When to challenge requests for blood transfusions and why

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Why is this important?

- Appropriate use
- Safety (short term and long term consequences)
- Blood shortages
- Cost

Inappropriate use of blood components

- National, regional and local audits in England consistently show inappropriate use of all blood components

- 15-20% of red cells inappropriate
- 20-30% of platelets/ plasma inappropriate

- (Only 4% of eligible population donate blood)

National Comparative Audit of Platelet Transfusions 2010

- 28% of platelet transfusions inappropriate
- 69% were prophylactic of which 34% were felt to be inappropriate: most as platelet count above needed threshold but also some other inappropriate conditions
- 10% of inappropriate transfusions double dose transfusions
- Recent large RCT showed no difference in significant bleeding whether single or double dose transfusion

Overview of morbidity and mortality: SHOT report 2014

	Death definitely related	Death probably/likely related	Death possibly related	Major morbidity	Potential for major morbidity
Avoidable, delayed or undertransfusion	-	-	3	4	-
Anti- D immunoglobulin	-	-	-	4	270
Acute transfusion reaction	-	-	-	104	-
Haemolytic transfusion reaction	1	-	-	5	-
Incorrect blood component transfused	-	-	-	4	7
Unclassifiable complicarion	-	-	-	2	-
TACO	1	3	2	36	-
Transfusion associated dyspnea	-	1	2	2	1
TRALI	-	1	1	7	-
Transfusion transmitted infection	-	-	-	1	-
Total	**2**	**5**	**8**	**169**	**277**

Safety of blood transfusions

- Risk of transfusion transmitted infections
- Iron overload
- Alloimmunisation

Mortality and morbidity in patients with very low postoperative Hb levels

Hb level (g/dl)	% mortality	% mortality/morbidity
1.1 - 2.0	100%	100%
2.1 - 3.0	54.2%	91.7%
3.1 - 4.0	25%	52.6%
4.1 - 5.0	34.4%	57.7%
5.1 - 6.0	9.3%	28.6%
6.1 - 7.0	8.9%	22%
7.1 - 8.0	0%	9.4%

Odds of death in patients with post-op Hb < 8 g/ dl increased 2.5 fold for each gram decrease in Hb. (Transfusion 2002, 42, 812-818)

Alternatives to blood transfusions

- Iron replacement in iron deficiency anaemia:
- National Audit 2011 showed 13% with parameters of possible iron deficiency transfused: total of 9,126 patients. 37% of men, 40% of women transfused with documented ferritin levels (rest had not been fully investigated)
- B12/Folate replacement
- Tranxaemic acid
- Cell salvage/ surgical techniques
- Conservative management!

NHS

The Chief Medical Officer's
National Blood Transfusion Committee

Issued 11/11

Indication Codes for Transfusion – an Audit Tool

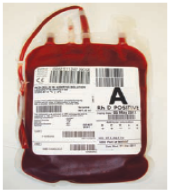
The indications for transfusion provided below are taken from UK national guidelines for the use of blood components (see references). Although it is accepted that clinical judgement plays an essential part in the decision to transfuse or not, the purpose of drawing available transfusion guidelines together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

Red cell concentrates

R1. *Acute blood loss* [4,8,3]

In patients with haemorrhage, the haemoglobin concentration (Hb) is a poor indicator of acute blood loss and estimation of blood loss may be difficult. Empirical decisions about the immediate use of red cell transfusion are required by clinicians experienced in resuscitation. The following is a guide to the likelihood of the need for blood transfusion:-

- < 30% loss of blood volume (< 1500ml in an adult): transfuse crystalloid/colloid. 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 crystalloid/colloid. Red cell transfusion will probably be required to maintain recommended Hb levels.
- >40% loss of blood volume (>2000ml in an adult): rapid volume replacement including red cell transfusion is required.



When normovolaemia has been achieved/maintained, frequent measurement of Hb (for example, by near patient testing) can be used to guide the use of red cell transfusion. Maintain circulating blood volume and Hb >7 g/dl in otherwise fit patients, and >8g/dl in elderly patients and those with known cardiovascular disease.

Peri-operative transfusion [2,4]

Many patients undergoing elective surgical operations will not require transfusion support if their Hb is normal before surgery. Assuming normovolaemia has been maintained, the Hb can be used to guide the use of red cell transfusion.

R2. Hb <7g/dl.

R3. Hb <8g/dl 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).

Critical Care [4]

R4. Transfuse to maintain the Hb >7g/dl, and >8g/dl in elderly patients and those with known cardiovascular disease.

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.

Radiotherapy

R6. Limited evidence for maintaining Hb above 10-11g/dl in patients receiving radiotherapy for cervical and possibly other tumours.

Chronic anaemia [4]

R7. Transfuse to maintain the haemoglobin concentration to prevent symptoms of anaemia. Many patients with chronic anaemia may be asymptomatic with a Hb >8g/dl.

Fresh frozen plasma [6,3]

(Dose - 12 - 15ml/kg body weight equivalent to 4 units for an adult)

F1. Replacement of single coagulation factor deficiencies, where a specific or combined factor concentrate is unavailable e.g. factor V.

F2. Immediate reversal of warfarin effect, in the presence of life-threatening bleeding. Prothrombin complex concentrate is the treatment of choice. FFP only has a partial effect and is not the optimal treatment.

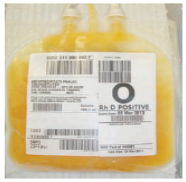
F3. Acute disseminated intravascular coagulation (DIC) in the presence of bleeding and abnormal coagulation results.

F4. Thrombotic thrombocytopenic purpura (TTP), usually in conjunction with plasma exchange.

F5. Massive transfusion. If emergency uncontrolled bleeding and massive haemorrhage is anticipated, early infusion of FFP (15ml/kg) is recommended to treat coagulopathy. Local protocols should be followed, and the later use of FFP should be guided by timely tests of coagulation including near patient testing. Where there is anticipated large volume blood loss associated with routine surgery, guidelines suggest the PT and APTT ratio should be maintained at <1.5. This is likely to occur after replacement of 1-1.5 x the patient's blood volume.

F6. Liver disease; there is no evidence of benefit from FFP in patients with a PT ratio of less than or equal to 1.5.

Cryoprecipitate [6,3]



(Dose - 2 pooled units, equivalent to 10 individual donor units, for an adult (contains approximately 3g of fibrinogen) Cryoprecipitate should be used in combination with FFP unless there is an isolated deficiency of fibrinogen.

C1. Acute disseminated intravascular coagulation (DIC), where there is bleeding and a fibrinogen level <1g/l.

C2. Advanced liver disease, to correct bleeding or as prophylaxis before surgery, when the fibrinogen level <1g/l.

C3. Bleeding associated with thrombolytic therapy causing hypofibrinogenaemia.

C4. Hypofibrinogenaemia secondary to massive transfusion. Maintain fibrinogen above 1g/l. A level of 1.5g/l may be required.

C5. Renal failure or liver failure associated with abnormal bleeding where DDAVP is contraindicated or ineffective.

C6. Inherited hypofibrinogenaemia, where fibrinogen concentrate is not readily available.

Platelet concentrates [1,3,5,7]

(Dose - 15 ml/kg body weight for children <20kg; 1 adult therapeutic dose for adults and older children)

Bone marrow failure

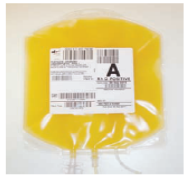
P1. To prevent spontaneous bleeding in patients with reversible bone marrow failure when the platelet count <10 x 10^9/l. Prophylactic platelet transfusions are not indicated in chronic stable thrombocytopenia.

P2. To prevent spontaneous bleeding when the platelet count <20 x 10^9/l in the presence of additional risk factors for bleeding such as sepsis or haemostatic abnormalities.

P3. To prevent bleeding associated with invasive procedures. The platelet count should be raised to >50 x 10^9/l before lumbar puncture, insertion of intravascular lines, transbronchial and liver biopsy, and laparotomy, to >80 x 10^9/l before spinal epidural anaesthesia and to >100 x 10^9/L before surgery in critical sites such as the brain or the eyes.

Critical care/surgery

P4. Massive blood transfusion. Empirical use of platelets, according to a specific blood component ratio, is reserved for the patients with severe trauma. Aim to maintain platelet count >75 x 10^9/l and >100 x 10^9/l if multiple, eye or CNS trauma.



P5. Acquired platelet dysfunction e.g. post-cardiopulmonary bypass, use of potent anti-platelet agents such as clopidigrel, with non surgically correctable bleeding.

P6. Acute disseminated intravascular coagulation (DIC) in the presence of bleeding and severe thrombocytopenia.

P7. Inherited platelet dysfunction disorders e.g. Glanzmanns thrombasthenia with bleeding or as prophylaxis before surgery.

Immune thrombocytopenia

P8. Primary immune thrombocytopenia, as emergency treatment in advance of surgery or in the presence of major haemorrhage. A platelet count of ≥80 is recommended for major surgery and a count of >70 x 10^9/l for obstetric regional axial anaesthesia.

P9. Post-transfusion purpura, in the presence of major haemorrhage.

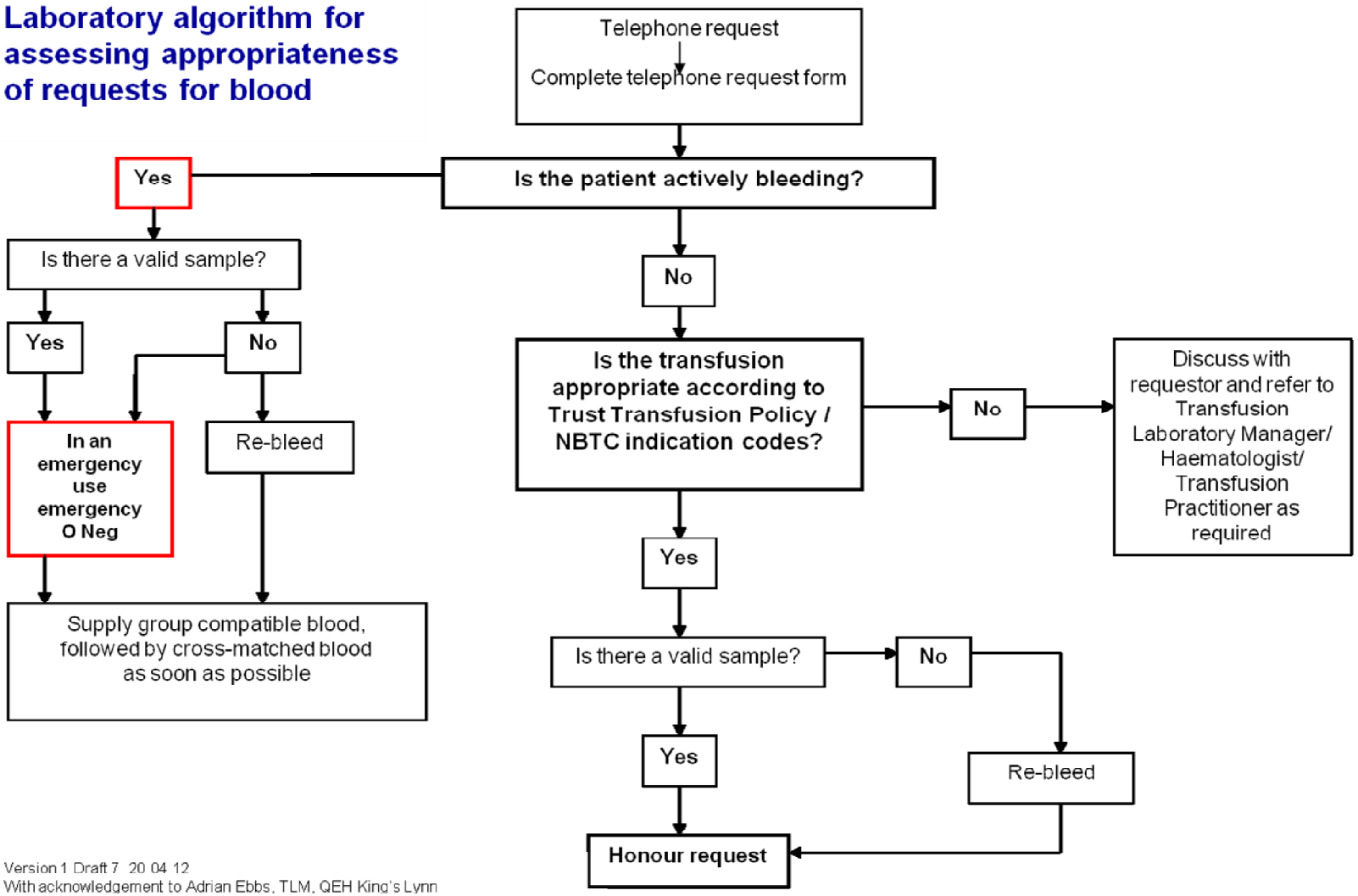
P10. Neonatal alloimmune thrombocytopenia, to treat bleeding or as prophylaxis to maintain the platelet count >30 x 10^9/l.

recently updated indication codes

References

1. American Society of Hematology 2011 evidence-based practice guideline for immune thrombocytopenia. Blood 2011 117: 4190-4207.
2. Association of Anaesthetists of Great Britain and Ireland (2008). Blood transfusion and the anaesthetist: red cell transfusion (www.aagbi.org).
3. Association of Anaesthetists of Great Britain and Ireland (2010). Blood transfusion and them anaesthetist: management of massive haemorrhage. *Anaesthesia*, 65, 1153-1161. (www.aagbi.org).
4. British Committee for Standards in Haematology (2001). Guidelines for the clinical use of red cell transfusion. *British Journal of Haematology*, 113, 24-31.
5. British Committee for Standards in Haematology (2003). Guidelines for the use of platelet transfusions. *British Journal of Haematology* 122, 10-23.
6. British Committee for Standards in Haematology (2004a). Guidelines for the use of fresh-frozen plasma, cryprecipitate and cryosupernatant. *British Journal of Haematology*, 126, 11-28.
7. British Committee for Standards in Haematology (2004b). Transfusion guidelines for neonates and older children. *British Journal of Haematology*, 124, 433-453.
8. Scottish Intercollegiate Guidelines Network (2008). Management of upper and lower gastrointestinal bleeding (www.sign.ac.uk).

Professor Mike Murphy, Dr Jonathan Wallis, Dr Janet Birchall, October 2011


Laboratory algorithm for assessing appropriateness of requests for blood
Telephone request
Complete telephone request form
Is the patient actively bleeding?
Yes
Is there a valid sample?
Yes
No
In an emergency use emergency O Neg
Re-bleed
Supply group compatible blood, followed by cross-matched blood as soon as possible
No
Is the transfusion appropriate according to Trust Transfusion Policy / NBTC indication codes?
No
Discuss with requestor and refer to Transfusion Laboratory Manager/ Haematologist/ Transfusion Practitioner as required
Yes
Is there a valid sample?
No
Yes
Re-bleed
Honour request
Version 1 Draft 7 20 04 12
With acknowledgement to Adrian Ebbs, TLM, QEH King's Lynn

- **2014 Low stocks**

- **Red cells**

March

- **Platelets**

August

October

November

NHS
Blood and Transplant

URGENT COMMUNICATION

An electronic copy of this fax can be found on the Hospitals & Science "Home Page" via the urgent area highlighted in red - http://hospital.blood.co.uk/.

25th March 2014

All Transfusion Laboratory Managers in hospitals served by NHS Blood and Transplant

Dear Colleague,

Update on Stocks of B RhD Negative and O RhD Negative Red Cells

On the 12th and 19th March we advised you that NHSBT were experiencing lower than normal levels of groups O RhD negative and B RhD negative red cells

Stock levels have increased and we have returned to business as usual and are able to supply to your needs.

We would like to thank you for your assistance and understanding whilst we rebuilt our stock levels.

If you have any queries regarding the above, please do not hesitate to contact an NHSBT Customer Service Manager, Hospital Services Manager or NHSBT Consultant. Alternatively please contact the Customer Service Response Desk on - 0208 201 3107 between the hours of 9:00 to 17:00, Monday to Friday.

Please also notify your Consultant with responsibility for the transfusion laboratory and your Transfusion Practitioner of this communication.

Yours sincerely,

Teresa Allen
Assistant Director - Customer Service
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Clinical Director – Patients
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Contigency plan for shortage

Category 1	Category 2	Category 3
Active major bleeding	Cancer surgery (palliative) Urgent but not emergency surgery	Elective surgery, likely to require Tx
Emergency surgery	Not life threatening anaemia	
Life threatening anaemia		

Blood costs: NHSBT Pricing 2015-2016

Standard red cells	£121.85
Neonatal red cells	£48.99
Premium for irradiated red cells	£8.57
Platelets	£193.15
Premium for HLA matched platelets	£240.54
Clinical FFP	£28.46
Pooled cryoprecipitate	£177.57

Patient Blood Management Guidelines: National Blood Transfusion Committee

- Use of appropriate dose and thresholds for transfusion
- Use locally agreed triggers for transfusion based on national guidelines and use
- National Blood Transfusion Committee (NBTC) indication codes when requesting blood from the transfusion laboratory and when prescribing blood components
- **Develop systems and protocols that empower transfusion laboratory staff to question requests that do not conform with these triggers and where inadequate clinical explanation is given**
- Regularly audit transfusion requests against these triggers
- Transfuse one dose of blood component at a time e.g. one unit of red cells or platelets in non-bleeding patients and reassess the patient clinically and with a further blood count to determine if further transfusion is needed

Conclusions

- May be better for patients to avoid transfusion …….
- However equally no patient should ever die for the lack of blood

SHOT Report 2014

Due to avoidable, delayed or under transfusion:

- Death possibly related: 3 patients
- Major morbidity: 4 patients

- Presentation adapted from one given by Dr Janet Birchall, Consultant Haematologist NBT.