North Bristol NHS Trust

South West Regional Transfusion Committee

When to challenge requests for blood components – and why

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SWRTC 'Transfusion Laboratory Staff Training and Empowerment Day' 21st June 2017

Why question ?

- Appropriate use
- Safety
  - SERIOUS HAZARDS OF TRANSFUSION SHOT
- Shortage
- Cost

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)

National Comparative Audit
of Blood Transfusion

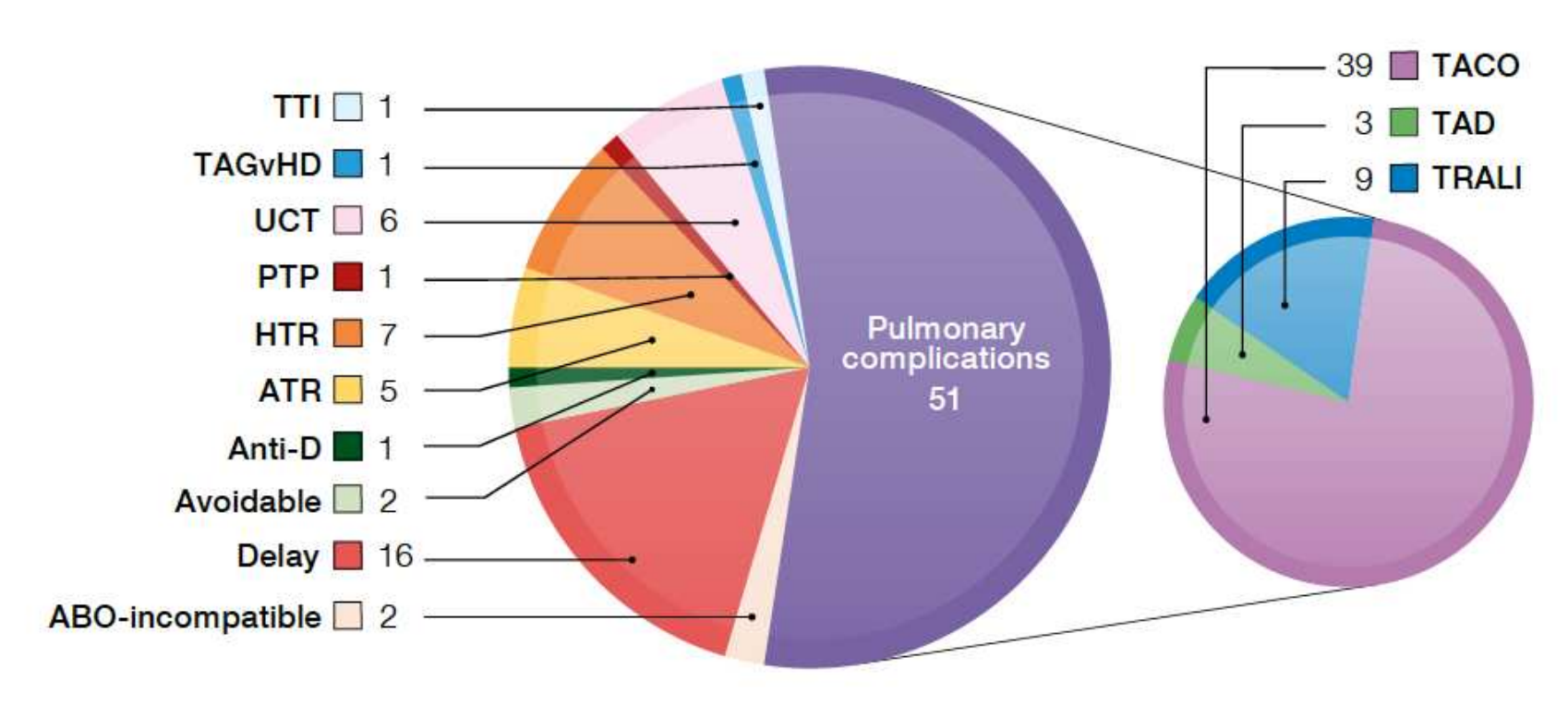
2016 Audit of Red Cell & Platelet Transfusion in Adult Haematology Patients

	Audited episodes in each category	Appropriate	Uncertain	Outside guidelines
Red cell Transfusion	100%	75%	10%	15%
Platelet Transfusion				
Prophylactic	77%	55%	8%	37%
Reversible BMF		72%	6%	22%
Chronic BMF*		43%	1%	56%
Pre-procedure	9%	61%	20%	19%
Therapeutic	10%	87%	7%	6%
Unclear	3%	0%	100%	0%

* Not receiving intensive treatment

SERIOUS HAZARDS OF TRANSFUSION SHOT

Transfusion-related deaths 2010 to 2015 n=93



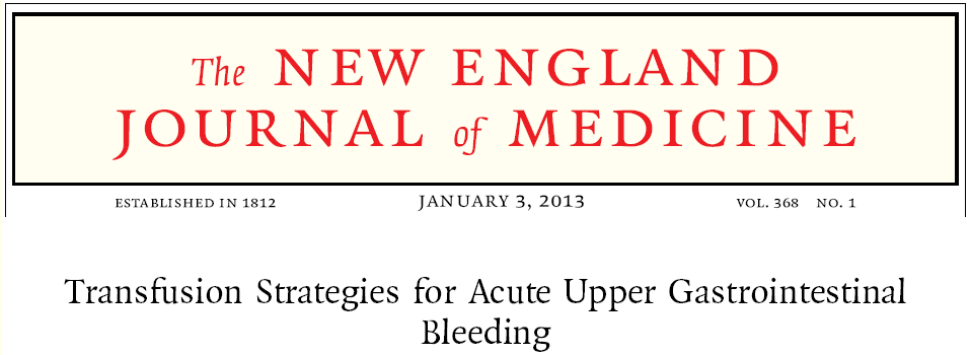
Mortality, morbidity & transfusion

Pre-operative anaemia

Correction with blood tx doesn't improve outcome and linked with ↑ infection, and in cancer, relapse. Relationship - dose-dependent

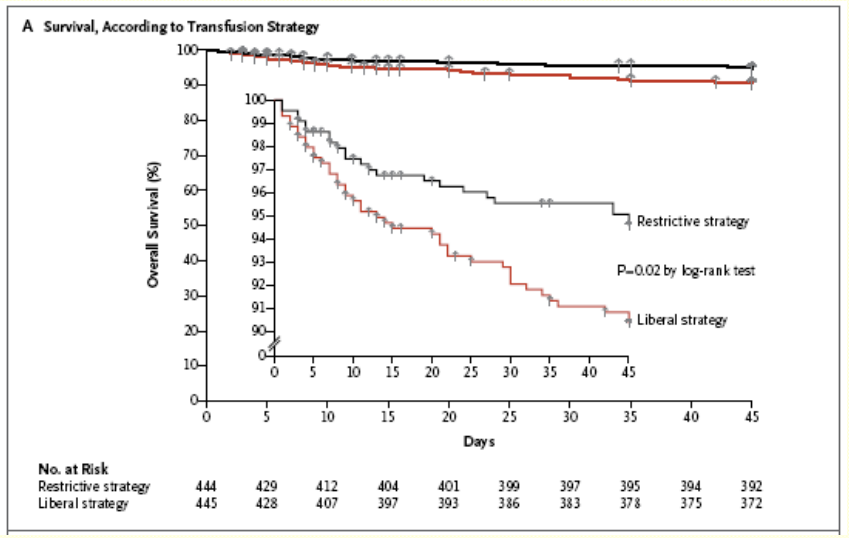
Medical patients with anaemia

Blood tx linked with adverse outcome observational studies.



Randomised to trigger Hb 70 or 90 g/L

n=921. 45 day mortality 5% (23) v 9% (41)



Low stocks

2015

Red cells January (O-)

Platelets

May (A-)

June (A-)

October (A-)

2016

Red cells September (O-)

Platelets

February (A-)

March x3 (A-)

July (A)

November (A-)

FFP May MBFFP (AB)

2017

Platelets

March (A-)

NHS
Blood and Transplant

URGENT COMMUNICATION

A copy of this letter can be found at http://hospital.blood.co.uk/

Date: 28 March 2017

To: All Transfusion Laboratory Managers and Transfusion Practitioners in hospitals served by NHSBT

Dear Colleagues

Platelet Stock Levels - Group A D negative

We are experiencing low stock levels of group A D negative platelets. This will result in some delays to supply and the need for substitutions during Wednesday 29 March. We expect a return to normal levels by Thursday morning. We will not be able to offer group A D negative platelets for non emergency cover, i.e. with a long shelf life held to avoid additional deliveries. We will work with you to supply to your needs and will endeavour to supply for trauma and surgical cover.

We have platelets coming through production that we expect will resolve the situation. We will continue to monitor progress and will keep you updated on stock levels and deliveries should the situation change.

Hospital Action:

1. Please avoid making requests for long dated platelets.
2. When ordering group A for clinical use, where possible please specify a substitution that would best meet your patient needs and indicate the date and time you require the platelets for transfusion. Please let our Hospital Services team know immediately if the urgency of any order changes.
3. Platelets may not arrive on your routine round and may be sent by free ad-hoc at a later time. Your platelet order may arrive from a different issuing site.
4. Please be vigilant in reviewing the appropriateness of requests for platelets, especially any requests for double dose platelets and ensure that wastage is kept to a minimum.
5. Please refer to the following link for advice on appropriate substitutions platelets across blood groups

We are not asking you to activate your Emergency Blood Management plans.

We are sorry for any inconvenience and thank you for helping us to resolve this issue.

If you have any queries, please contact an NHSBT Consultant, Customer Service Manager or Hospital Services Manager. Alternatively please contact the Customer Service Response Desk on - 0208 201 3107 between 08:30 to 16:30, Monday to Friday.

Please copy this letter to your consultant lead for transfusion.

Yours sincerely

Chris Philips
Head of Hospital Customer Service
Email: chris.philips@nhsbt.nhs.uk

Dr Kate Pendry
Clinical Director – Patients
Email: kate.pendry@nhsbt.nhs.uk

NHS Blood and Transplant is a Special Health Authority within the National Health Service

Contingency 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		

Appendix 1 – National Prices: Impact of Cost Pressures, Developments and Cost Reduction Programmes for 2017/18

	Baseline National Price 2016/17	Product Demand & Cost Reduction Plan				Cost Pressures		Pre-Inflation National Price 2017/18	Price Movement Pre Inflation	Inflation Funding GDP Deflator	National Price 2017/18	Price Movement Post Inflation
		Income Impact Product Demand	Fixed cost Adjustment Product Demand	DRR Adjustment	CIP / Price Differential	Increments Apprentice Levy Capital Charges	HEV Testing & Plasma Import Cost					
Red Cell Components												
Standard Red Cells Other Groups	120.00		4.71	-0.09	-4.76	0.83	2.11	122.80	2.80	1.66	124.46	4.46
Standard Red Cell O Rh D negative	120.00		4.71	-0.09	-4.76	0.83	2.11	122.80	2.80	1.66	124.46	4.46
Neonatal Red Cells	51.68		0.79	-0.02	-1.19	0.36		51.62	-0.06	0.71	52.33	0.65
Frozen Red Cells, Thawed & Washed	792.53		4.71	-0.09	-7.11	5.50		795.54	3.01	10.95	806.49	13.96
Red Cells for Exchange Transfusion	199.00		4.71	-0.09	-7.11	1.38		197.89	-1.11	2.75	200.64	1.64
Large Volume Neonates & Infants	158.80		4.71	-0.09	-7.11	1.10		157.41	-1.39	2.19	159.60	0.80
Red Cells for Intra-Uterine Transfusion	182.26		4.71	-0.09	-7.11	1.27		181.04	-1.22	2.52	183.56	1.30
Red Cell Added Value Services												
Premium for CMV -ve Red Cells	8.80					0.06		8.86	0.06	0.12	8.98	0.18
Premium for Irradiated Red Cells	8.78					0.06		8.84	0.06	0.12	8.96	0.18
Premium for Cell Washing	121.75					0.85		122.60	0.85	1.68	124.28	2.53
Premium HLA selected red cells	126.98					0.88		127.86	0.88	1.75	129.61	2.63
Premium HPA selected red cells	126.98					0.88		127.86	0.88	1.75	129.61	2.63
Platelet Components												
Platelets (1.0 ATD) Pooled	193.15		11.83		-30.80	1.34		175.52	-17.63	2.67	178.19	-14.96
Platelets (1.0 ATD) CD	193.15		11.83		10.31	1.34		216.63	23.48	2.67	219.30	26.15
Platelets (1.0 ATD) Rh A neg Pooled	193.15		11.83		-30.80	1.34		175.52	-17.63	2.67	178.19	-14.96
Platelets (1.0 ATD) Rh A neg CD	193.15		11.83		10.31	1.34		216.63	23.48	2.67	219.30	26.15
Neonatal Platelets	90.16		2.96		-3.96	0.63		89.79	-0.37	1.25	91.04	0.88
Platelets for Intra-Uterine Transfusion	317.93		11.83		-15.84	2.21		316.13	-1.80	4.39	320.52	2.59
Platelet Added Value Services												
Premium for CMV -ve Platelets	8.80					0.06		8.86	0.06	0.12	8.98	0.18
Premium for Irradiated Platelets	8.78					0.06		8.84	0.06	0.12	8.96	0.18
Premium for Cell Washing	33.37					0.23		33.60	0.23	0.46	34.06	0.69
Premium for HLA Selected Platelets	239.90		0.00			1.67		241.57	1.67	3.31	244.88	4.98
Premium for HPA Selected Platelets	239.90		0.00			1.67		241.57	1.67	3.31	244.88	4.98
Plasma Components												
Clinical FFP (UK sourced)	28.46		2.51		-3.10	0.20		28.07	-0.39	0.39	28.46	0.00
Paediatric MBFFP (non-UK Sourced)	178.03		0.00		-1.24	1.24	5.50	183.53	5.50	0.00	183.53	5.50
Neonatal MBFFP (non-UK Sourced)	50.02		0.00		-0.35	0.35	1.38	51.40	1.38	0.00	51.40	1.38
Cryoprecipitate												
Cryoprecipitate (UK Sourced)	31.63		0.00		-0.44	0.00		31.19	-0.44	0.44	31.63	0.00
Pooled cryoprecipitate (UK Sourced)	177.57		-2.05		-1.65	1.23		175.10	-2.47	2.45	177.55	-0.02
MB Cryoprecipitate-Neonatal (non-UK Sourced)	187.50		0.00		-1.31	1.30	5.50	192.99	5.49	0.00	192.99	5.49
MB Cryoprecipitate-Pooled (non-UK Sourced)	1080.48		0.00		-7.53	7.50	33.00	1113.45	32.97	0.00	1113.45	32.97
Other Components and Services												
Optimised Pooled Granulocyte	1104.65					7.67		1112.32	7.67	15.26	1127.58	22.93
Buffy Coats	82.05					0.57		82.62	0.57	1.13	83.75	1.70
Premium for HEV neg	17.18		-17.18			0.00		0.00	-17.18	0.00	0.00	-17.18
Total (£m's) [price x volume issued]	**265.3**	**-13.1** (A)	**10.1** (B)	**-0.1** (C)	**-10.0**	**1.8**	**3.2**	**257.0**	**-8.2**	**3.5**	**260.6**	**-4.7**

Patient Blood Management

- Aim to achieve better patient outcome by relying on patients own blood rather than donor blood
- Goes beyond appropriate use as pre-empts and ↓ need for donor blood by addressing modifiable risk factors
  - Maximise patients red cell mass
  - Minimise bleeding
  - Optimise patients physiological reserve

National Blood Transfusion Committee Indication Codes for Transfusion 2016

"The indications for transfusion taken from UK national guidelines for the use of blood components. Although clinical judgment plays an essential part in the decision to transfuse, 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 "

NBTC Blood Component (triggers) Poster & Bookmark Also i-phone & android app

Guidance for the use of Blood Components

NHS

National Blood Transfusion Committee

This guidance is based on the National Blood Transfusion Committee (NBTC) Indication Codes for Transfusion (June 2016)

The indications for transfusion provided below are taken from national guidelines for the use of blood components in adults (see references). Amalgamation into this summary document aims to act as a prompt for clinicians to facilitate appropriate use and to enable robust documentation of indications. Each indication has been assigned a number, to permit reproducible coding, 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 at request either on a written request form, electronic blood order or by telephone when the request is urgent. These are current guidelines and may change depending on new evidence.

Red cell concentrates

Dose – in the absence of active bleeding, use the minimum number of units required to achieve a target Hb. Consider the size of the patient; assume an increment of 10g/L per unit for an average 70kg adult.

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

R2. ***Hb ≤ 70g/L stable patient***
Acute anaemia. Use an Hb threshold of 70g/L and a target Hb of 70-90g/L to guide red cell transfusion. Follow local/specific protocols for indications such as post cardiac surgery, traumatic brain injury, acute cerebral ischaemia.

R3. ***Hb ≤ 80g/L if cardiovascular disease***
Use an Hb threshold of 80g/L and a target Hb of 80-100g/L.

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

R5. ***Radiotherapy maintain Hb ≥110g/L***
There is limited evidence for maintaining an Hb of 110g/L in patients receiving radiotherapy for cervical and possibly other tumours.

R6. ***Exchange transfusion***

Fresh frozen plasma (FFP)

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

F1. ***Major haemorrhage***
Early infusion of FFP is recommended in a ratio of 1 unit FFP:1 unit red cells for trauma and at least 1 unit FFP:2 units red cells in other major haemorrhage settings. Once bleeding is under control, FFP use should be guided by timely tests for coagulation as indicated below.

F2. ***PT Ratio/INR >1.5 with bleeding***
Clinically significant bleeding without major haemorrhage. FFP required if coagulopathy. Aim for a PT and APTT ratio of ≤1.5.

F3. ***PT Ratio/INR >1.5 and pre-procedure***
Prophylactic use when coagulation results are abnormal e.g. disseminated intravascular coagulation and invasive procedure is planned with risk of clinically significant bleeding.

F4. ***Liver disease with PT Ratio/INR >2 and pre-procedure***
FFP should not be routinely administered to non-bleeding patients or before invasive procedures when the PT ratio/INR is ≤2.

F5. ***TTP/plasma exchange***

F6. ***Replacement of single coagulation factor***

Prothrombin complex concentrate

Dose should be determined by the situation and INR. Local guidelines should be followed.

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

PCC2. **Emergency reversal of VKA pre emergency surgery**

Cryoprecipitate

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

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

C2. **Fibrinogen <1g/L and pre procedure**

C3. **Bleeding associated with thrombolytic therapy**

C4. **Inherited hypofibrinogenaemia, fibrinogen concentrate not available**

Platelet concentrates

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

Prophylactic platelet transfusion

P1. **Plt <10 x 10^9/L reversible bone marrow failure Not indicated in chronic bone marrow failure**

P2. **Plt 10 – 20 x 10^9/L sepsis/haemostatic abnormality**

Prior to invasive procedure or surgery

P3. **To prevent bleeding associated with invasive procedures**. Platelets should be transfused if:

- **P3a Plt <20 x 10^9/L central venous line**
- **P3b Plt <40 x 10^9/L pre lumbar puncture/spinal anaesthesia**
- **P3c Plt <50 x 10^9/L pre liver biopsy/major surgery**
- **P3d Plt <80 x 10^9/L epidural anaesthesia**
- **P3e Plt <100 x 10^9/L pre critical site surgery e.g. CNS.**
- **Transfusion prior to bone marrow biopsy is not required.**

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

P4a **Major haemorrhage Plt <50 x 10^9/L**

P4b **Critical site bleeding e.g. CNS/traumatic brain injury Plt <100 x 10^9/L**

P4c **Clinically significant bleeding Plt <30 x 10^9/L.**

Specific clinical conditions

P5a **DIC pre procedure or if bleeding.**

P5b **Primary immune thrombocytopenia (emergency treatment pre-procedure/severe bleeding).**

Platelet dysfunction

P6a **Consider if critical bleeding on anti-platelet medication.**

P6b **Inherited platelet disorders directed by specialist in haemostasis.**

References

British Committee for Standards in Haematology (2012). Guidelines on the management of anaemia and red cell transfusion in adult critically ill patients. *British Journal of Haematology*, **160**, 445-46.
British Committee for Standards in Haematology (2015). A practical guideline for the haematological management of major haemorrhage. *British Journal of Haematology*, **170**, 788-803.
British Committee for Standards in Haematology (2016). Draft guidelines for the use of platelet transfusions.
British Society of Gastroenterology (2015). UK guidelines on the management of variceal haemorrhage in cirrhotic patients. *GUT*, **0**, 1-25.
British Society of Gastroenterology. Clinical Services. Care Bundles. British Society of Gastroenterology & British Association for the study of the Liver Decompensated Cirrhosis Care Bundle – First 24 Hours. www.bsg.org.uk
European Society of Anaesthesiology Guidelines (2013). Management of severe perioperative bleeding. *European Journal of Anaesthesiology*, **30**, 270-382
National Institute for Health and Clinical Excellence (2015). Blood transfusion NG24. nice.org.uk/guidance/ng24
Royal College of Obstetricians & Gynaecologists (2015). Blood Transfusion in Obstetrics. *Green-top Guideline No.47.*

Further information on blood transfusion will be available on hospital intranet sites or from the blood transfusion laboratory.

BLC674.3 September 2016 1617361

NHS

National Blood Transfusion Committee

Indications for the use of Blood Components in Adults

This guidance is based on the NBTC Indication Codes for Transfusion (June 2016).

Red cell concentrates

Dose – if no bleeding and anaemia reversible, use the minimum number of units to achieve a target Hb. Assume an increment of 10g/L per unit for a 70kg adult.

- **R1 Acute Bleeding** Once normovolaemia achieved, frequent measurement of Hb (including by near patient testing) should be used – see suggested thresholds below.
- **R2 Hb ≤70g/L** if stable acute anaemia. Use a target Hb of 70-90g/L. Follow local protocols for post cardiac surgery, traumatic brain injury, acute cerebral ischaemia.
- **R3 Hb ≤80g/L if cardiovascular disease** Use a target Hb of 80-100g/L.
- **R4 Chronic transfusion dependent anaemia** Maintain an Hb which prevents symptoms. Suggest an initial threshold of 80g/L then adjust as required. Haemoglobinopathy patients require individualised Hb thresholds.
- **R5 Radiotherapy** Limited data for maintaining Hb of 110g/L.
- **R6 Exchange transfusion.**

Fresh frozen plasma

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

- **F1 Major haemorrhage** Early use in trauma – 1 unit FFP: 1 unit red cells. Other settings at least 1 unit FFP: 2 units red cells. Once bleeding controlled use thresholds below.
- **F2 PT Ratio/INR >1.5 with bleeding** without major haemorrhage. Keep PT/APTT ratio of <1.5.
- **F3 PT Ratio/INR >1.5 and pre-procedure** e.g. disseminated intravascular coagulation (DIC) with risk of significant bleeding.
- **F4 Liver disease with PT Ratio/INR >2 and pre-procedure** Not usually required if no bleeding or before invasive procedure if PT ratio/INR is <2.
- **F5 TTP/plasma exchange.**
- **F6 Replacement of single coagulation factor.**

Prothrombin complex concentrate

Dose determined by situation and INR. Follow local guidelines.

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

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

NHS

National Blood Transfusion Committee

Cryoprecipitate

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

- **C1 Clinically significant bleeding and fibrinogen <1.5g/L (<2g/L in obstetric bleeding).**
- **C2 Fibrinogen <1g/L and pre procedure.**
- **C3 Bleeding associated with thrombolytic therapy.**
- **C4 Inherited hypofibrinogenaemia, fibrinogen concentrate not available.**

Platelet concentrates

Dose – for prophylaxis, 1 adult therapeutic dose. Prior to invasive procedure/to treat bleeding, consider patient size, previous increments and target count.

Prophylactic platelet transfusion

- **P1 Plt <10 x 10^9/L reversible bone marrow failure. Not indicated in chronic bone marrow failure.**
- **P2 Plt 10 – 20 x 10^9/L sepsis/haemostatic abnormality.**

Prior to invasive procedure or surgery if:

- **P3a Plt <20 x 10^9/L central venous line.**
- **P3b Plt <40x10^9/L pre lumbar puncture/spinal anaesthesia.**
- **P3c Plt <50x10^9/L pre liver biopsy/major surgery.**
- **P3d Plt <80x10^9/L epidural anaesthesia.**
- **P3e Plt <100x10^9/L pre critical site surgery e.g. CNS.**
- **Transfusion prior to bone marrow biopsy not required.**

Therapeutic use to treat bleeding (WHO bleeding grade ≥2)

- **P4a Major haemorrhage Plt <50 x 10^9/L.**
- **P4b Critical site bleeding e.g. CNS Plt <100 x 10^9/L.**
- **P4c Clinically significant bleeding Plt <30 x 10^9/L.**

Specific clinical conditions

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

Platelet dysfunction

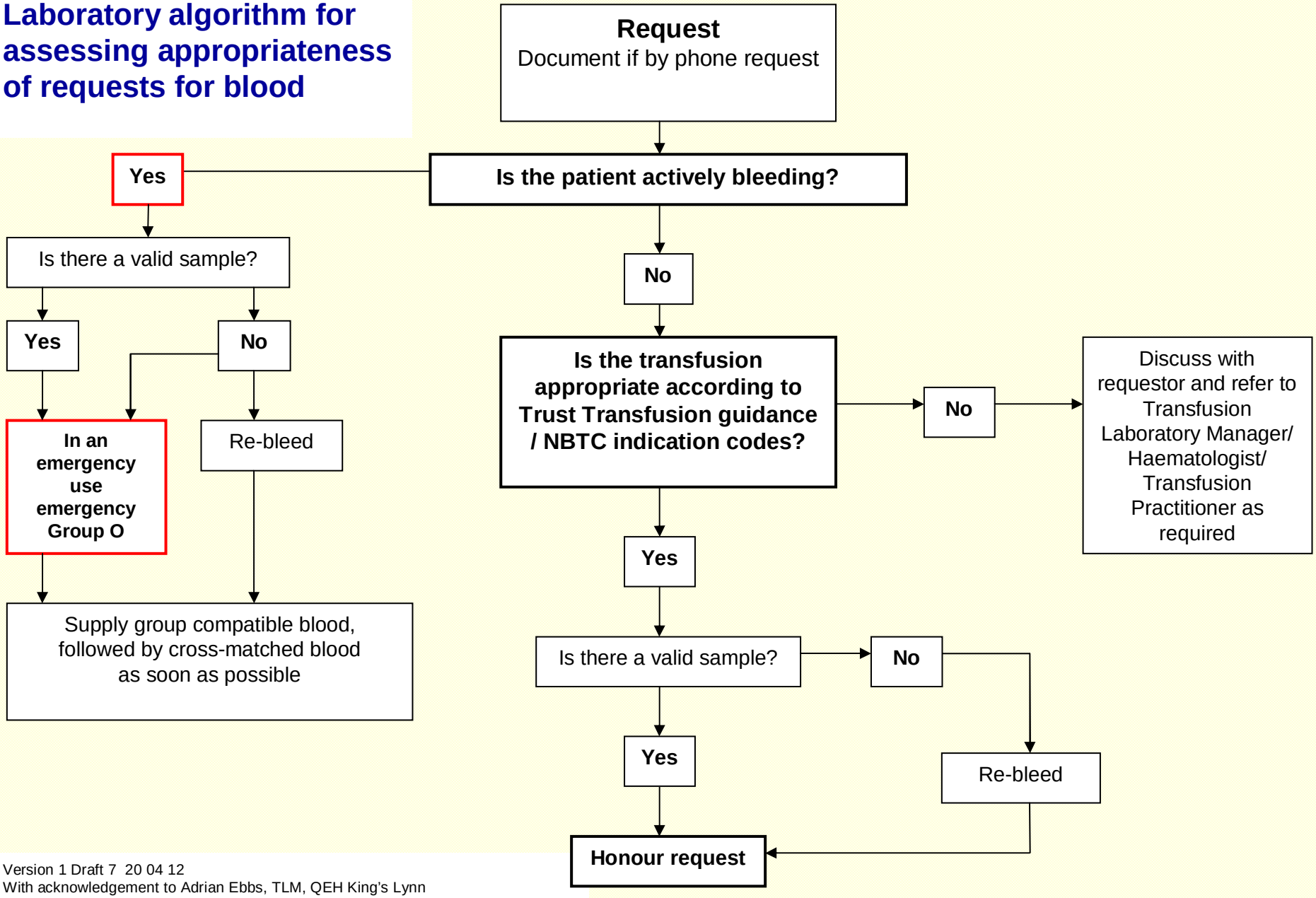
- **P6a Consider if critical bleeding on anti-platelet agent.**
- **P6b Inherited platelet disorders directed by haemostasis specialist.**

Further information will be available on hospital intranet sites or from the blood transfusion laboratory.

Further supplies of this bookmark can be ordered by accessing https://hospital.nhsbtleaflets.co.uk

BLC675.4 September 2016 1617331

Laboratory algorithm for assessing appropriateness of requests for blood



Version 1 Draft 7 20 04 12

With acknowledgement to Adrian Ebbs, TLM, QEH King's Lynn

Summary

Discuss unclear requests for reasons of -

- Appropriate use
- Safety
- Potential shortage
- Cost
- Use National Blood Transfusion Committee Indication Codes and South West RTC laboratory algorithm as part of PBM