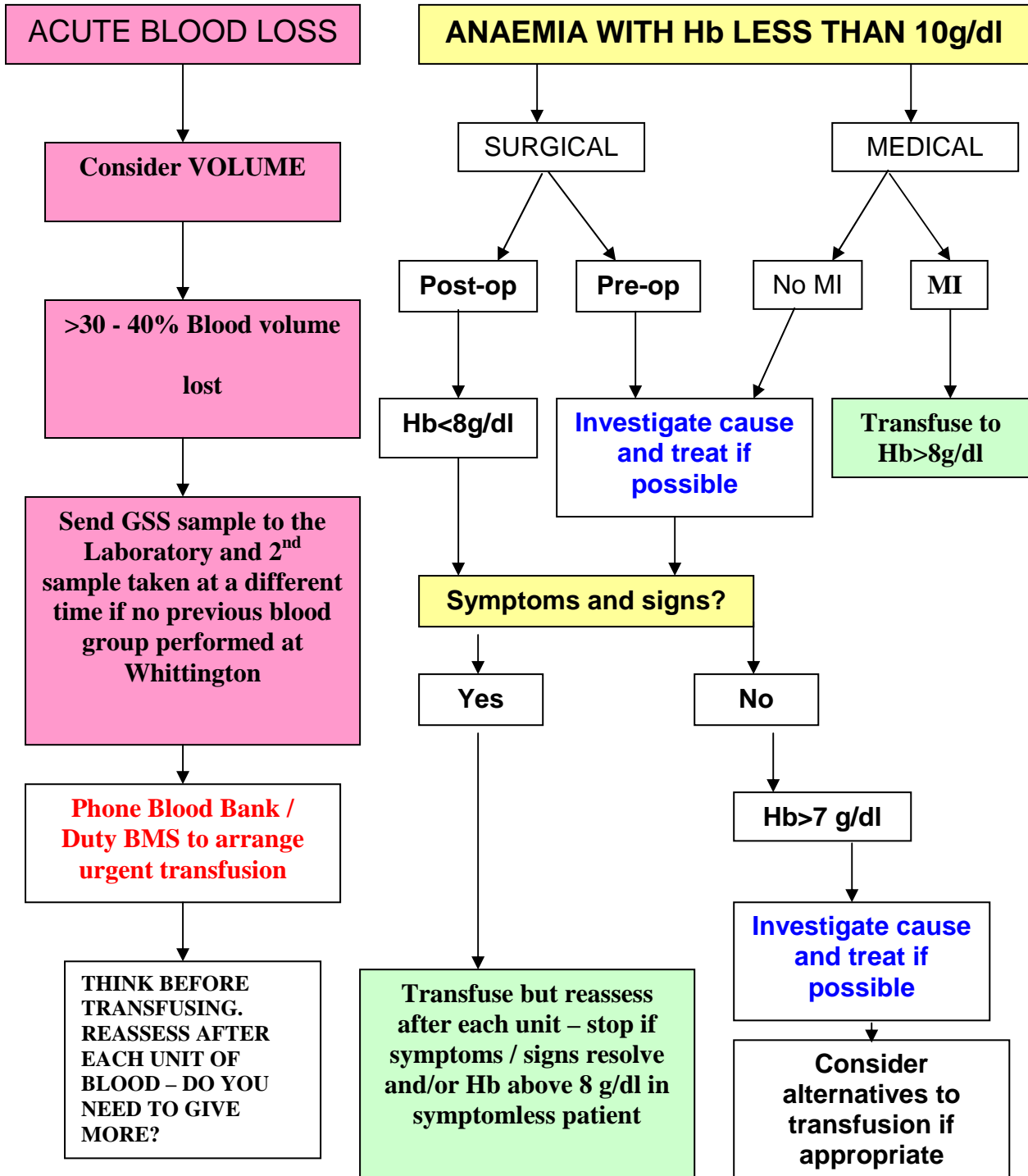
Audits as detailed by NHS Blood and Transplant (as part of National Audit Program), monitored by the Hospital Transfusion Committee.



➤ 9. Appendix 1

Algorithm for the use of Red Cells in an Adult

**GUIDELINES FOR RED CELL TRANSFUSION**



## Appendix A

### Plan for Dissemination and implementation plan of new Procedural Documents

To be completed and attached to any document which guides practice when submitted to the appropriate committee for consideration and approval.

Acknowledgement: University Hospitals of Leicester NHS Trust

<b>Title of document:</b>	<b>Blood (Red Cells) ~ clinical use</b>		
<b>Date finalised:</b>	<b>November 2009. (REVIEWED AND RE-ISSUED JULY 2015)</b>	<b>Dissemination lead: Print name and contact details</b>	
<b>Previous document already being used?</b>	<b>Yes</b>		
<b>If yes, in what format and where?</b>	<b>Trust Guideline on the intranet</b>		
<b>Proposed action to retrieve out-of-date copies of the document:</b>	<b>Electronic copy only</b>		
<b>To be disseminated to:</b>	<b>How will it be disseminated/implemen ted, who will do it and when?</b>	<b>Paper or Electronic</b>	<b>Comments</b>
<b>All hospital staff</b>	<b>Via intranet</b>		
<b>Is a training programme required?</b>	<b>Currently red cell transfusion training programme is mandatory for all medical and nursing staff involved in blood transfusion.</b>		
<b>Who is responsible for the training programme?</b>			

## Appendix B

### Equality Impact Assessment Tool

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval.

<b>Impact (= relevance)</b> 1 Low 2 Medium 3 High	<b>Evidence for impact assessment (monitoring, statistics, consultation, research, etc)</b>	<b>Evidential gaps (what info do you need but don't have)</b>	<b>Action to take to fill evidential gap</b>	<b>Other issues</b>
<b>Race</b>	1			
<b>Disability</b>	1			
<b>Gender</b>	1			
<b>Age</b>	1			
<b>Sexual Orientation</b>	1			
<b>Religion and belief</b>	1			

Once the initial screening has been completed, a full assessment is only required if:

- The impact is potentially discriminatory under equality or anti-discrimination legislation
- Any of the key equality groups are identified as being potentially disadvantaged or negatively impacted by the policy or service
- The impact is assessed to be of high significance.

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