WASTAGE OF BLOOD COMPONENTS

(A National and Local perspective)

ATMF/IPFA Joint Webinar

Dr Craig Taylor

Clinical Lead for Transfusion – Black Country Pathology Service

Blood Stocks Management Scheme – Steering Group Chair

NHS Pathology Serving the Black Country

Blood Stocks Management Scheme

Background

- Blood components – Red cells, Platelets, Plasma
- Precious and limited resource
- Limited shelf life
- Supply challenges
  - Need it where and when it is needed
- Altruistically donated
  - Have a moral duty to make the best use of

How do we manage/minimise wastage?

- Need DATA!

- What is being wasted?
- Where it is being wasted?
- Why is it being wasted?
- Who is wasting it?

- Is it systems or people (or people without systems!)?

Blood Stocks Management Scheme

- Set up in 2001 to understand and improve inventory management
  - Funded by UK Forum
  - Hosted by NHSBT
- Voluntary participation
  - Though encouraged through National guidance
  - Currently England, Wales, Northern Ireland.
- Collect issue, stock and wastage data
- Benchmarking across hospitals/networks
- Promote best practice and shared learning

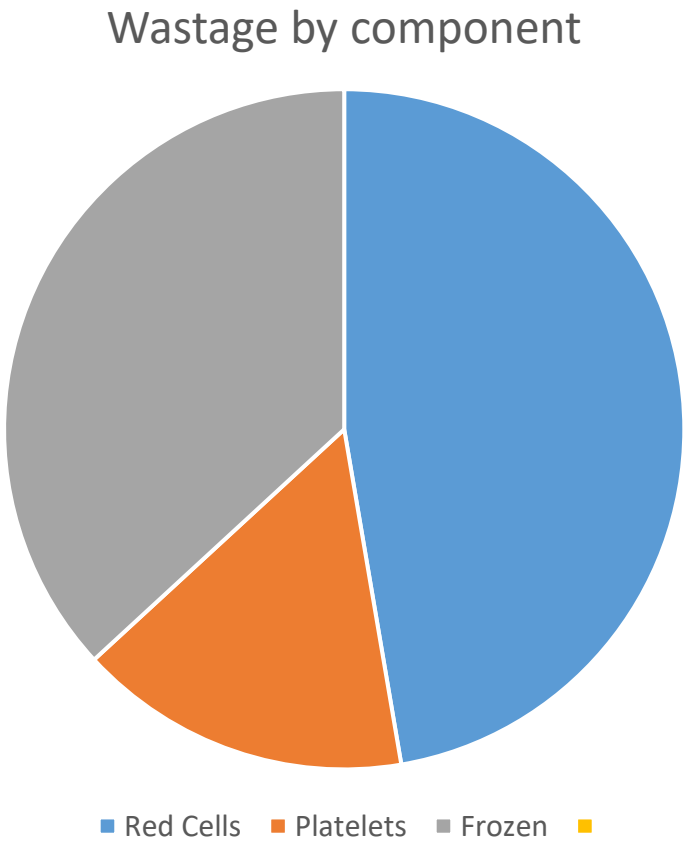
BSMS limitations…

- Voluntary participation
  - Data incomplete
  - Blood service data difficult to obtain…
- Manual data entry (mostly)
  - Don’t have connected systems
- Do not have ‘whole supply chain data’

- Remains the only repository of this data in England and Wales

What is being wasted?

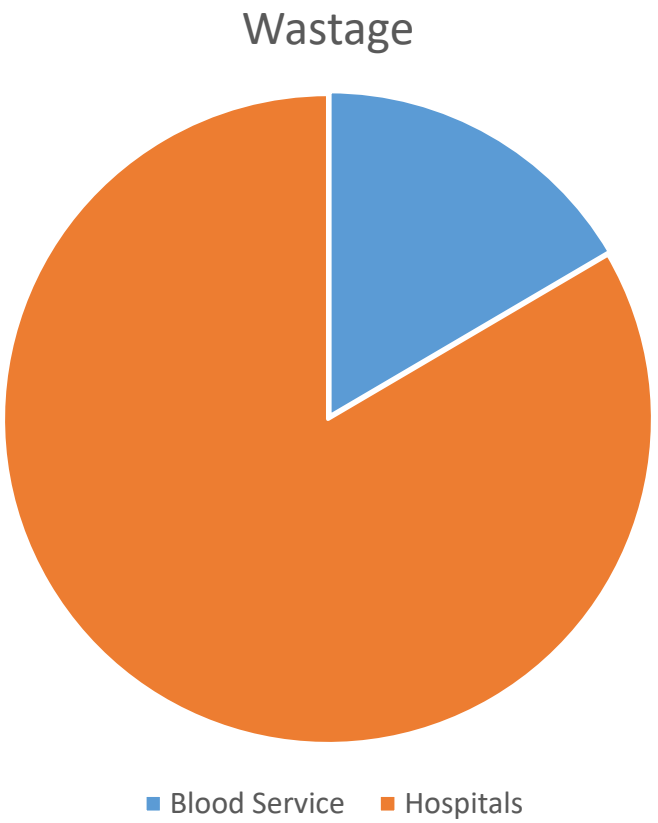
- BSMS Hospital Data for 2020-21
  - 34,856 red cell units
    - 2.6% of issues
  - 11,671 platelet doses
    - 4.5% of issues
  - 27144 adult FFP (underestimate)
- Cost to Hospitals?
  - £145.99 standard red cells
  - £222.94 standard adult platelets
  - £36.70 adult FFP
  - **£8.7m**





Where are red cells being wasted?

- Hospital v Blood service
  - 2007-08 data
- NHSBT
  - 7918 units
    - (0.4% WAPI)
- NHSBT supplied Hospitals
  - 39,927 units
    - (2.1% of all issues)

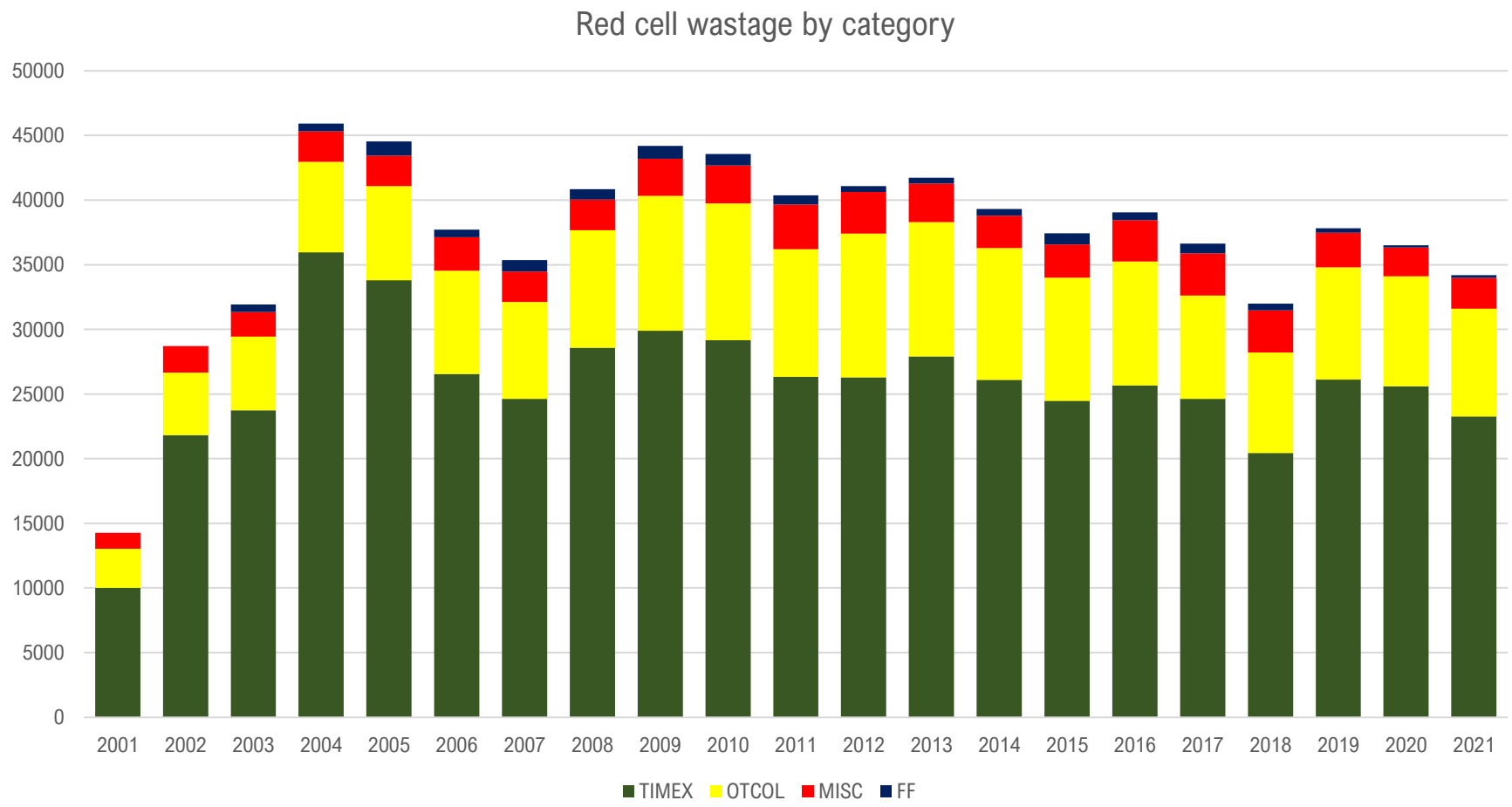


Why are red cells being wasted?

- TIMEX
  - Time expired in laboratory
- OTCOL
  - Out of Temperature Control – Lab or clinical area
- Fridge Failure

- Miscellaneous
  - Spiked, punctured, dropped, lost…..

Hospital RBC Wastage



2020-21

Non-TIMEX wastage ≈ 10.4k*

2020-21

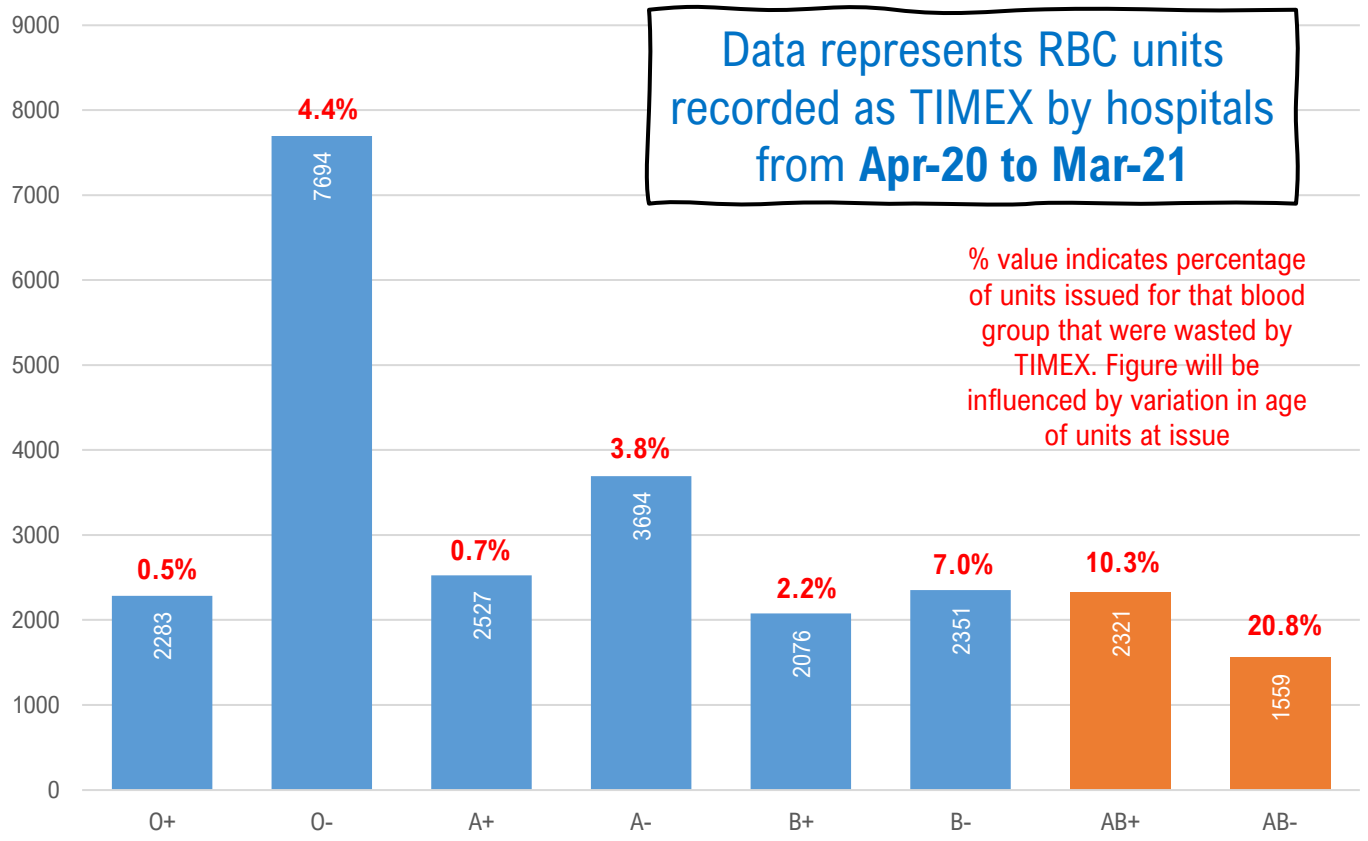
TIMEX wastage ≈ 24.4k*

*Please note that reported figures are likely to be an underestimation as not all hospitals report wastage data

Hospital RBC expiries by group

Blood Stocks Management Scheme

- Hospital RBC wastage for units that time expire varies significantly by blood group.



The volume of red cell units reported as time expired during 2020-21 was heavily impacted by Covid-19 and in particular the 1st nationwide lockdown and subsequent suspension of clinical services. Analysis would suggest that this accounted for an additional **2.2k** of units wasted.

Data provided by Blood Stocks Management Scheme. Please visit www.bloodstocks.co.uk or email bsms@nhsbt.nhs.uk for further information

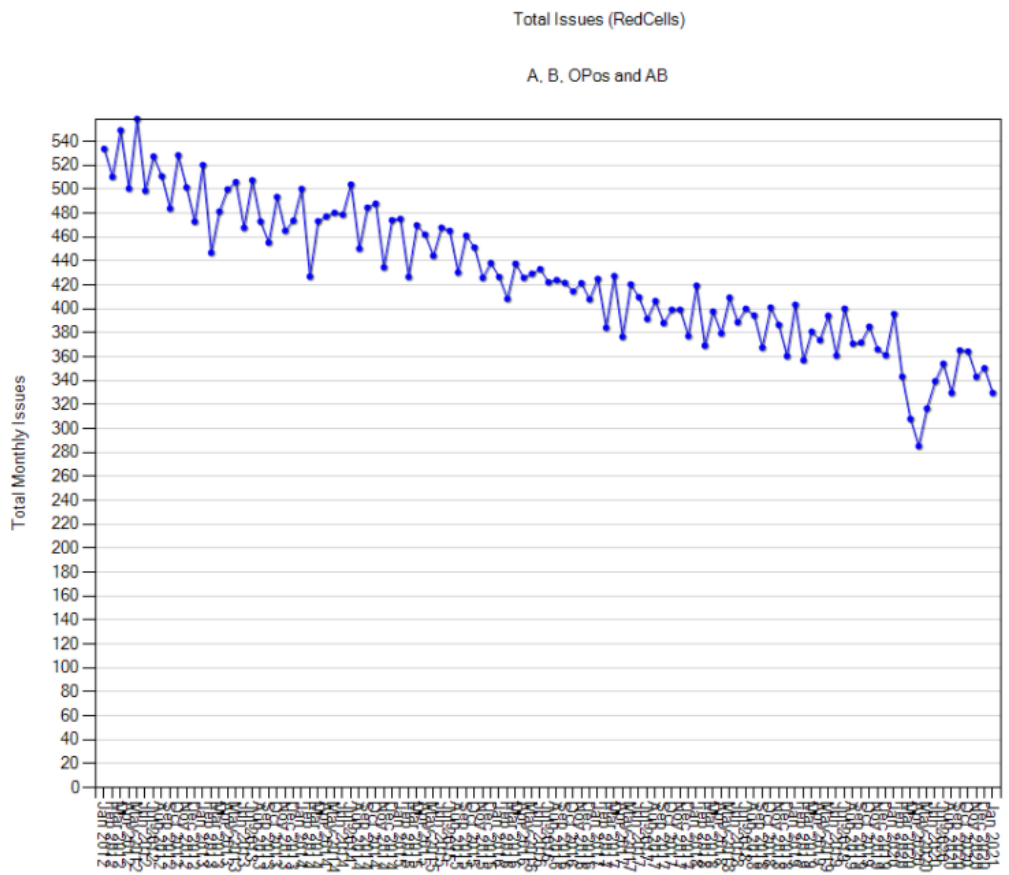
O neg wastage…

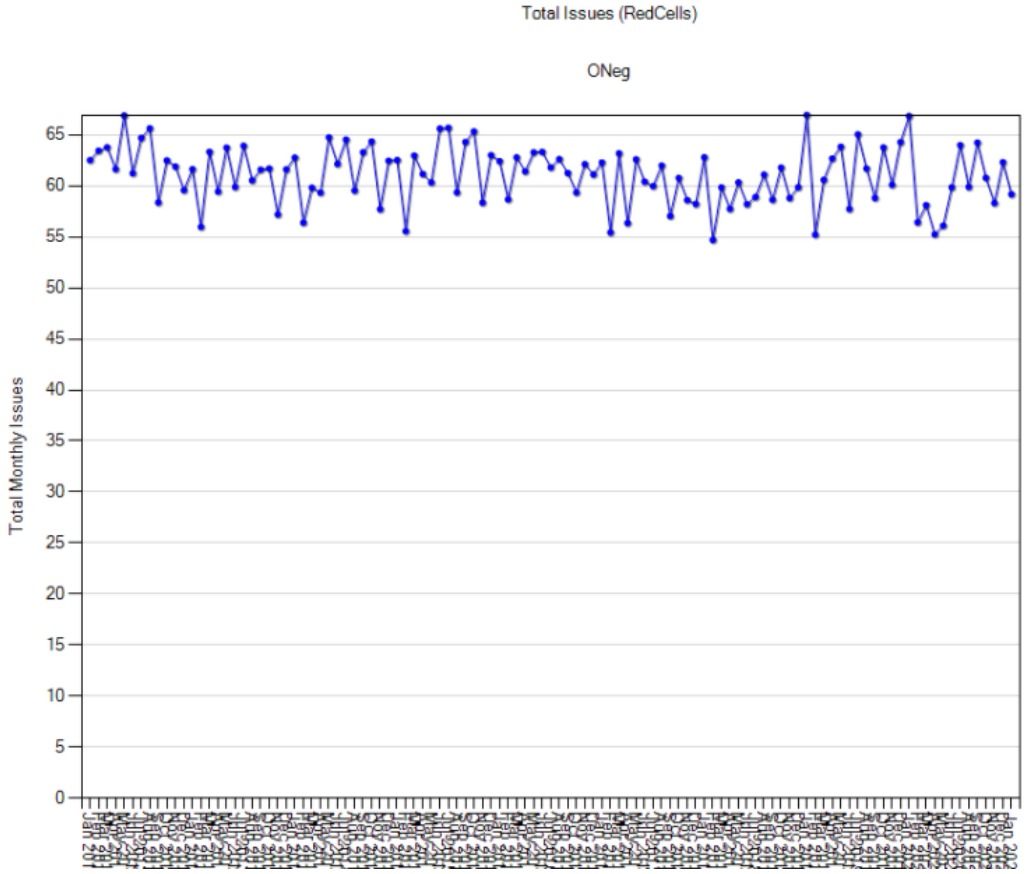
- **Emergency blood**
- Most precious resource
  - But highest wastage

- Hospital factors
  - Laboratory processes – Turnaround times, Electronic issue, MSBOS…
  - Geography – of hospital, from blood centre
  - Specialities – Trauma centre, cardiac surgery…..
  - **Perception of risk**

O Neg Issues – 2012-21

7% of population, 13% of issues







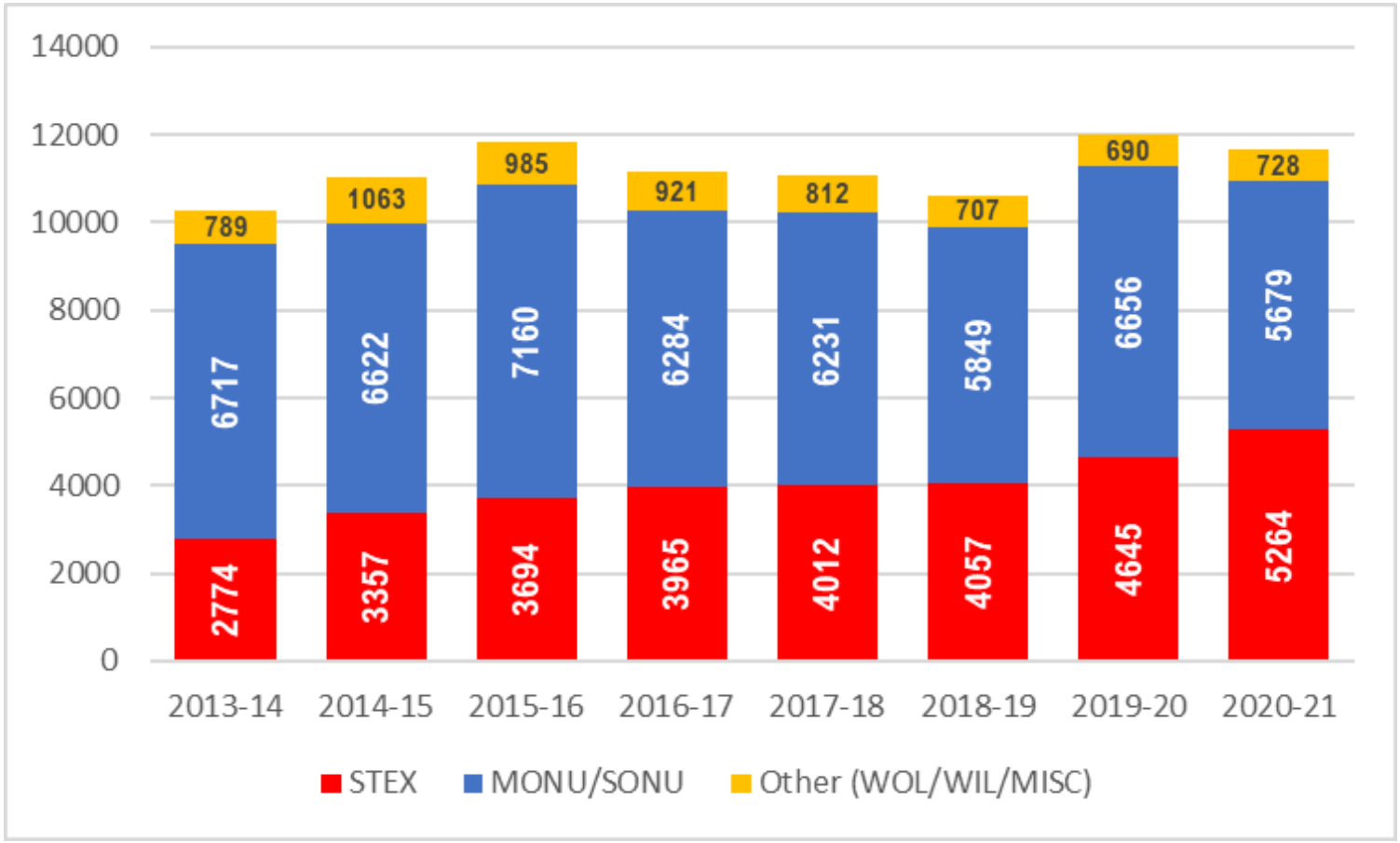
Platelet wastage

- STEX – Stock time expired
- MONU/SONU – Medical/Surgical Order Not Used
- WOL/WIL – Wasted Outside/Inside the Laboratory
- Miscellaneous

Hospital Plt Wastage

Blood Stocks Management Scheme

- Hospital platelet wastage 4.5%



2020-21
Stock TIMEX wastage
≈ **5.2k**

2020-21
Medically/Surgically ordered wastage ≈ **5.6k**

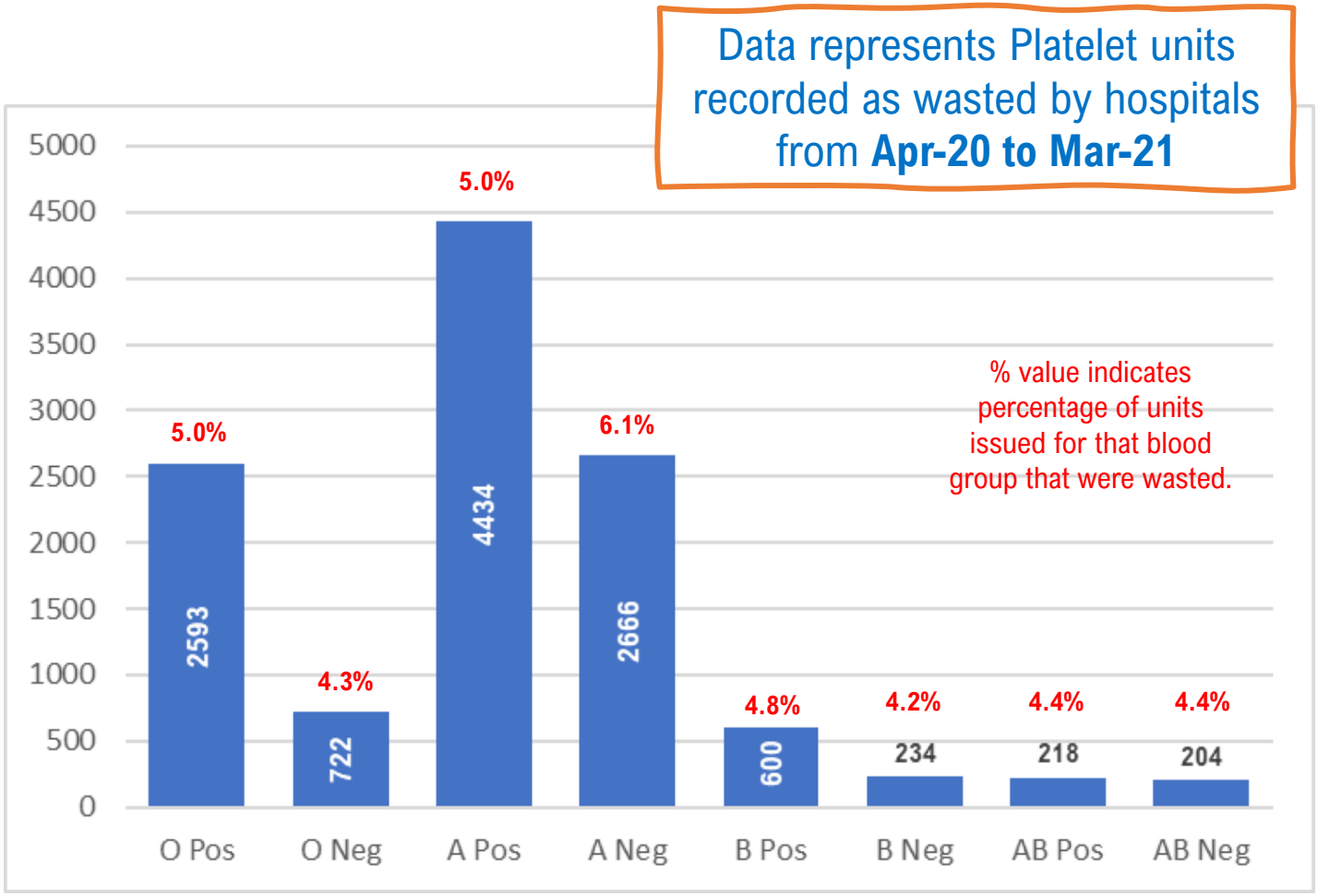
2020-21
Other wastage ≈ **0.7k**

Data provided by Blood Stocks Management Scheme. Please visit www.bloodstocks.co.uk or email bsms@nhsbt.nhs.uk for further information

Hospital Platelet expiries by group

Blood Stocks Management Scheme

- Hospital Plt wastage varies significantly by blood group. A+/A- units are more likely held as stock in some hospitals which raises the likelihood of wastage.



The volume of plateles reported as time expired during 2020-21 was impacted by Covid-19 and in particular the 1st nationwide lockdown and subsequent suspension of clinical services. Analysis would suggest that this accounted for an additional **0.8k** of platelet units wasted.

Data provided by Blood Stocks Management Scheme. Please visit www.bloodstocks.co.uk or email bsms@nhsbt.nhs.uk for further information

Need to consider the whole supply chain?

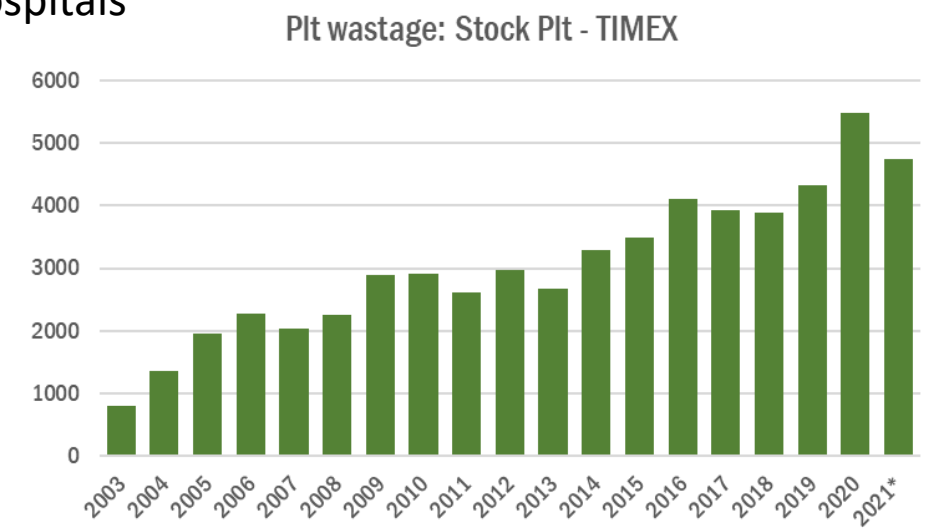
- Most platelet wastage is in blood centre
- Increasing stock being held in hospitals

- What is the best model?
  - We lack the data to know.
  - To minimise wastage?
  - To maximise patient safety

NHSBT Platelet wastage

Year	TIMEX	MISC	Total	WAPI (%)
2007/8	11,800	7877	19,677	9.1
2006/7	14,988	9,946	24,944	11.7
2005/6	15,115	10,387	25,502	12.2
2004/5	17,099	10,202	27,301	13.0
2003/4	15,780	12,887	28,667	13.0

Hospitals



TIMEX Red cells – Why?

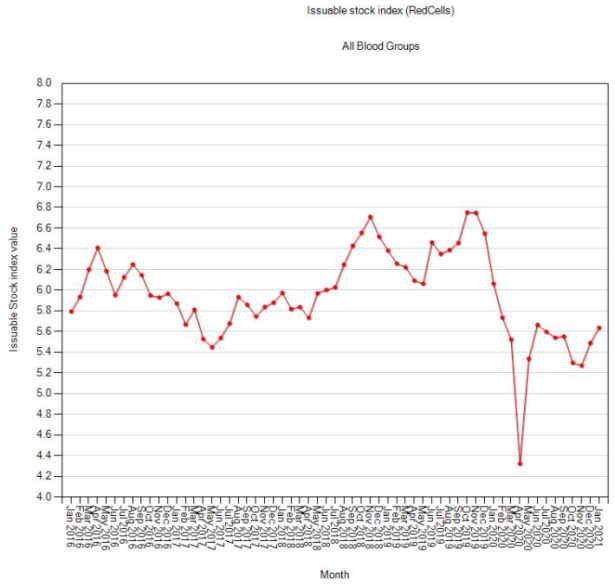
- Largest category – LABORATORY WASTAGE
- Transfusion Medicine 2009: Hospital Blood Inventory Practice: the factors affecting stock level and wastage
  - **https://doi.org/10.1111/j.1365-3148.2009.00914.x**
  - Analysis of data from 305 hospitals in (2006)
  - Questionnaire data from 265

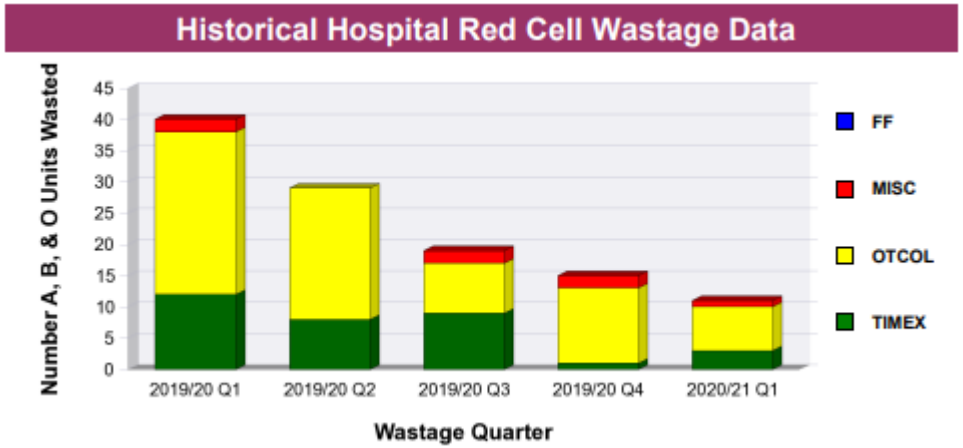
Significant findings:

- Strong relationship between stock and wastage (correlation coef 0.61)
- Factors influencing stock
  - Reservation period 48hr v 24 hr p=0.04
  - Computer calculated ordering v visual review p=<0.001
  - Stock sharing relationship v none p=0.03
    - (tend to more stock though lower wastage)

What can we do to reduce TIMEX?

- Use the Issuable Stock Index (ISI)
  - ISI = Stock/average daily usage
  - Target? – determine locally but around 4 days recommended.
    - Influenced by geography of site (fridges), distance from supplier, specialities
  - Restock to ideal level - computer calculation (rather than guessing)



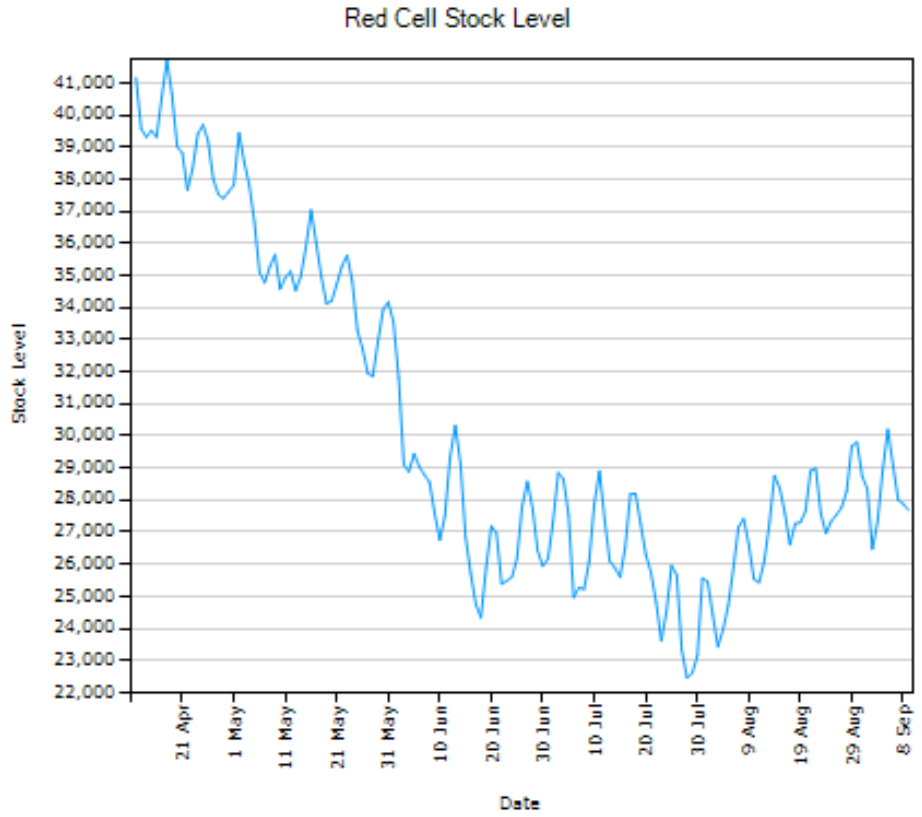


- **Minimise the allocation of stock** (that is unlikely to be transfused)
  - Dereserve unused blood after 24 hours (could be less)
  - Avoid cross-matching when unlikely to be used
    - Audit and agree Maximum Blood Ordering Schedule (MSBOS)
    - Electronic Issue
  - Limit stocks of emergency O neg
    - Audit and risk assess
  - Optimise Emergency blood rotation policy
    - Low turnover (small hospital) = need longer to use when returned to stock

NHSBT red cell stock levels = shelf life

NHSBTStock Figures -Thursday, 09 September 2021

	Red Cells	Platelets		
	STOCK	ISI	TARGET	STOCK
O Pos	7084	4.5	10170	187
O Neg	3924	6	3701	100
A Pos	8065	6.4	8479	434
A Neg	3094	9	2297	153
B Pos	3529	10.1	2226	78
B Neg	795	6.6	691	35
AB Pos	997	12.9	608	28
AB Neg	202	7.3	231	18
Total	27690	7.8	28403	1033



Share the data…

Hospital Quarterly Red Cell Top Level Report (Financial Quarters) for 2020/21 Q1

Average NHSBT Hospital RBC Usage - High (NHSBT)		
Current Quarter	2020/21 Q1	% Annual Change
All Red Cells	2,155	-13.1%
O Neg Red Cells	307	-1.0%
% of O Neg RBC	14.2%	

Red Cell Report

Wastage Quartiles for RBC Wastage - High (NHSBT)			
2020/21 Q1	Green	Amber	Red
ABO Limits	<=25	>25 <=65	>65
ABO WAPI	<=1.6%	>1.6% <=3.9%	>3.9%
O Neg Limits	<= 7	> 7 <= 17	>17
O Neg WAPI	<=2.5%	>2.5% <=8.0%	>8.0%
Number of Hospitals	49	% Entering Wastage Data	100.0%

Average NHSBT Hospital RBC Wastage - High (NHSBT)			
Wastage Quarter	Wastage Reason	A, B & O	O Neg
2020/21 Q1	Timex	31	9
	OTCOL	11	3
	MISC	4	1
	FF	0	0
Current Quarter	Total Wastage	46	13

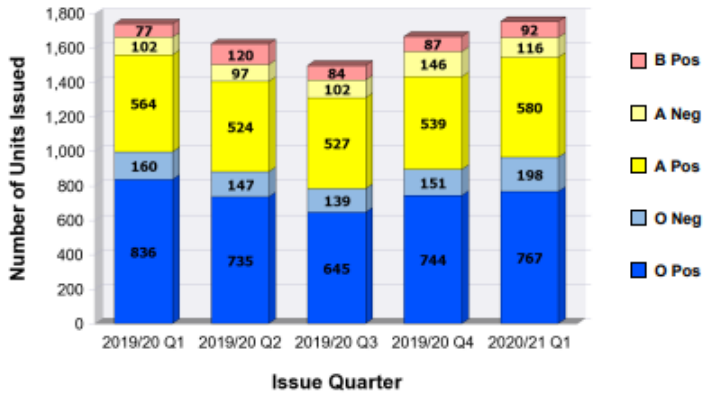
H033 Russell's Hall Hospital

Current Quarter	All Red Cell Groups	RBC % Annual Change	O Neg Red Cells	O Neg % Annual Change	% of O Neg RBC's Issued
2020/21 Q1	1,840	1.0%	198	23.8%	10.8%

Only Wastage data entered before 05/09/2020 is included in report

Wastage Quarter	Reason	ABO Waste	O Neg Waste	ABO WAPI	O Neg WAPI	Wastage Entries
2020/21 Q1	Timex	3	0	0.2%	0.0%	74
	OTCOL	7	1	0.4%	0.5%	
	MISC	1	1	0.1%	0.5%	
	FF	0	0	0.0%	0.0%	
Current Quarter	Total or Avg	11	2	0.6%	1.0%	74

Historical Hospital Red Cell NET Issue Data



Historical Hospital Red Cell Wastage Data



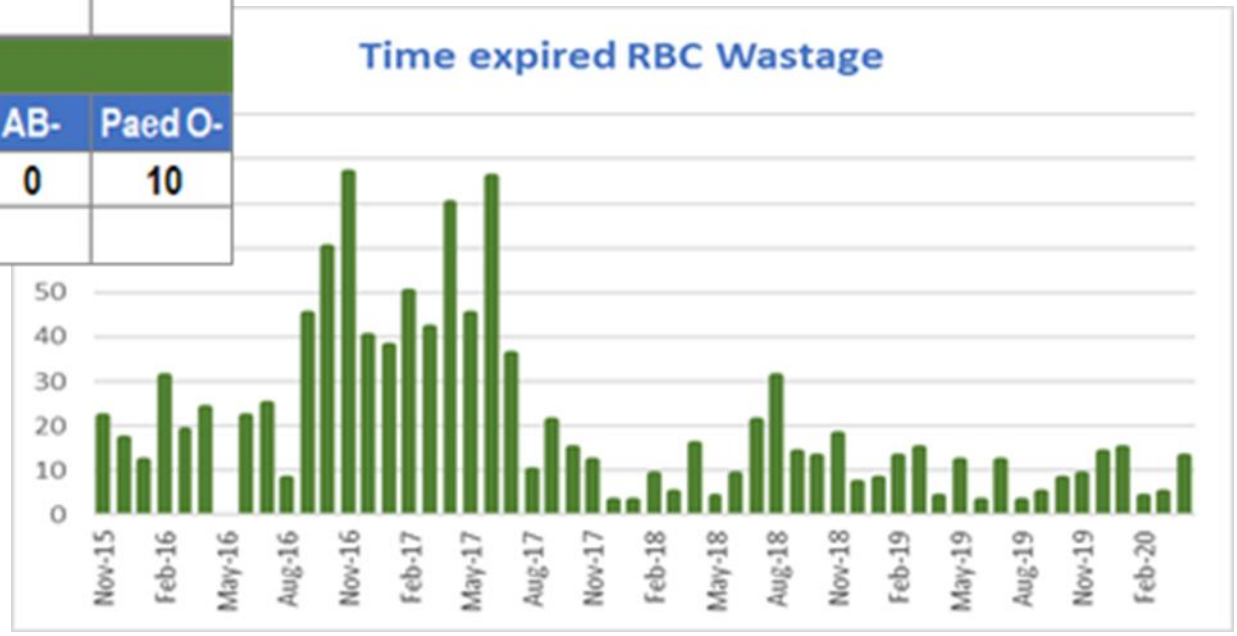
Data Supplied by the Blood Stocks Management Scheme

Examples – Successes.

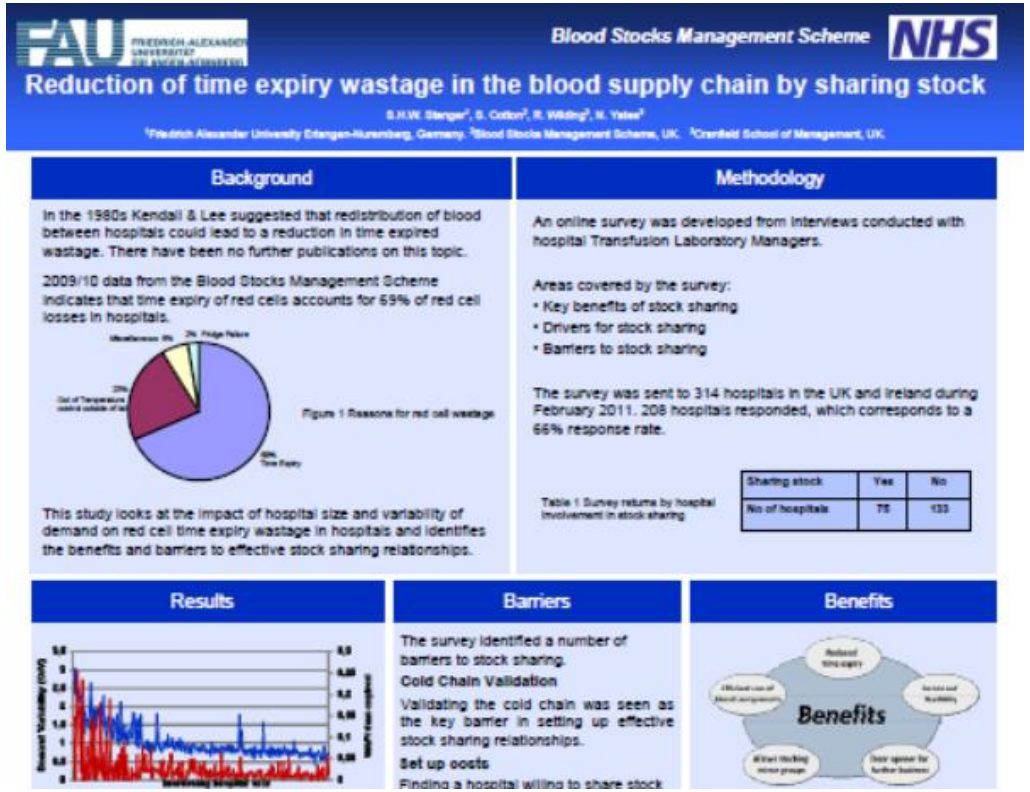
- St Marys, London

Stock levels before review									
Location	O+	O-	A+	A-	B+	B-	AB+	AB-	Paed O-
Lab Stock Fridge	50	25	40	10	15	4	7	2	4
A&E Fridge	6	6							

Stock levels after review									
Location	O+	O-	A+	A-	B+	B-	AB+	AB-	Paed O-
Lab Stock Fridge	28	14	20	4	8	4	0	0	10
A&E Fridge	8	4							



Stock sharing..



Blood Stocks Management Scheme

NHS

Reduction of time expiry wastage in the blood supply chain by sharing stock

S.H.W. Stenger[1], S. Cotton[2], R. Wilding[3], N. Yates[3]

[1]Friedrich Alexander University Erlangen-Nuremberg, Germany. [2]Blood Stocks Management Scheme, UK. [3]Cranfield School of Management, UK.

Background

In the 1980s Kendall & Lee suggested that redistribution of blood between hospitals could lead to a reduction in time expired wastage. There have been no further publications on this topic.

2009/10 data from the Blood Stocks Management Scheme indicates that time expiry of red cells accounts for 69% of red cell losses in hospitals.

Figure 1 Reasons for red cell wastage

This study looks at the impact of hospital size and variability of demand on red cell time expiry wastage in hospitals and identifies the benefits and barriers to effective stock sharing relationships.

Methodology

An online survey was developed from interviews conducted with hospital Transfusion Laboratory Managers.

Areas covered by the survey:

- Key benefits of stock sharing
- Drivers for stock sharing
- Barriers to stock sharing

The survey was sent to 314 hospitals in the UK and Ireland during February 2011. 208 hospitals responded, which corresponds to a 66% response rate.

Table 1 Survey returns by hospital involvement in stock sharing

Sharing stock	Yes	No
No of hospitals	75	133

Results

Barriers

The survey identified a number of barriers to stock sharing.

Cold Chain Validation

Validating the cold chain was seen as the key barrier in setting up effective stock sharing relationships.

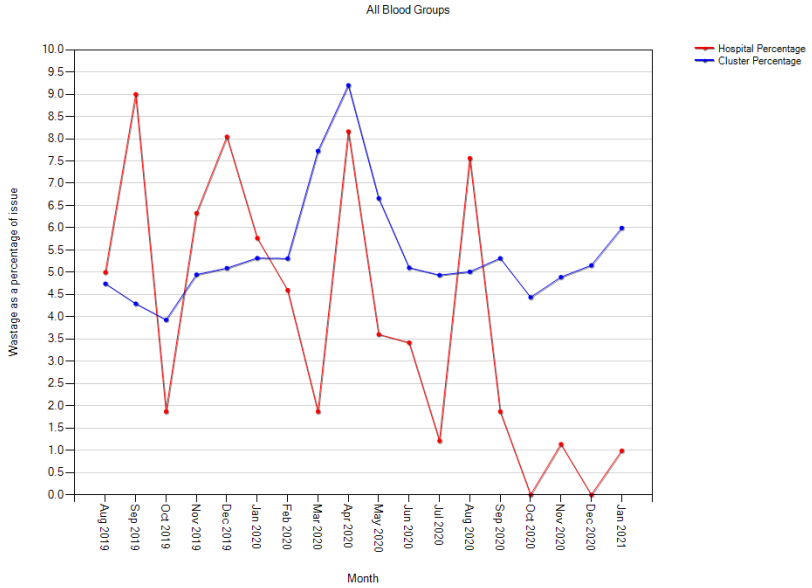
Set up costs

Finding a hospital willing to share stock

Benefits

Benefits

Sharing of platelets within network



- Barriers to overcome:
  - Financial arrangements
  - Cold Chain
  - IT/Information sharing

Fridge/Freezer failure

- £20,000 FFP lost, shortly after laboratory move
- Freezer unplugged by cleaner

- Risk assessed contingencies





How much wastage is acceptable?

- We don’t know…
- Some is inevitable
- Need a ‘whole supply chain view’
  - Consider where the stock is best kept/wasted
- Low use groups (AB) – must accept higher wastage
  - And encourage hospitals to stock to reduce pressure on O stocks

Wastage Quartiles for RBC Wastage - High (NHSBT)			
2020/21 Q1	Green	Amber	Red
ABO Limits	<=25	>25 <=65	>65
ABO WAPI	<=1.6%	>1.6% <=3.9%	>3.9%
O Neg Limits	<= 7	> 7 <= 17	>17
O Neg WAPI	<=2.5%	>2.5% <=8.0%	>8.0%
Number of Hospitals	49	% Entering Wastage Data	100.0%

Take Home Messages…

- **National level**
- NEED DATA to know what is being wasted, by who and why…
  - Getting this is challenging
  - Ideally need sight of whole supply chain

- **Local level**
  - Need to monitor and act
  - BSMS data allows benchmarking
  - There is an evidence base to guide improvements

Thankyou

