NHS
Blood and Transplant

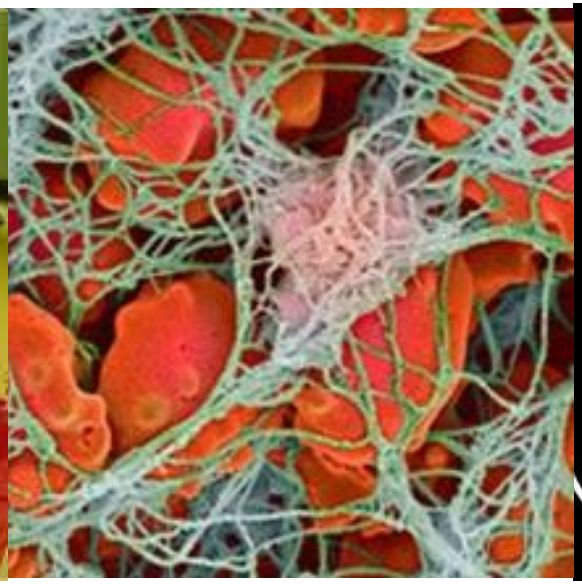
A D Negative Platelet Components ordering & use

Dr Lise Estcourt

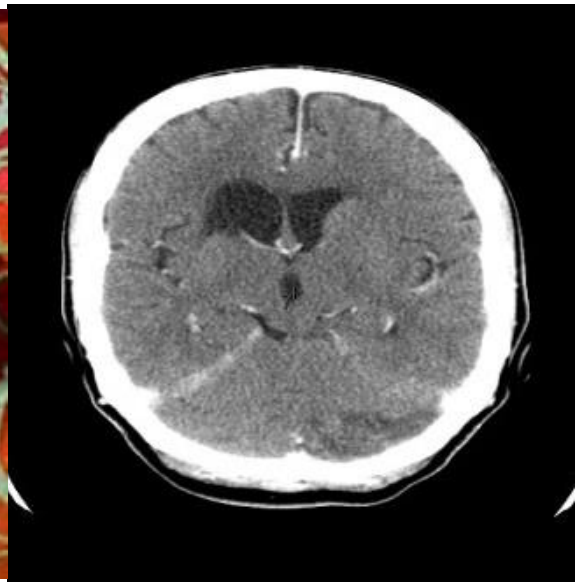
Caring Expert Quality

Why do we use platelet transfusions?

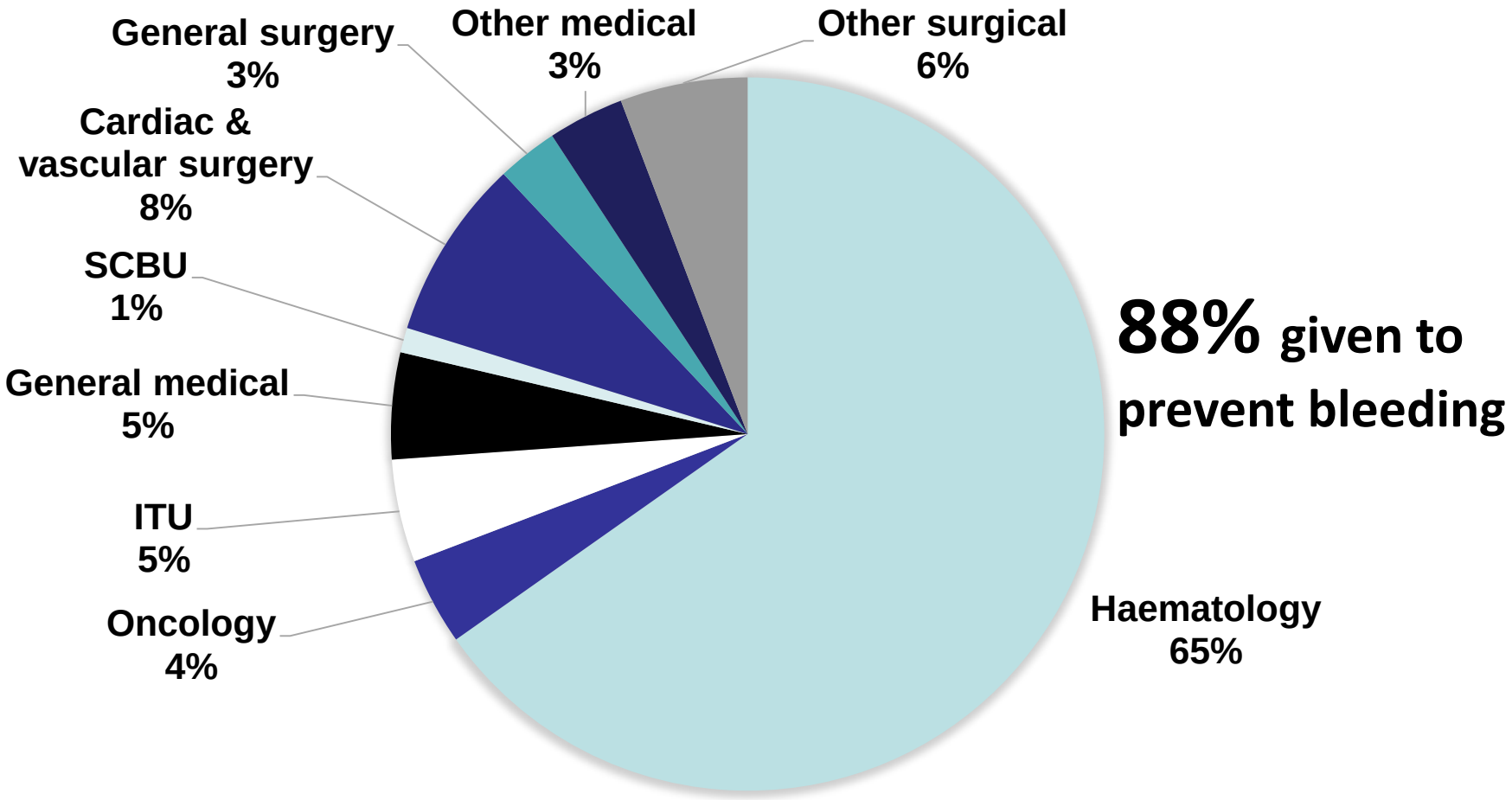
STOP



PREVENT



Haematology patients use the majority of platelet transfusions

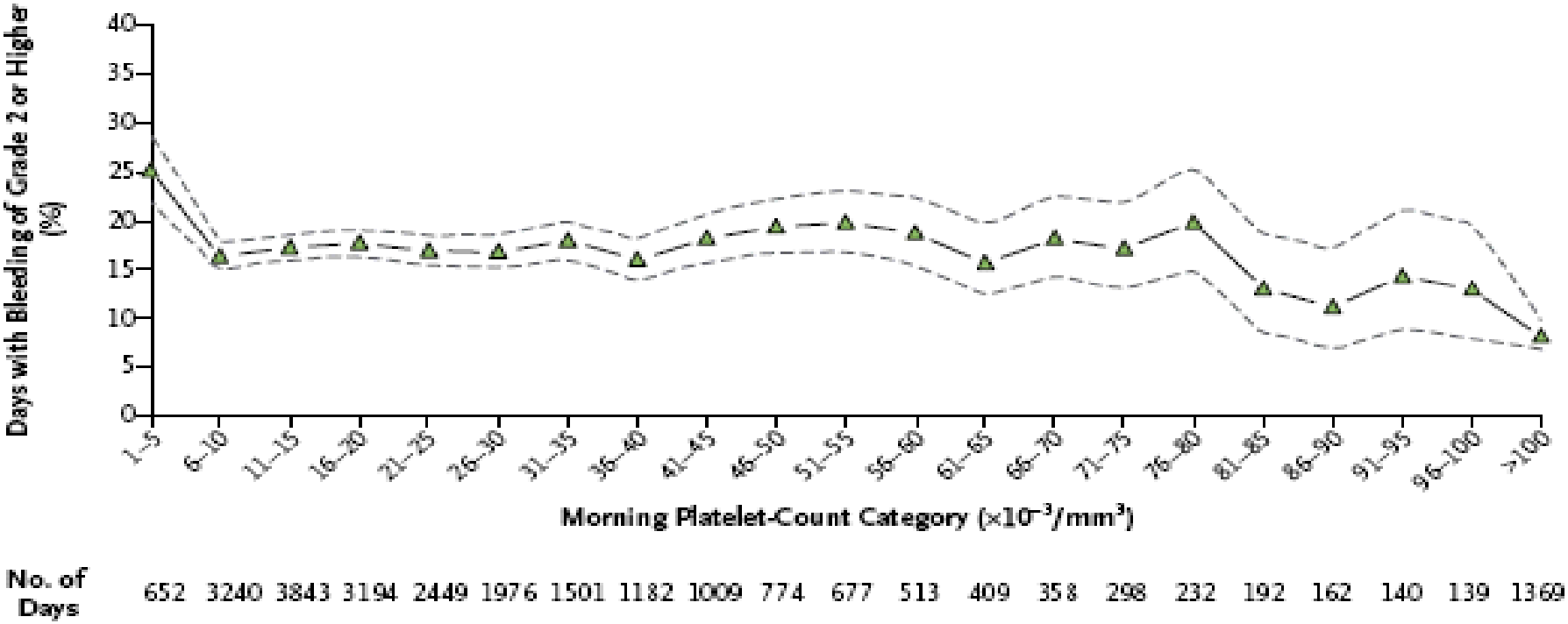


A survey of where and why platelets are used in hospitals in the South West region of England. Jones et al 2013. Transfusion Medicine 23(S2):P034

Prophylactic Platelet Transfusions

65% (305/469) of patients received a prophylactic platelet transfusion for reversible bone marrow failure without additional risk factors, when the count was less than or equal to 10 x 10^9/L.

Morning platelet count is a poor predictor of bleeding risk

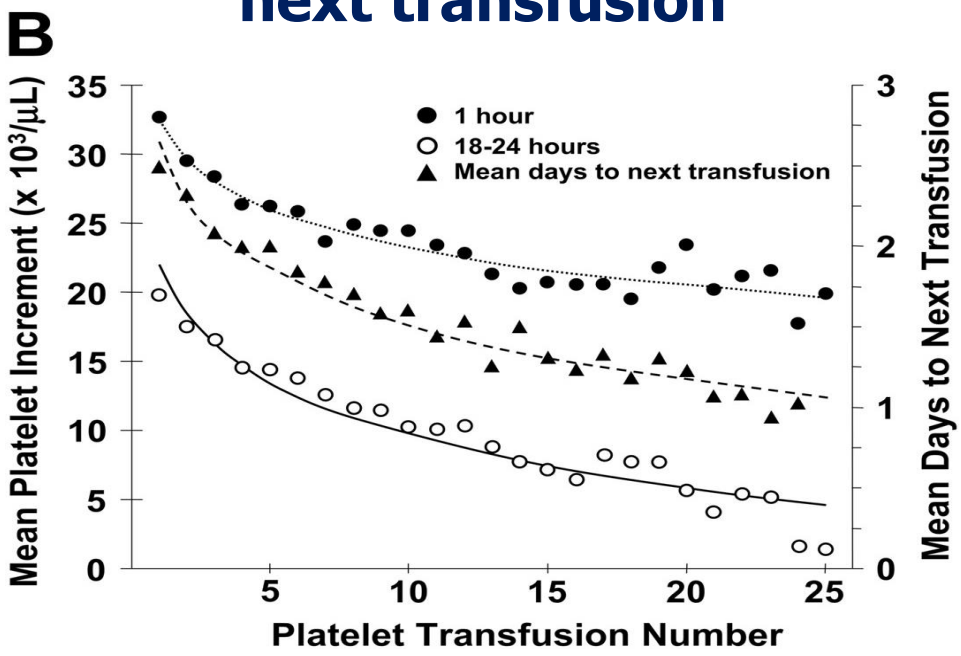


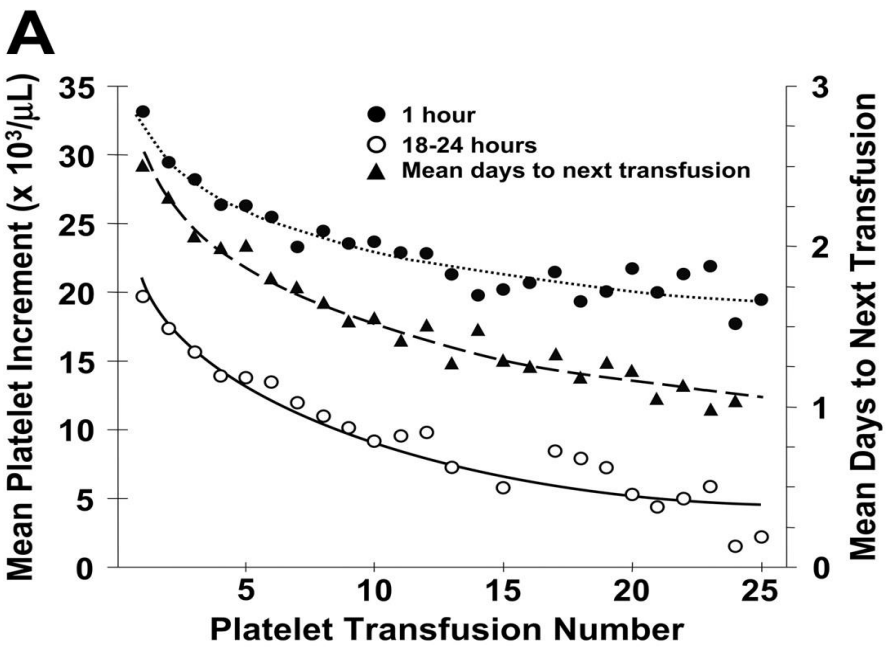
Dose of prophylactic platelet transfusions and prevention of hemorrhage. Slichter *et al. NEJM* 2010;362:600-613

Prophylactic Platelet Transfusions

Only **42%** of prophylactic platelet transfusions were considered appropriate in chronic bone marrow failure

Relationship between number of platelet transfusions, platelet increments and days to next transfusion





- ● 1-hr increment
- ○ 18-24 hr increment
- ▲ Days to next transfusion

Slichter S J et al. Blood 2005;105:4106-4114

Pre-procedure Platelet Transfusions

Overall appropriate use was **27%** (37/138)

51% (29/57) compliance in patients prior to procedures where platelet transfusion was recommended up to a maximum platelet count threshold of 50 x 10^9/L.

In **7%** (9/138) of patients who had a platelet transfusion prior to a procedure the only procedure being performed was a bone marrow aspirate or trephine.

Central Line Insertion (ultrasound-guided)

	Number of procedures (Platelets < 50)	Number of haemorrhages (Platelets < 50)	Number of major haemorrhages
Haas 2010 (tunnelled)	344	0	0
Zeidler 2011	173	6	0
Foster 2010	122	0	0
Cavanna 2010	116	0	0
Tercan 2008	49	0	0
Della Vigna 2009	45	0	0
Napolitano 2013	39	1	0
Tomoyose 2013	33	0	0
Total	**921**	**7**	**0**

Bone marrow aspirate & trephine

Year	Number of bone marrows performed	Number of haemorrhages	Number of haemorrhages (plts < 50)	Risk of haemorrhage
2002	13,506	10	3	1 in 1,351
2003	19,259	11	2	1 in 1,751
2004	20,323	9	0	1 in 2,258
2006	15,388	8	1	1 in 1,924
2013	9,295	9	6	1 in 1,033
Total		**47**	**12**	

Bain BJ. Bone marrow biopsy morbidity and mortality: 2002 data. Clin Lab Haem 2004;26:315-8.
Bain BJ. Bone marrow biopsy morbidity: review of 2003. J Clin Pathol 2005;58:406-8.
Bain BJ. Morbidity associated with bone marrow aspiration and trephine biopsy - a review of UK data for 2004. Haematologica 2006;91:1293-4.
Devalia V. Annual British Society for Haematology confidential survey of bone marrow examination associated adverese events 2011. Br J Haematol 2013;161:22-3.

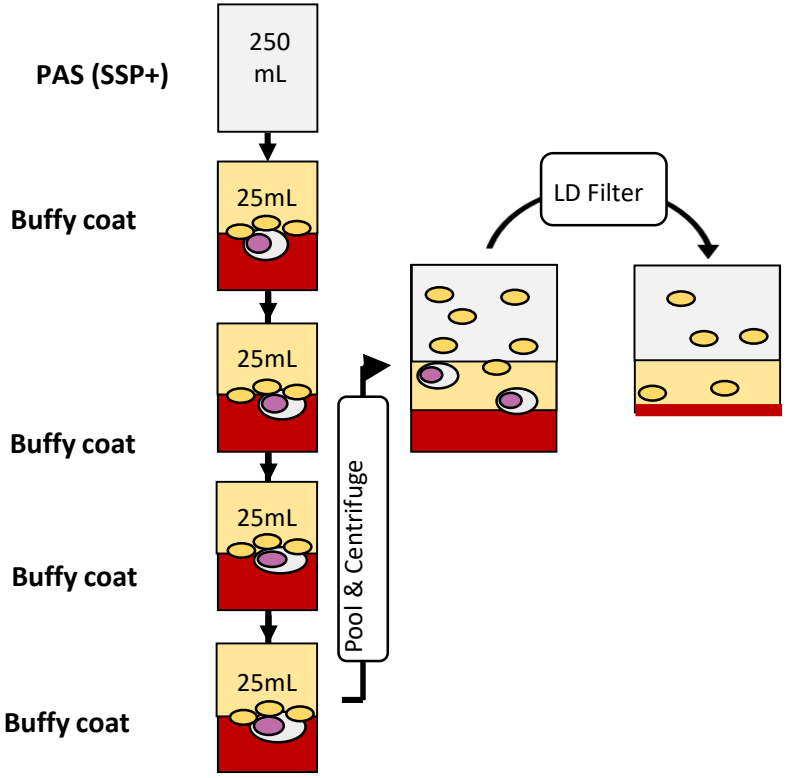
Current methods for platelet production (UK)

Apheresis

1, 2 or 3 units collected per donation via machine that returns other blood cells to donor

50% of UK supply

Whole blood (buffy coat)-derived



50% of UK supply

The Component

Approx 300 x10^9 platelets in 300 mL

Only a tiny volume of a platelet component is platelets < 1%

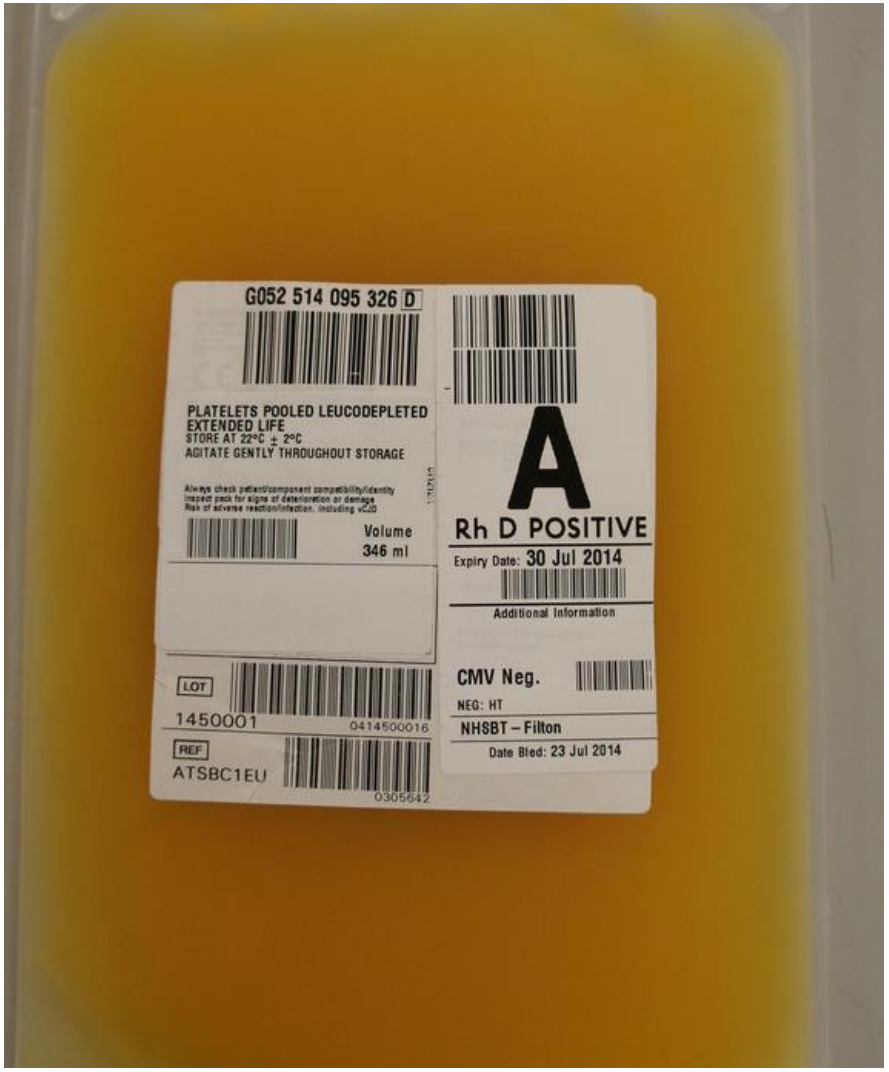
Stored for 7 days – room temp

Compatible for ABO/RhD blood groups

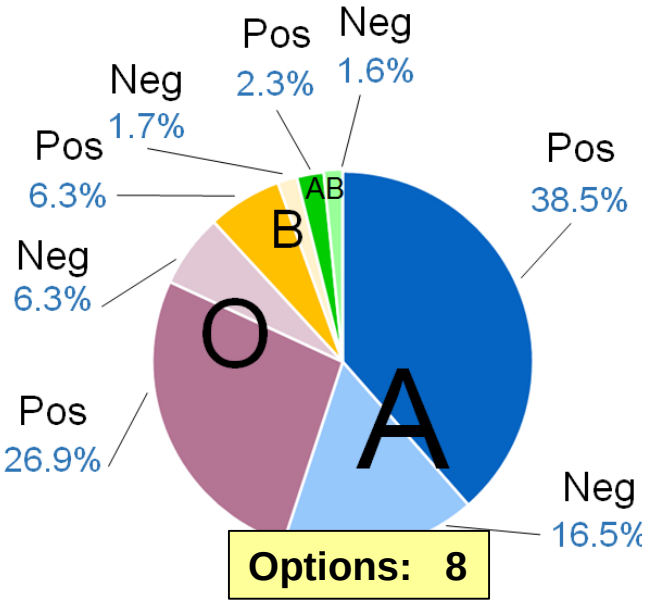
Apheresis platelets have to be high titre negative

HLA/HPA matched if needed

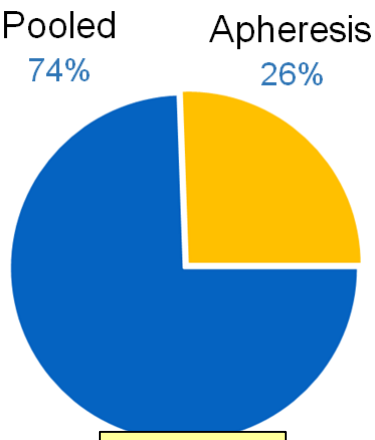
Tested for HIV, HBV, HCV, HEV, bacteria



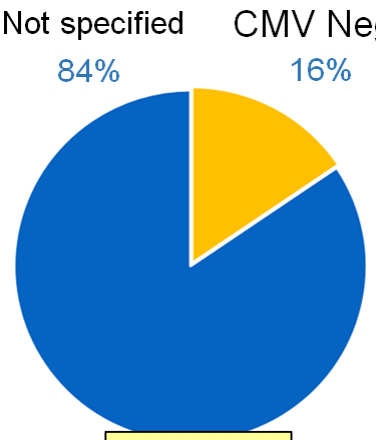
The supply chain is complex



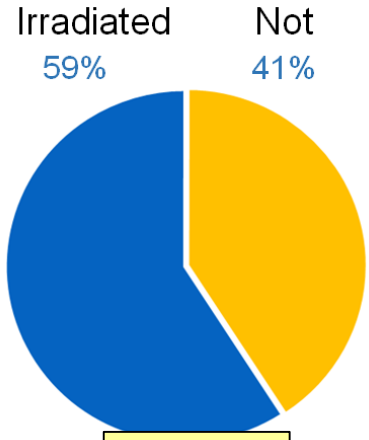
Options: 8



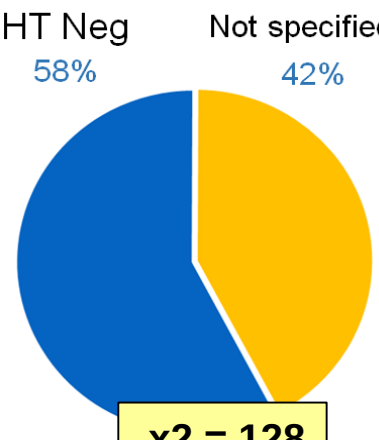
x2 = 16



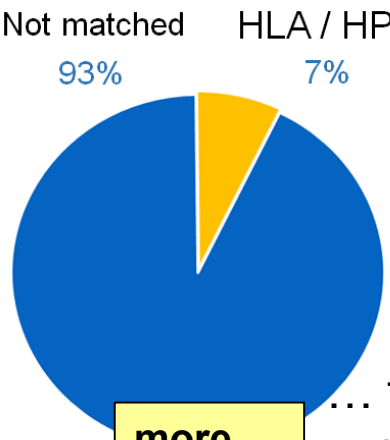
x2 = 32



x2 = 64



x2 = 128

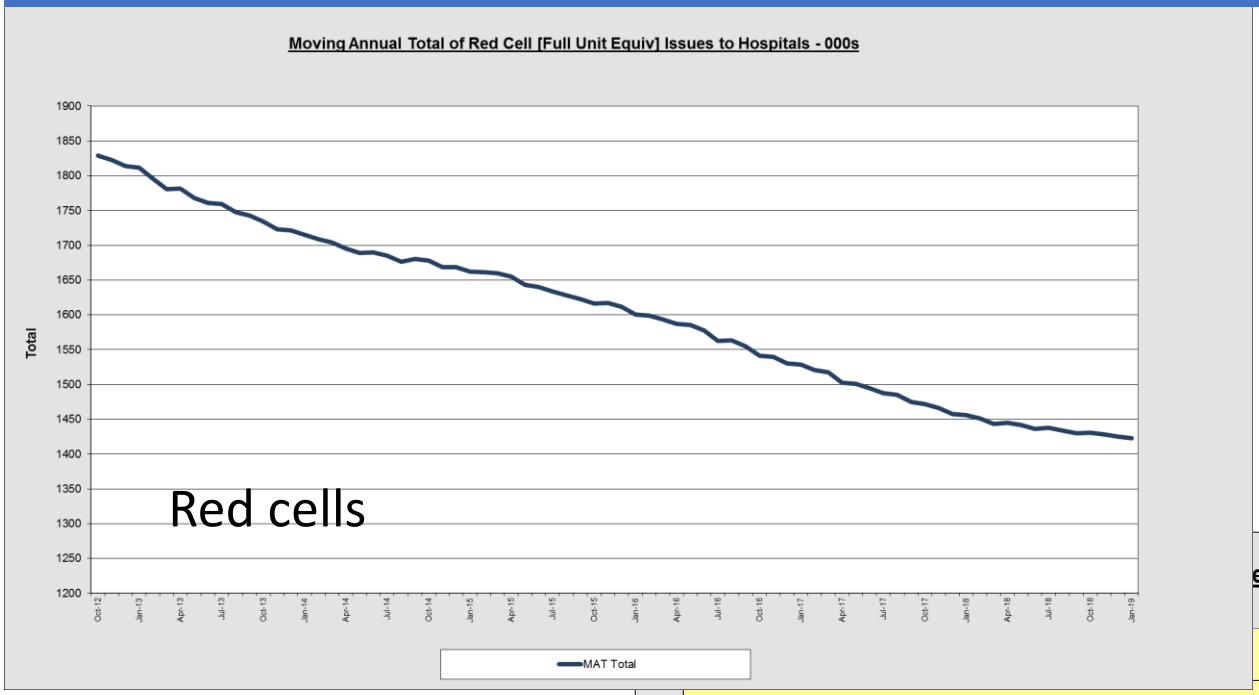


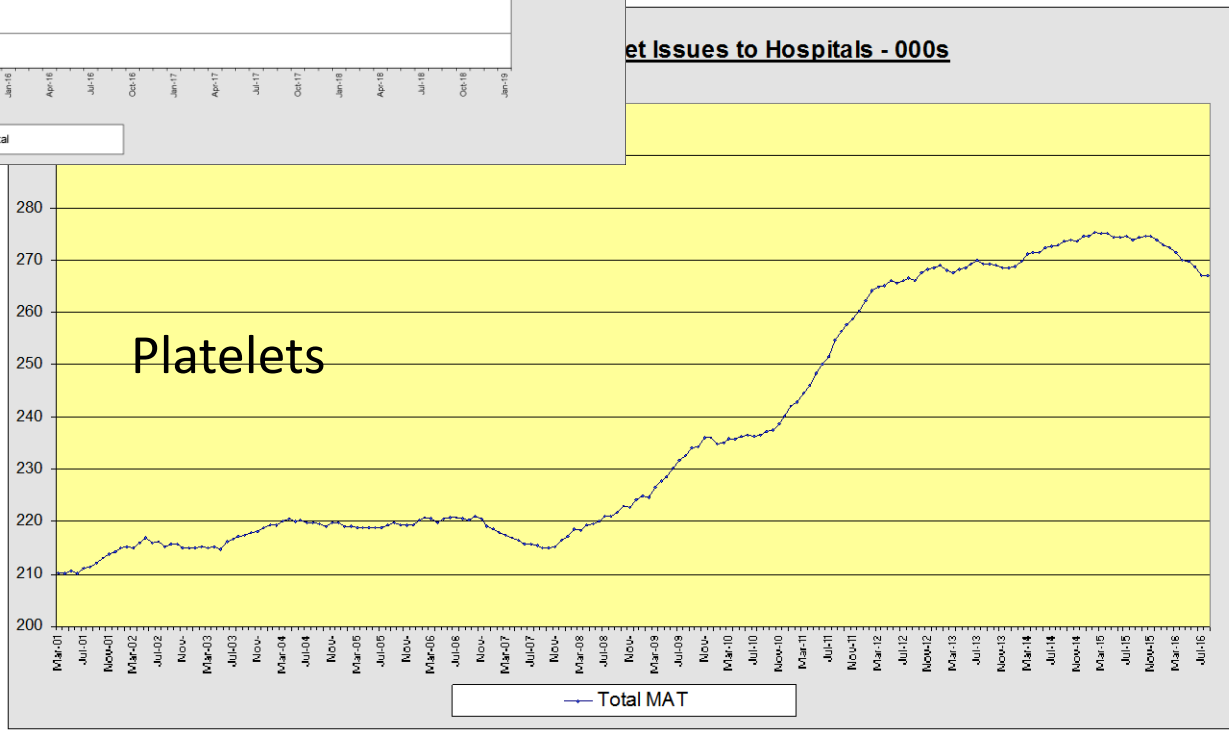
more …

OBOS Demand Data
March '18 to March '19
Platelet Supply Team

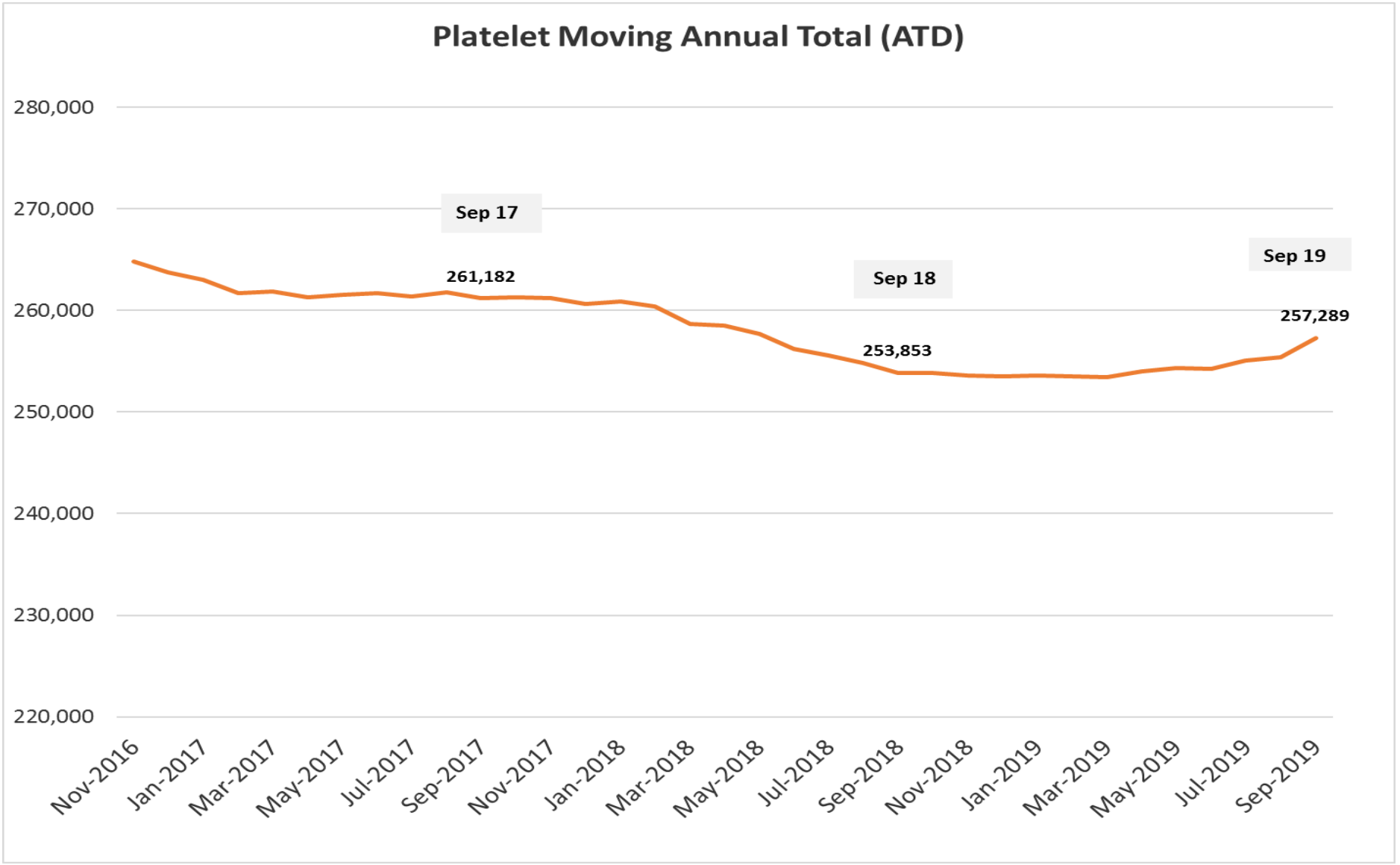
… for adult platelets with an expiry of 3-4 days to be held at 15 Stock Holding Units.

Red cell demand has decreased, not platelets

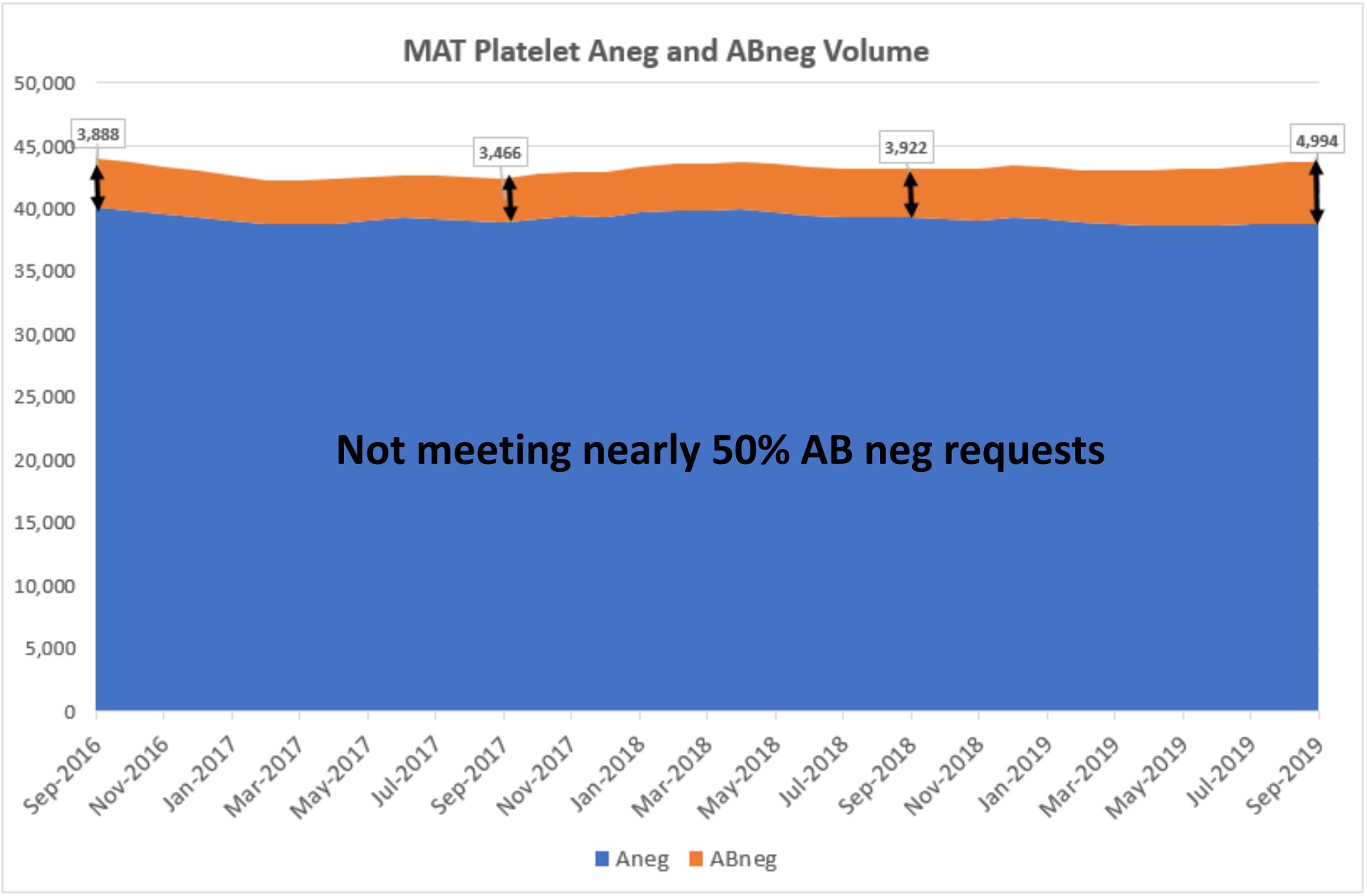




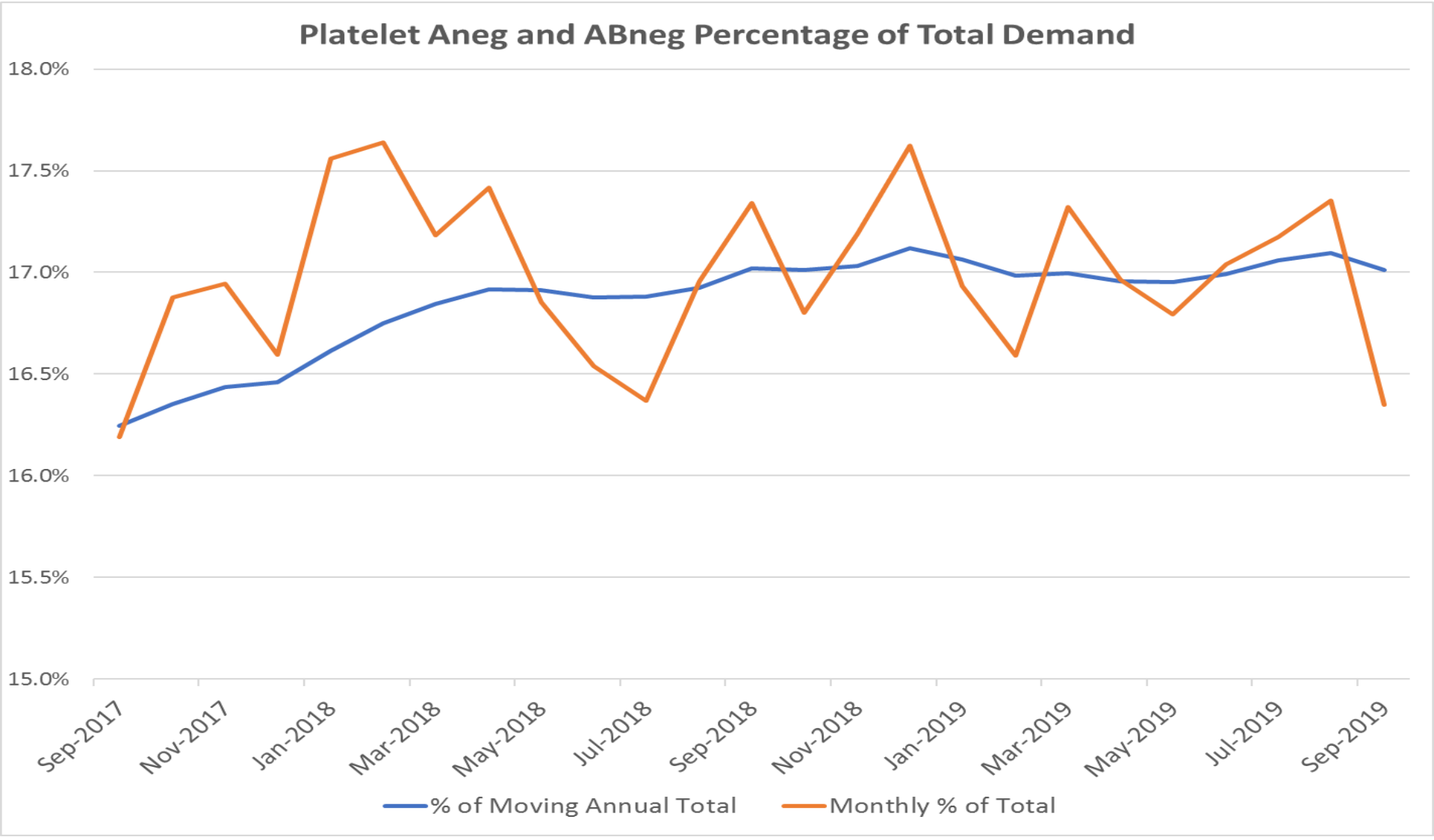
Total Platelet MAT demand



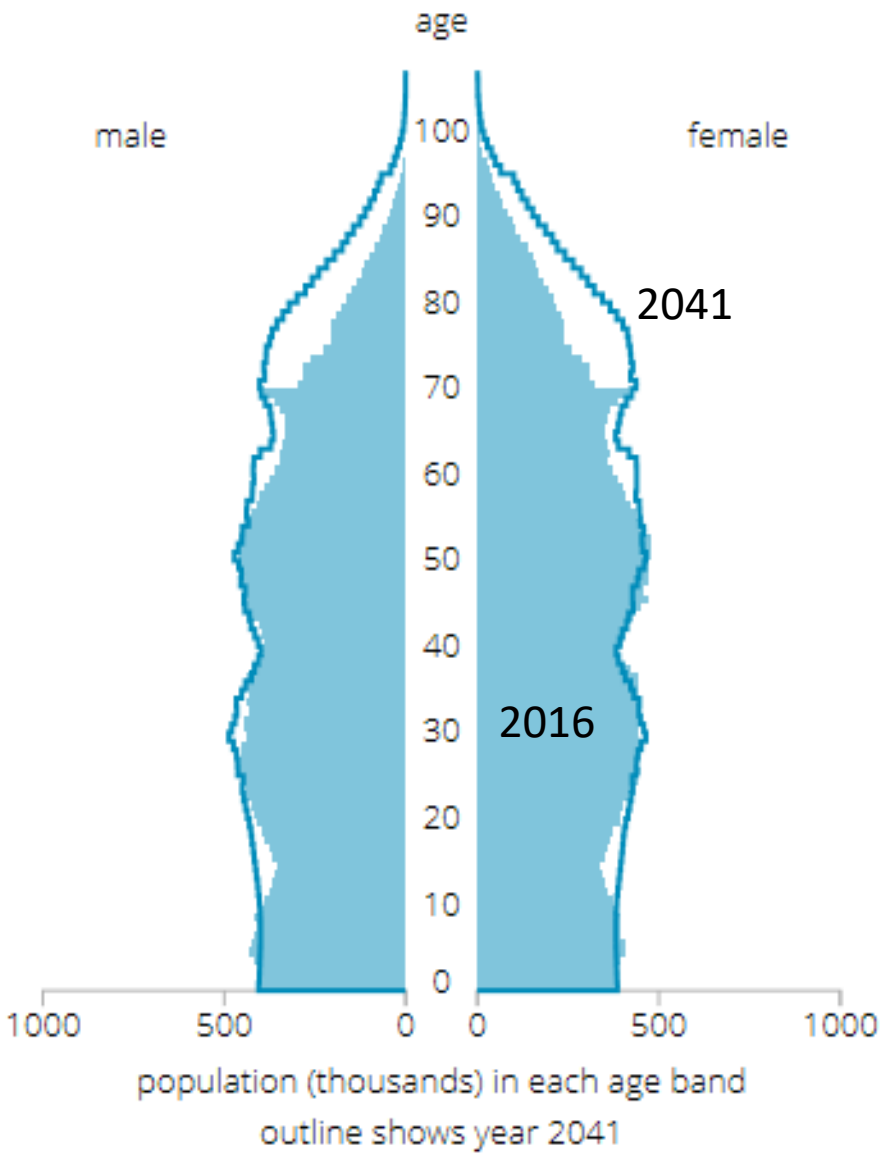
A neg + AB neg Platelet demand as volume



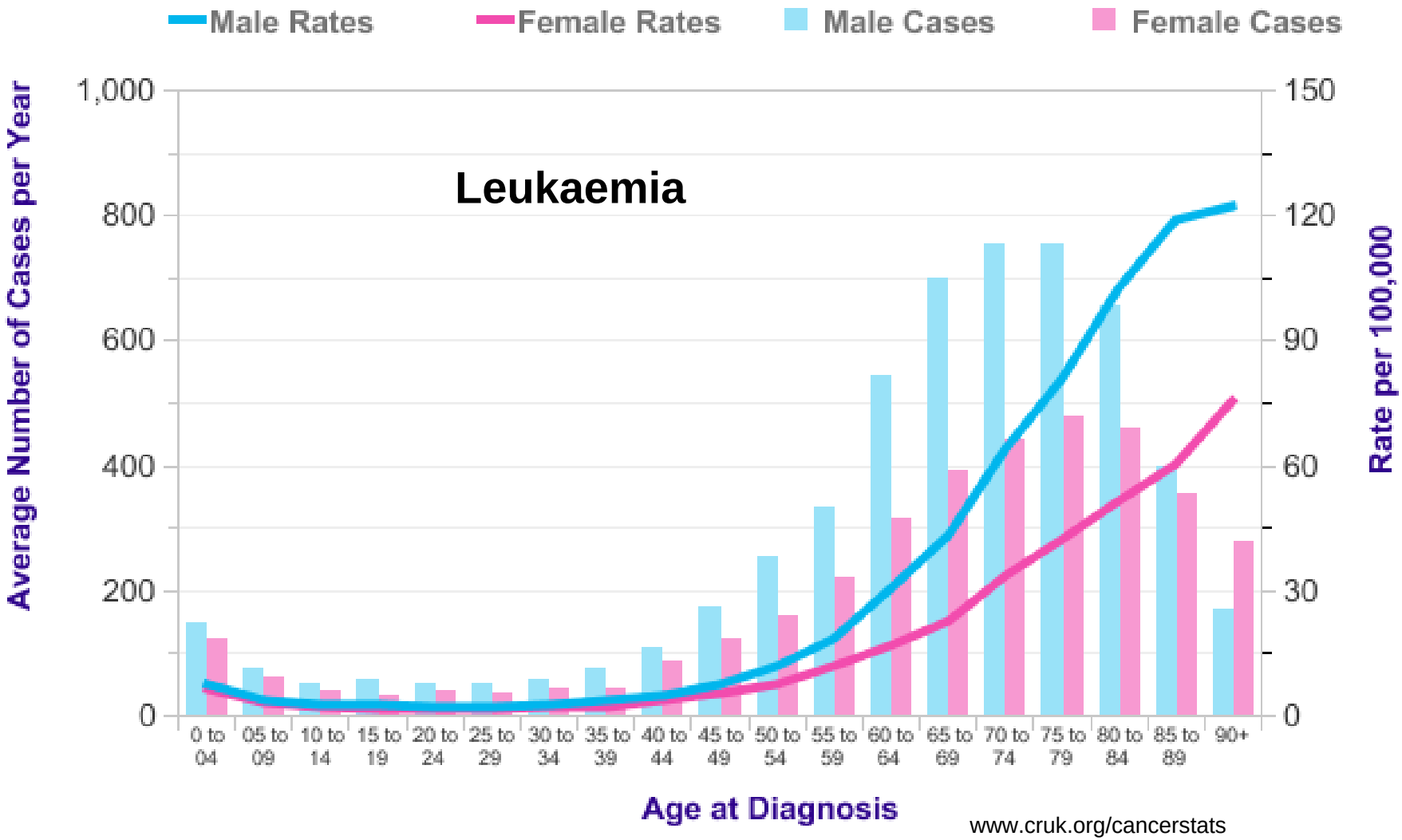
A neg + AB neg Platelet demand as % of total platelet demand



Our population is ageing



Conditions that may require platelet transfusions increase with age



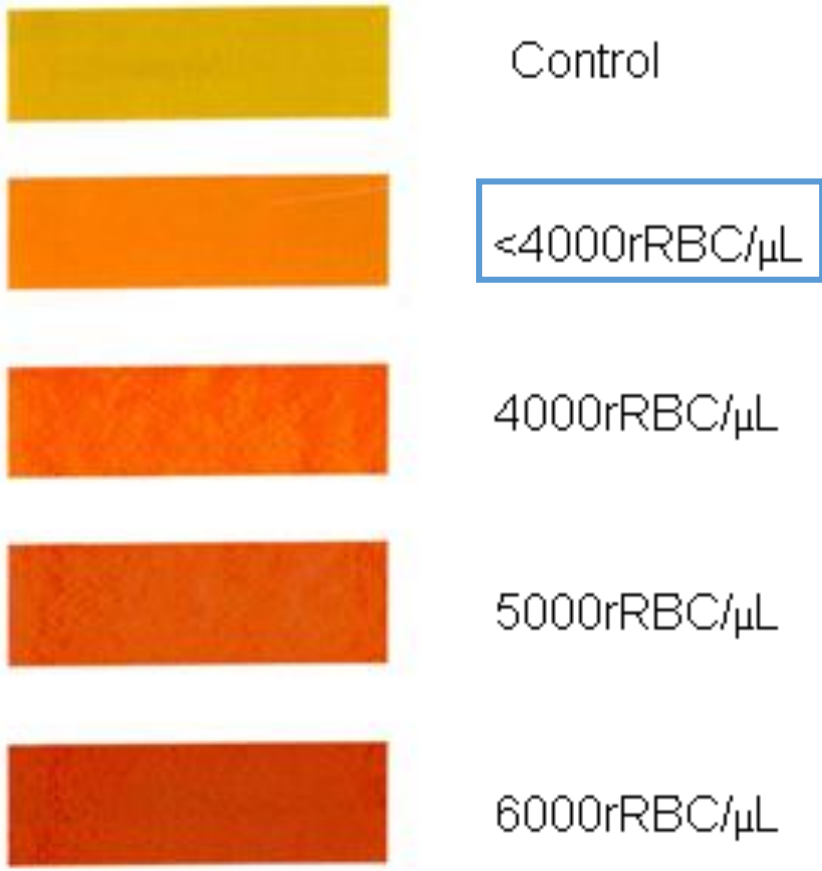
www.cruk.org/cancerstats

Why do we need ABO and Rh matched platelets?

- Risk of red cell alloimmunisation
  - Residual red blood cells (rRBC)
- Risk of haemolytic transfusion reaction
  - Donor alloantibodies
- Increased destruction of transfused platelets
  - Recipient alloantibodies

Residual RBC content

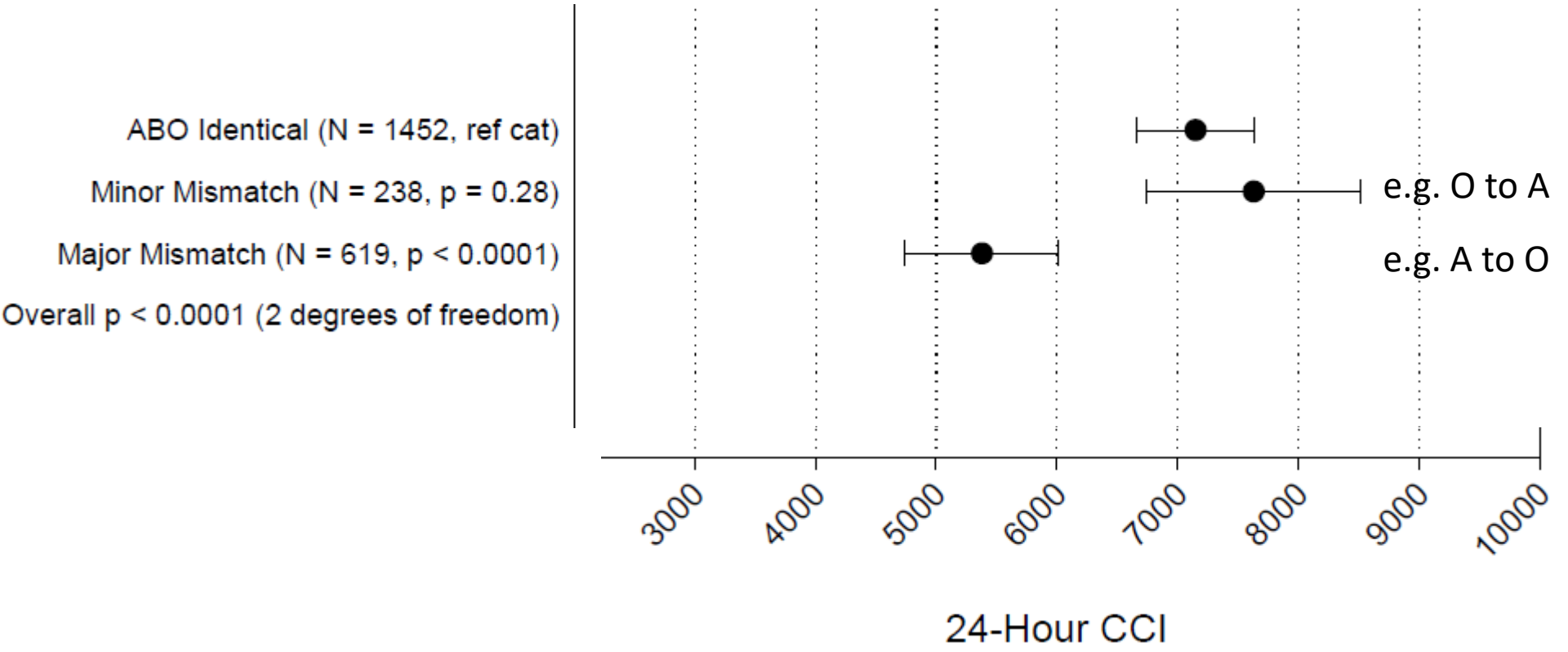
No UK or EU requirement to measure red cells routinely



Comparison with published studies – apheresis

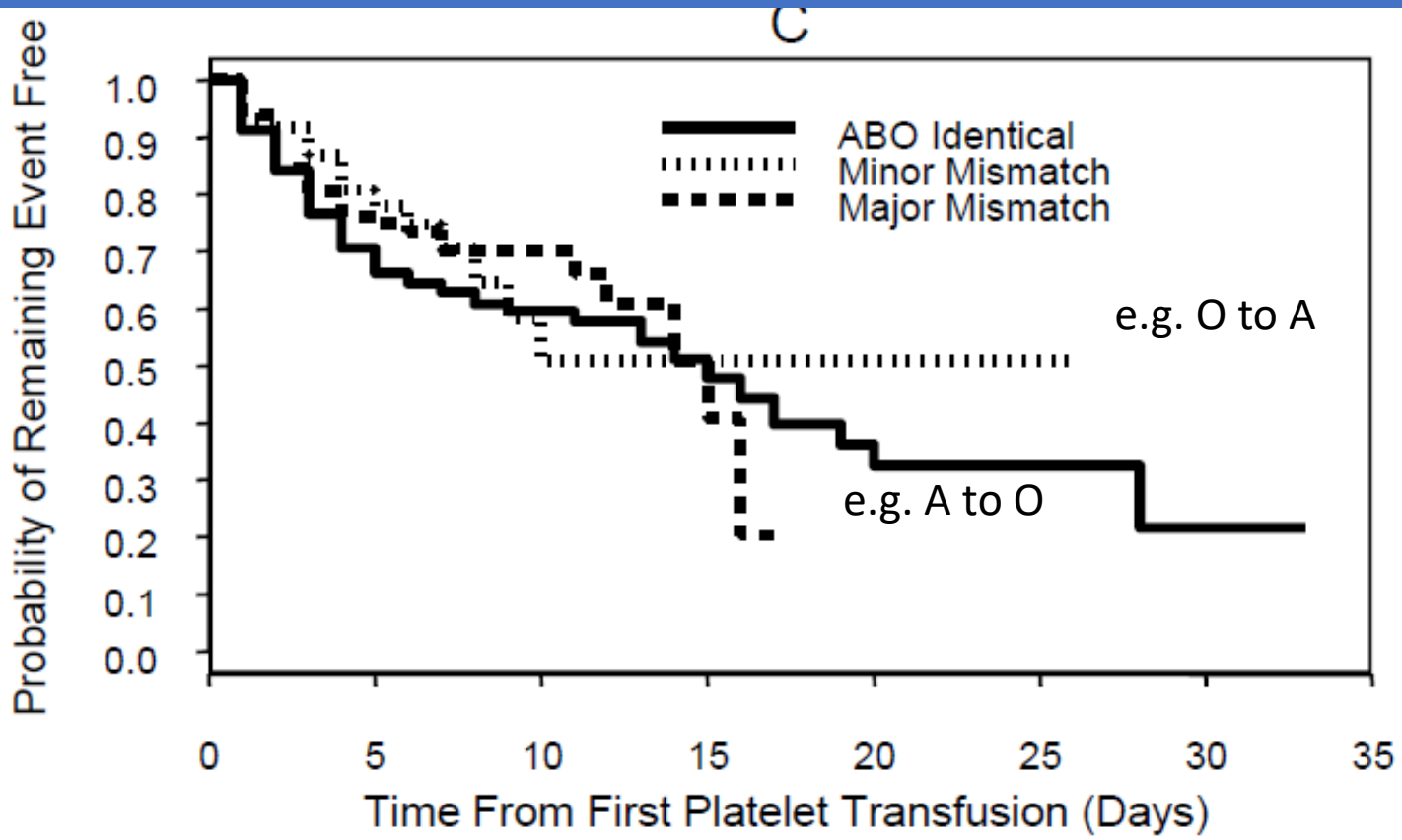
Country	Study	Median volume of RBCs per unit
USA	Molnar et al 2002	0.17µL
England	Unpublished	0.3µL
Spain	Cid et al 2011	0.43µL
USA	Santana & Dumont 2006	0.47µL
Canada	Culibrk et al 2012	1.44µL (1.08-2.07µL)

Corrected count increment



Triulzi et al 2012, Blood

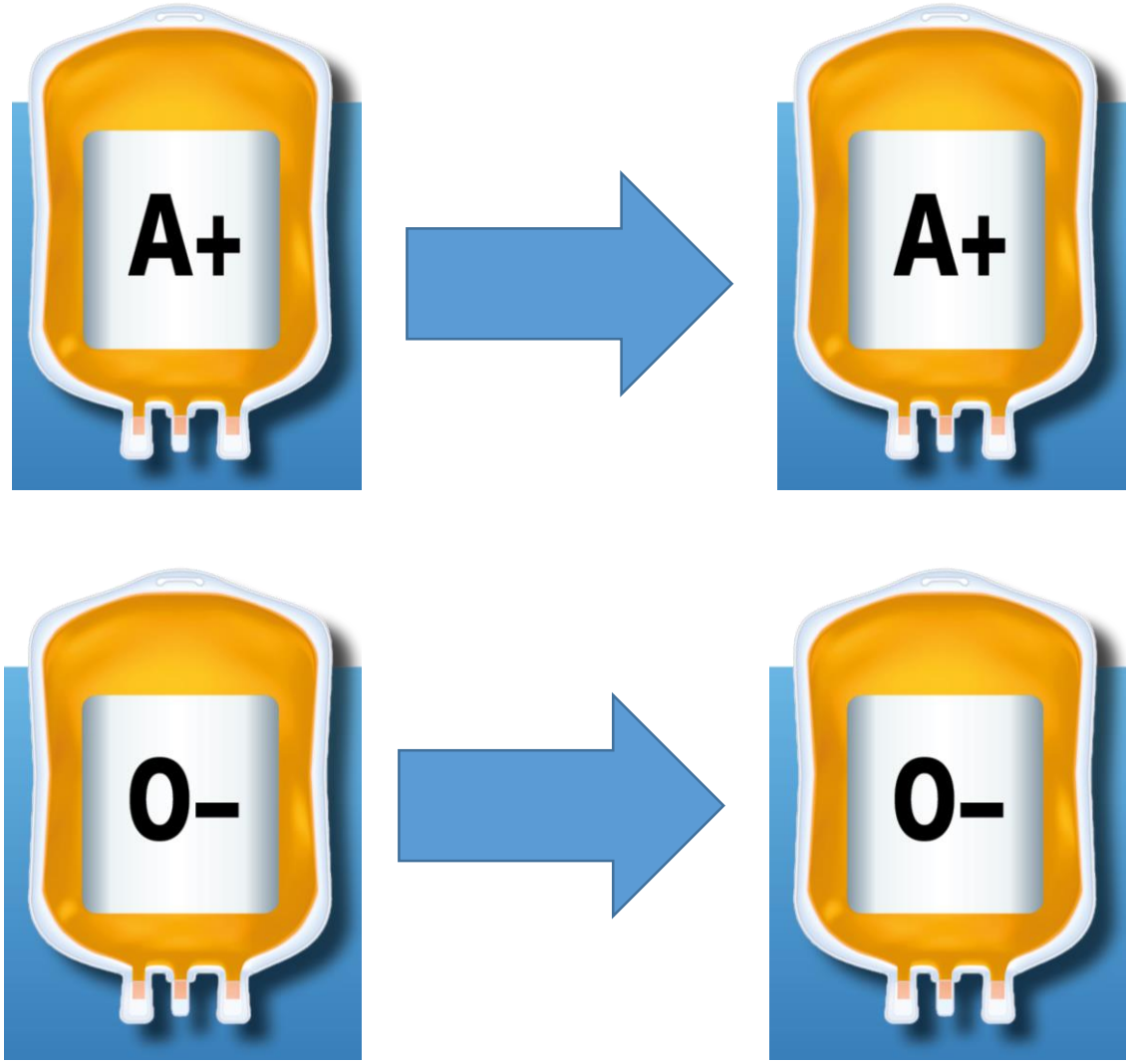
Risk of bleeding



No. Patients at Risk							
ABO Identical	467	215	78	31	10	3	1
Minor Mismatch	75	30	8	2	1	1	
Major Mismatch	198	72	27	5			

Triulzi et al 2012, Blood

Best choice is ABO & Rh matched




A+
O+
O–
If you stock platelets establish a strategy to maximise transfusion of ABO/D compatible units

The use of platelets of a different group should be limited to patients where:

1. the blood group is unknown
2. there is a need to prevent wastage due to time expiry
3. specific requirements are necessary
4. time does not allow

CMV negative platelets are rarely needed: do not order unless the patient requires them

1 Intra-uterine transfusion (IUT)

2 Neonatal transfusion up to 28 days post EDD

3 Elective transfusion during pregnancy (not labour or delivery)

Best choices across ABO blood groups

Recipient Group	Group O	Group A	Group B	Group AB	Unknown
1st Choice	**O**	**A**	**B**	**AB**♓	**AB**♓
2nd Choice	A or B	AB♓	AB♓	A* or B*	A* or B*
3rd Choice	AB♓	B* or O*‡	A* or O*‡	O*‡	O*‡

Not enough AB platelets

*** High titre negative if available**

‡Avoid O platelets in non-O neonates and children – higher risk of haemolysis

Best choices for D negative patients

D matched if possible

Prioritise

- D negative women of child bearing potential
- D negative children (< 18 years)
- Already have anti-D antibodies

If D mismatched

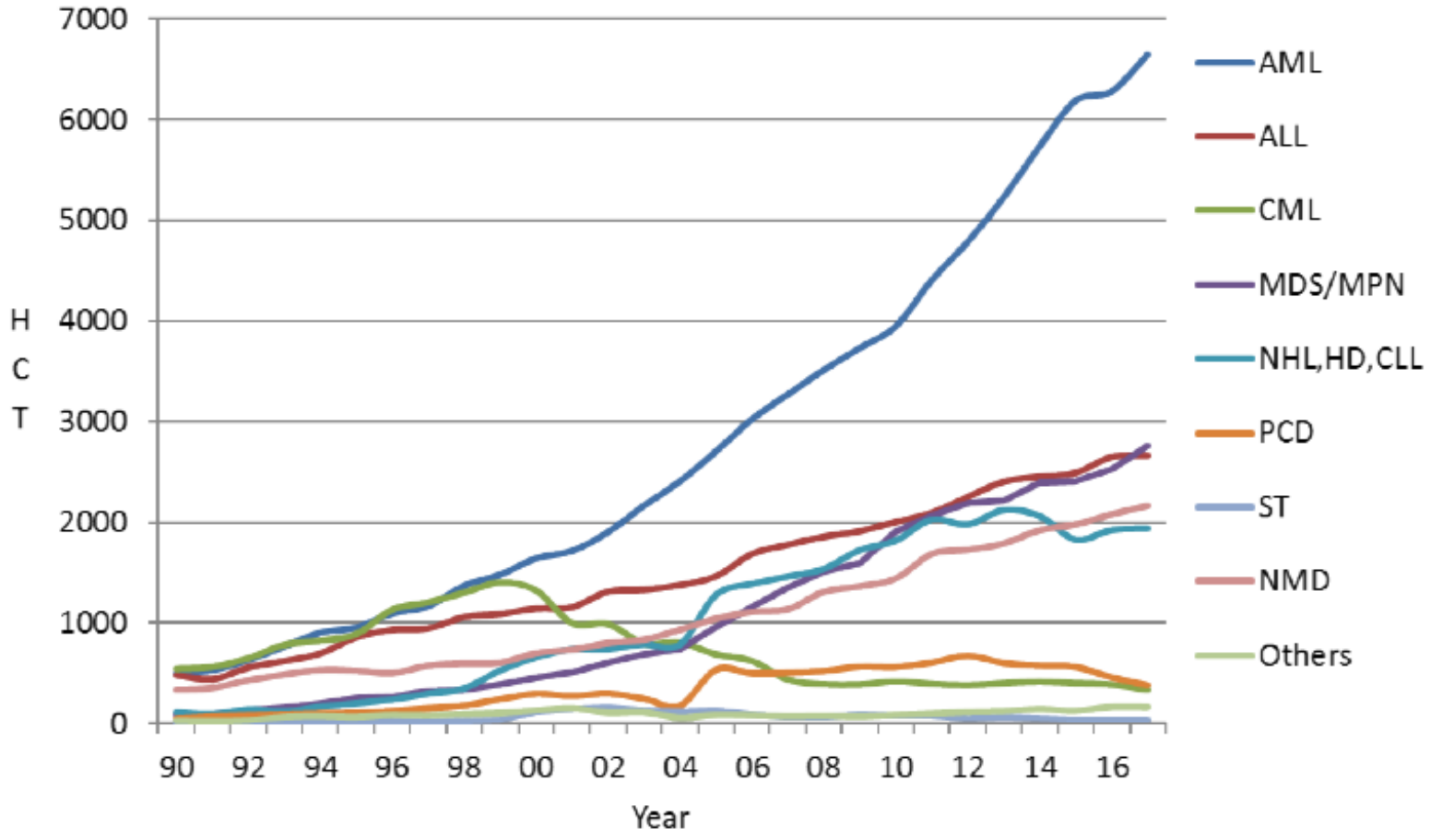
Use apheresis platelets if available (less RBC contamination)

Give Anti-D to D negative girls & women of child bearing potential

Platelet stem cell transplant first choices

Donor	Recipient			
	O	A	B	AB
O	O	A	B	AB
A	A	A	AB	AB
B	B	AB	B	AB
AB	AB	AB	AB	AB

HSCT Activity in Europe 1990-2017:
Main indications: allogeneic 1st. HSCT



Algorithm to guide hospital decision making in holding stock platelets

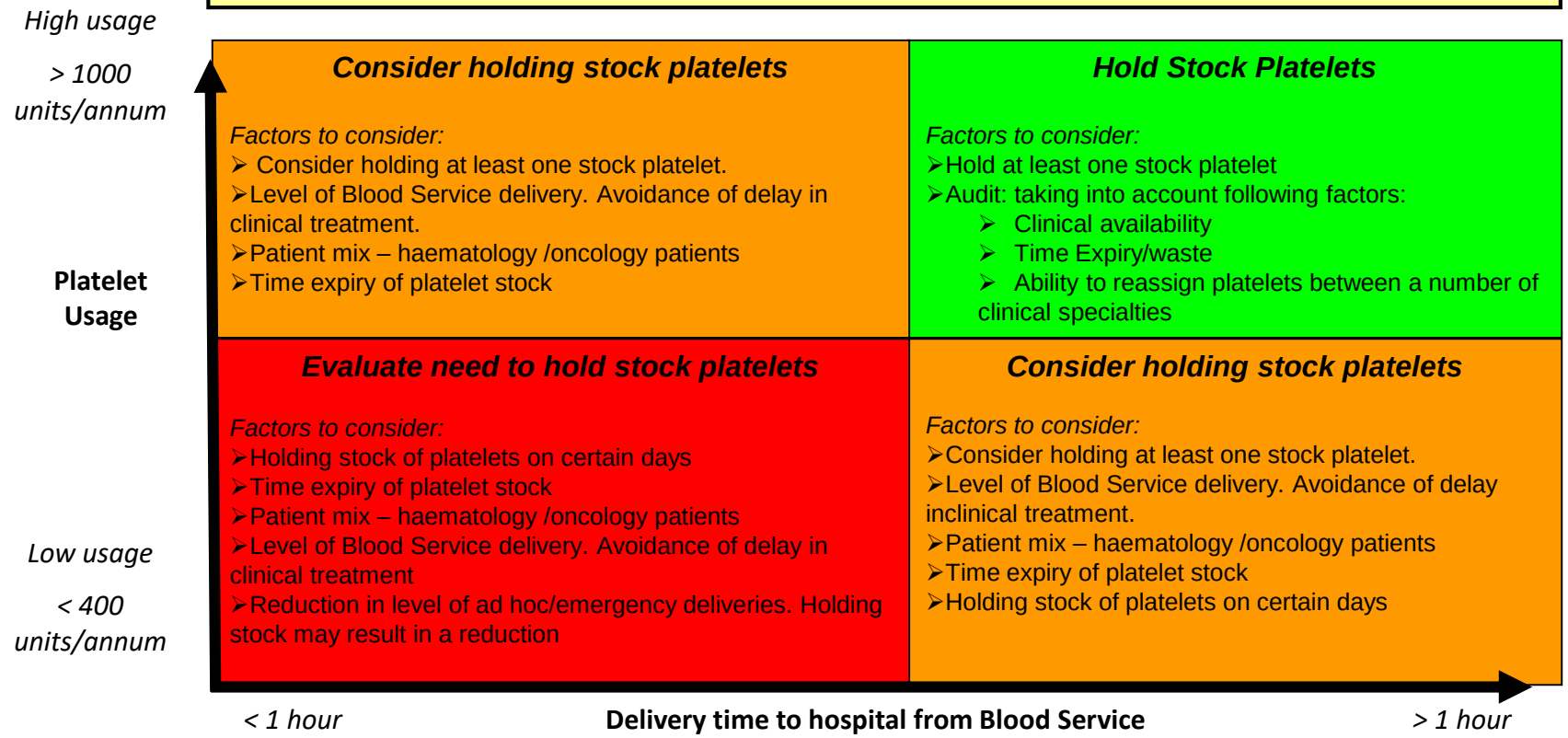
The objective of the algorithm is to guide hospitals in making a decision as to whether to hold stock platelets. Evidence has been collated by the BSMS in 2011 and in 2016.

Specification of emergency platelet stock

It is not necessary to hold A D Negative platelets.

- *Units negative for high titre haemagglutinins & non-group O platelets are associated with a lower risk of haemolysis.*
- *Pooled platelets suspended in PAS would also be expected to reduce the risk of haemolysis.*
- *Develop practices which maximise the use of ABO and D identical platelets.*

It is usually not necessary to specify CMV Negative/Apheresis.



References

http://hospital.blood.co.uk/media/28910/appropriate-use-of-platelets-across-blood-groups-final-_1_-_2_.pdf

http://www.b-s-h.org.uk/guidelines/guidelines/use-of-platelet-transfusions/

Summary

Reduce inappropriate use

Consider stockholding practices

Use ABO and D matched red cells whenever possible

- Better for patients
- Preserves supply of A neg and AB neg platelets