

Increasing Efficiencies in the Blood Supply Chain by Reducing Hospital Red Cell Wastage

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Presentation Outline

- Monitoring blood supply management in the UK
- Wastage
 - *data*
 - *the inventory*
 - *out of temperature control*
 - *Storage*
 - *Inventory Management Practice*
- Conclusions

Blood Supply Data in the UK



Collected by the **Blood Stocks Management Scheme** (BSMS) from hospitals and blood services in England, Wales and Northern Ireland

The BSMS is a **partnership** between hospitals and blood services

Blood Supply Management Data

- Essential for understanding the blood supply chain
- A driver for improvement in practice
- Necessary for performance evaluation

Data Collected

- Hospitals manually input data online on:
 - DAILY unreserved stock
 - Wastage by reason
- Blood Service automated daily feed on:
 - Red cell stock
 - Red cell and platelet issues
 - Red cell and platelet wastage
 - Age of stock at issues

Red Cell Wastage Entry Page

Red Cells : Edit daily wastage

Hospital name: Cheltenham General Hospital Pulse code: T154

Date: 23 Apr 2008

Set Date

Show Calendar

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Blood Group	TIMEX	OTCOL	MISC	FF	Day Total	Month Total	WAPI
O Pos	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	1	2	0.65
O Neg	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	0	2	2.50
A Pos	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	0	0	0.00
A Neg	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	0	1	1.92
B Pos	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	0	0	0.00
B Neg	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	0	0	0.00
AB Pos	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	0	0	0.00
AB Neg	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	0	0	0.00
Total	0	1	0	0	1	5	0.73
A, B & O	0	1	0	0	1	5	0.75
AB	0	0	0	0	0	0	0.00

Time Expiry

Fridge Failure

Miscellaneous

Comments

Out of
temperature
control

Last updated on 01 May 2008 14:48:42 by bsms0006

Most recent update was for 23 Apr 2008 on 01 May 2008 14:48:42 by bsms0006

Submit

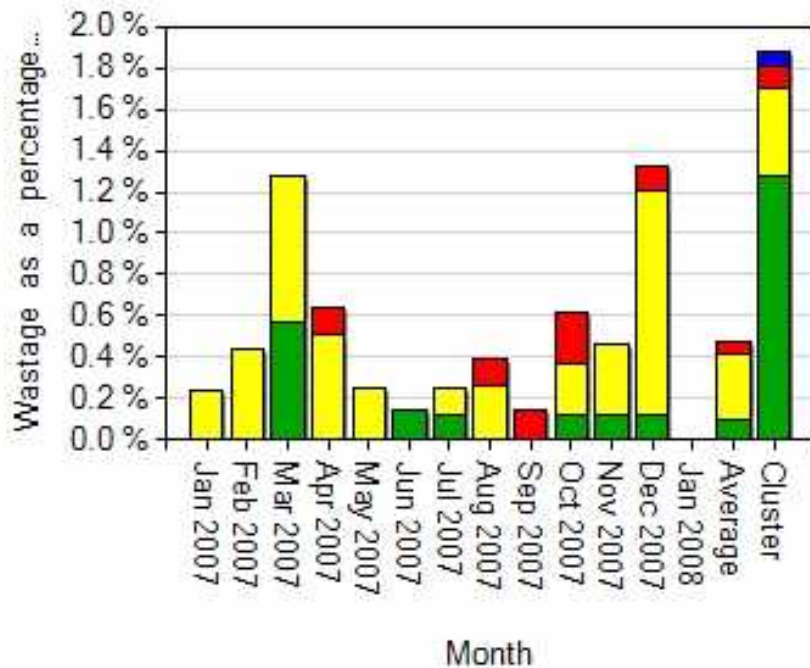
Reset

Zero Wastage

Wastage Data Charts

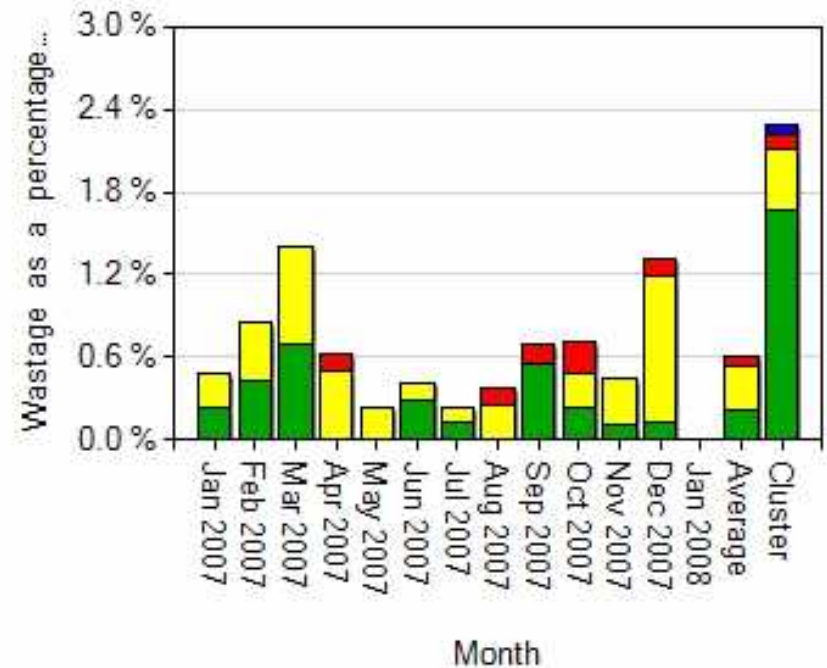
Wastage as a percentage of issue

A, B and O

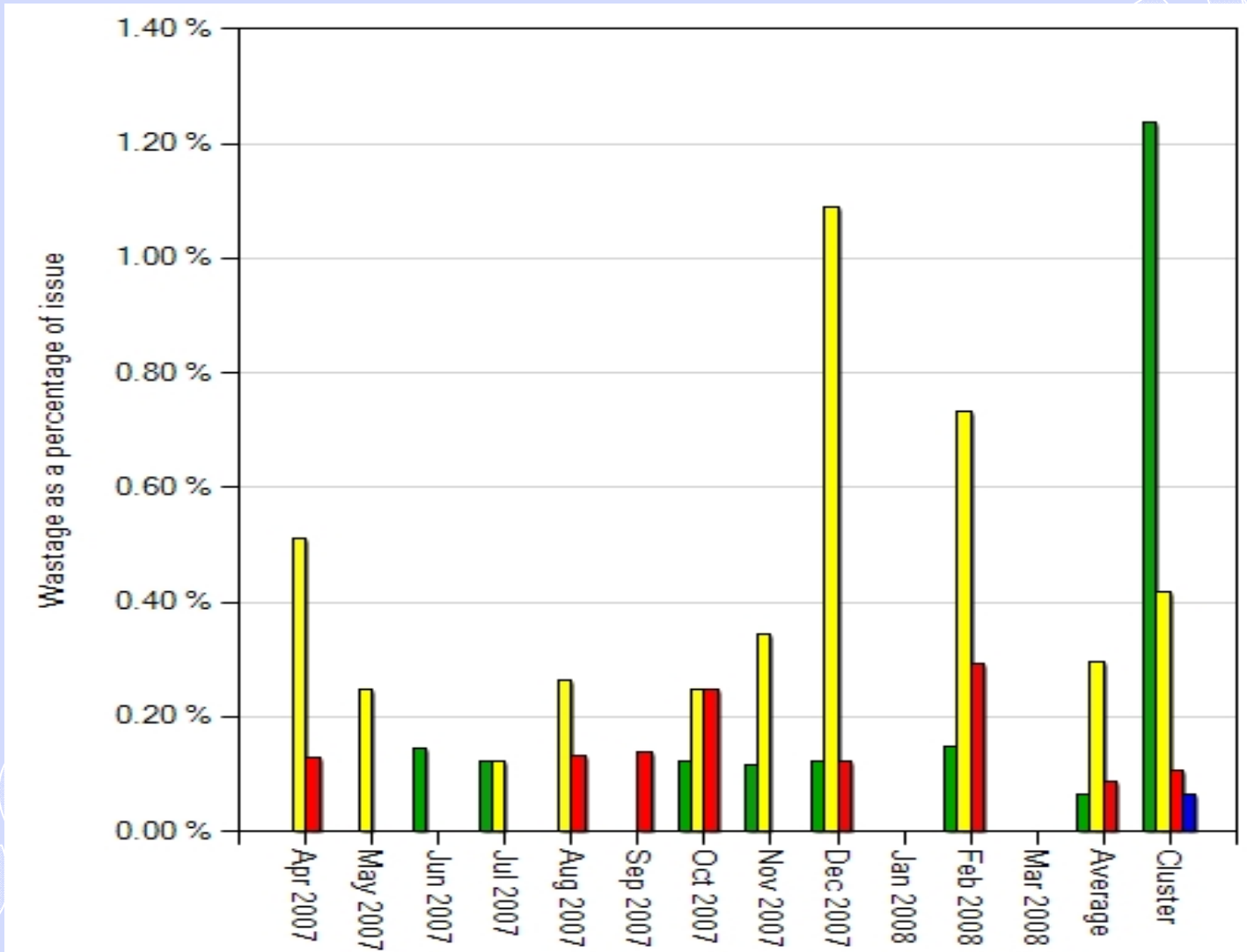


Wastage as a percentage of issue

All Blood Groups



Wastage Bar Chart - Side by Side



Hospital Red Cell Wastage 2006- 07

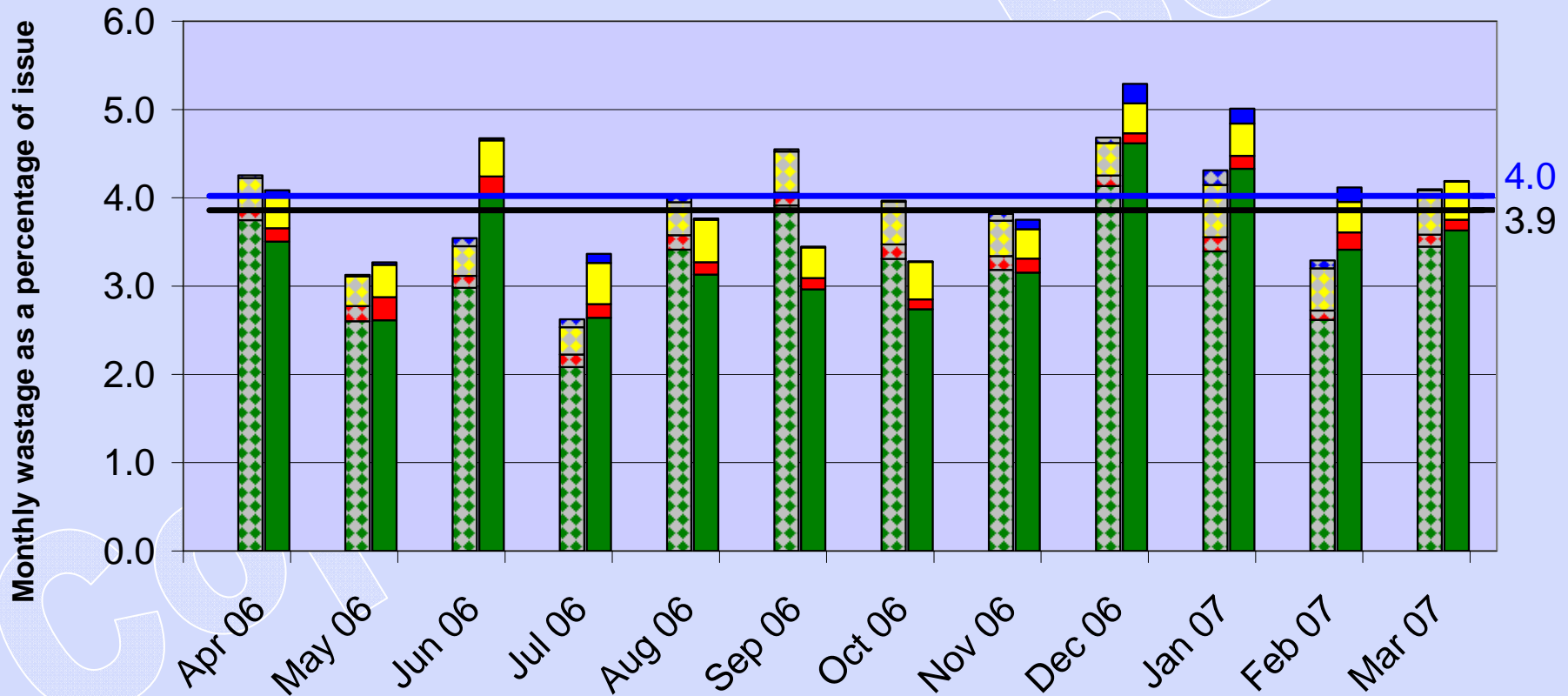
- The total number of units wasted in England and North Wales was 35,005 out of 1.873 units issued.
- The percentage of all red cell issues that were recorded as wasted was 1.9% during
- The average hospital wastage as a % of issues was 4.5%

Average Hospital Wastage as a % of Issue

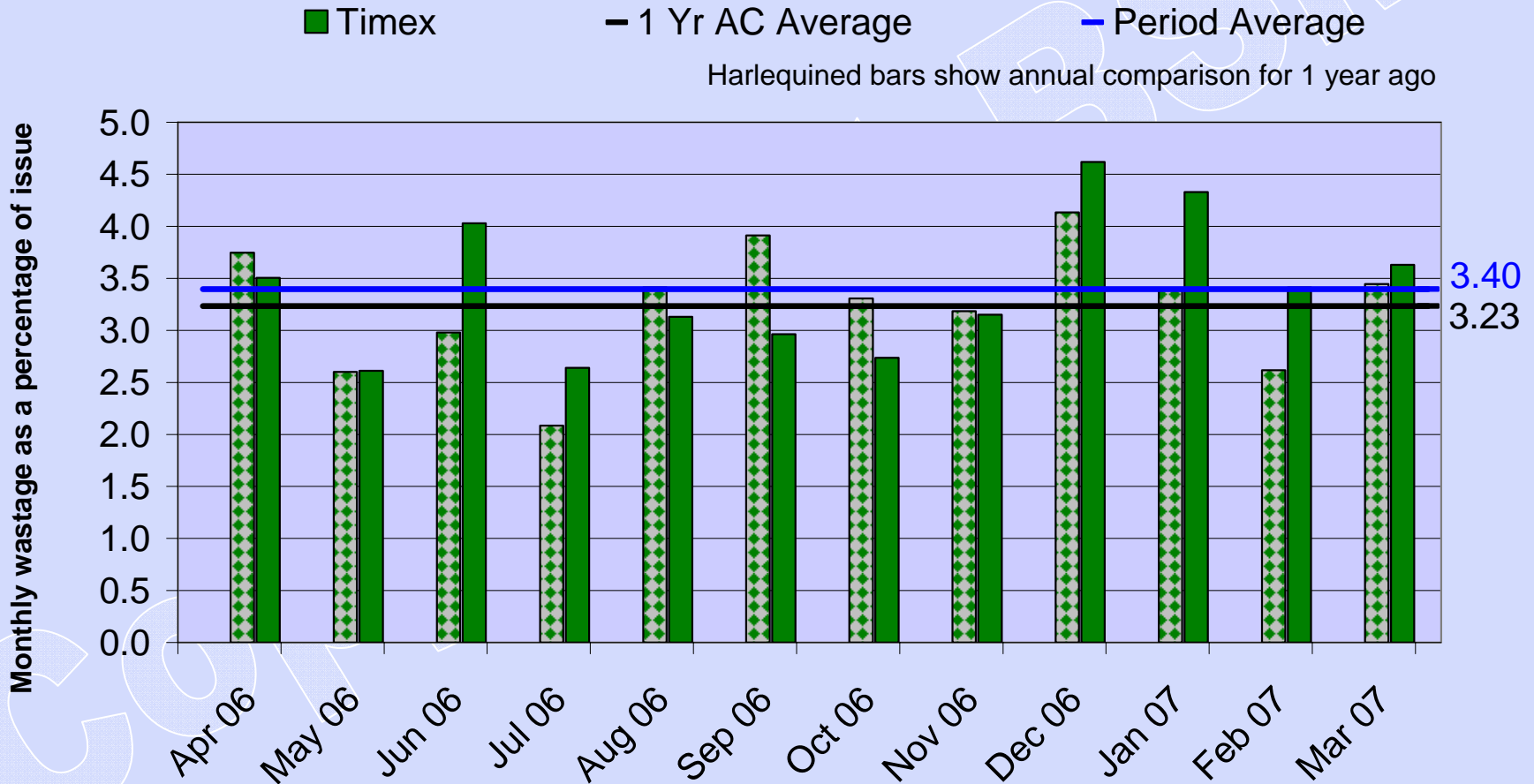
April 06 – March 07

■ Timex ■ MISC ■ OTCOL ■ FF — 1 Yr AC Average — Period Average

Harlequined bars show annual comparison for 1 year ago



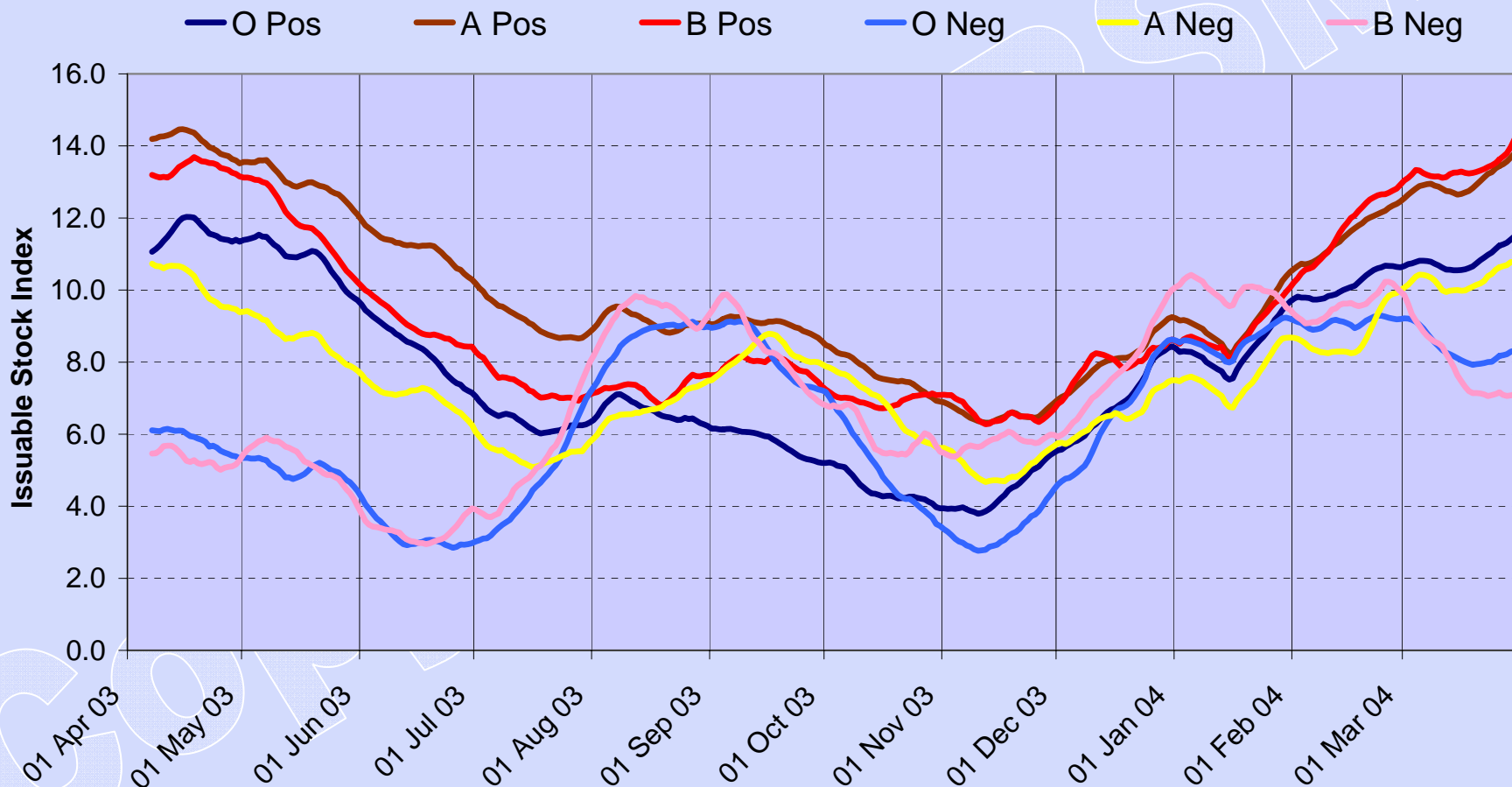
Average Time Expiry Wastage as a % of Issue April 06 – March 07



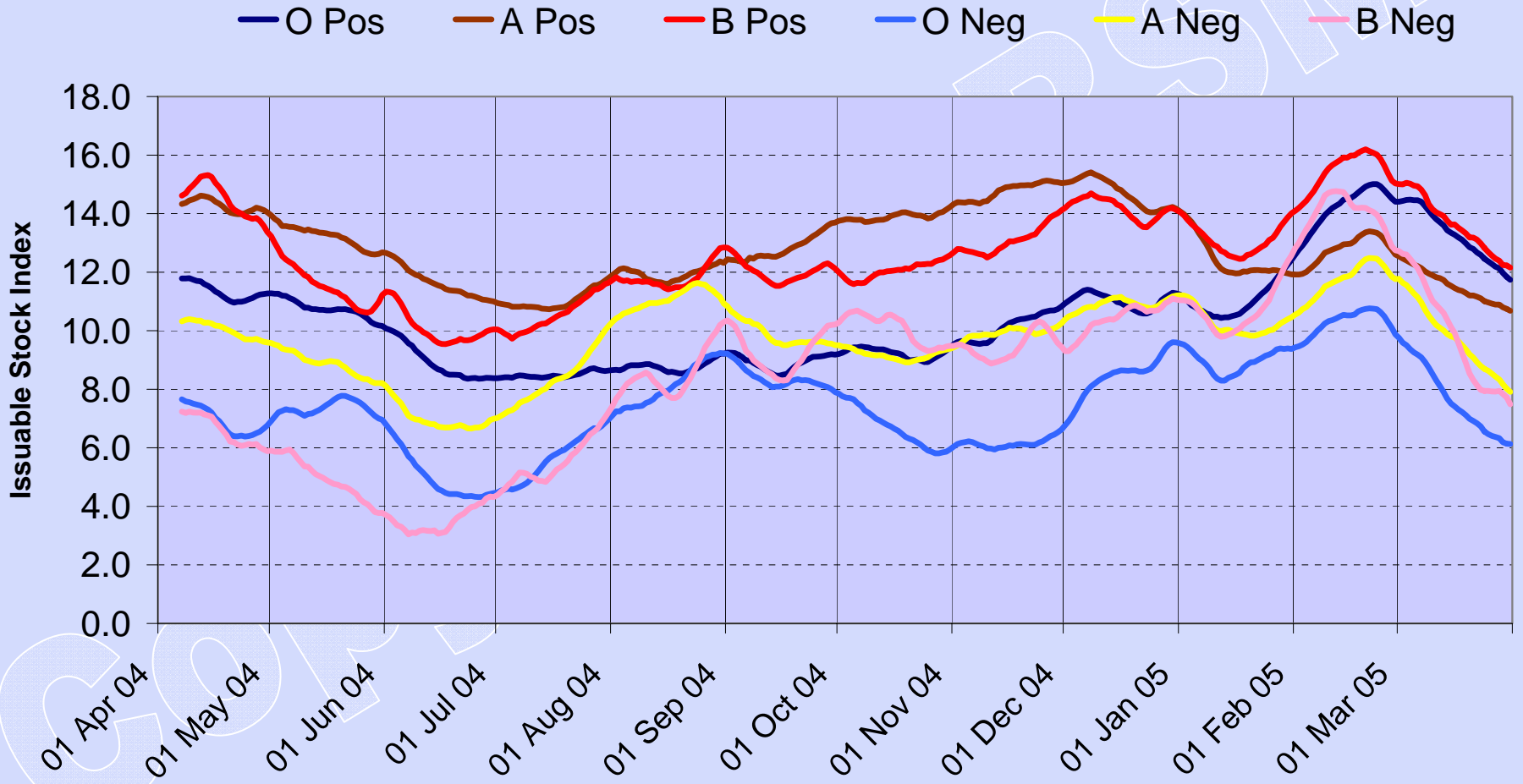
No. of Red Cell Units Wasted per Participant by Wastage Category

Ave. per participant	TIMEX	OTCOL	Misc.	Fridge Fail	Total
2006-07	97	28	10	2	138
2005-06	104	26	8	3	142
2004-05	139	25	8	3	175
2003-04	91	23	7	2	125

Inventory Level 2003 - 04



Inventory Level 2004 - 05



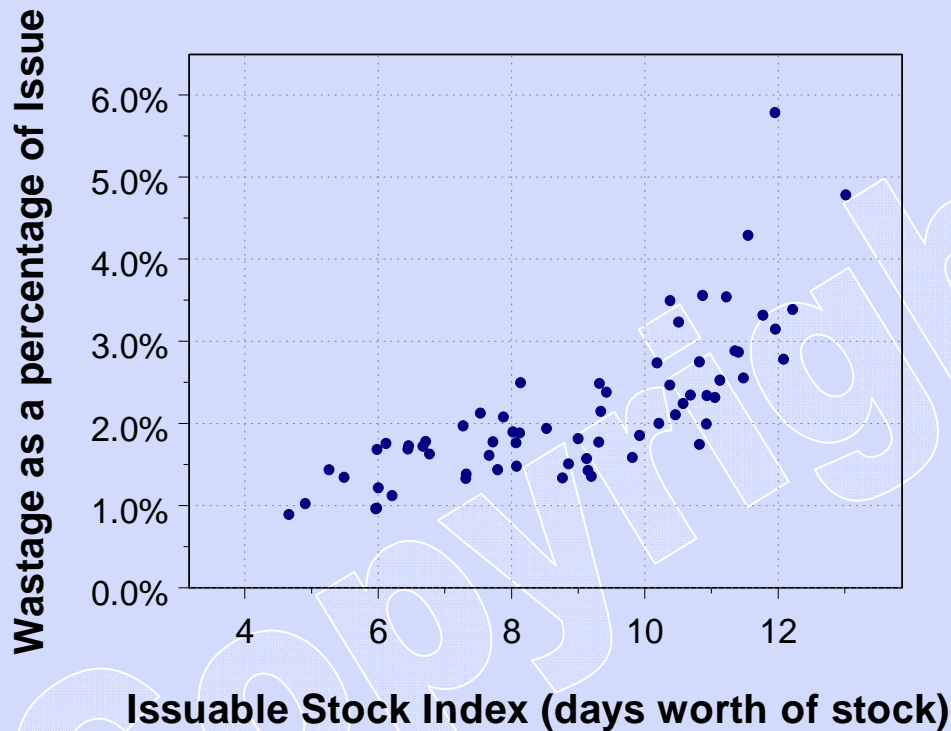
Time Expiry Wastage

- The number of times a unit can be crossmatched before it expires is determined by the age of the unit at time of issue
- When the blood service inventory is high, the age of units at issue declines.
- Time expiry wastage is therefore implicitly linked to blood service inventory.

Methodology

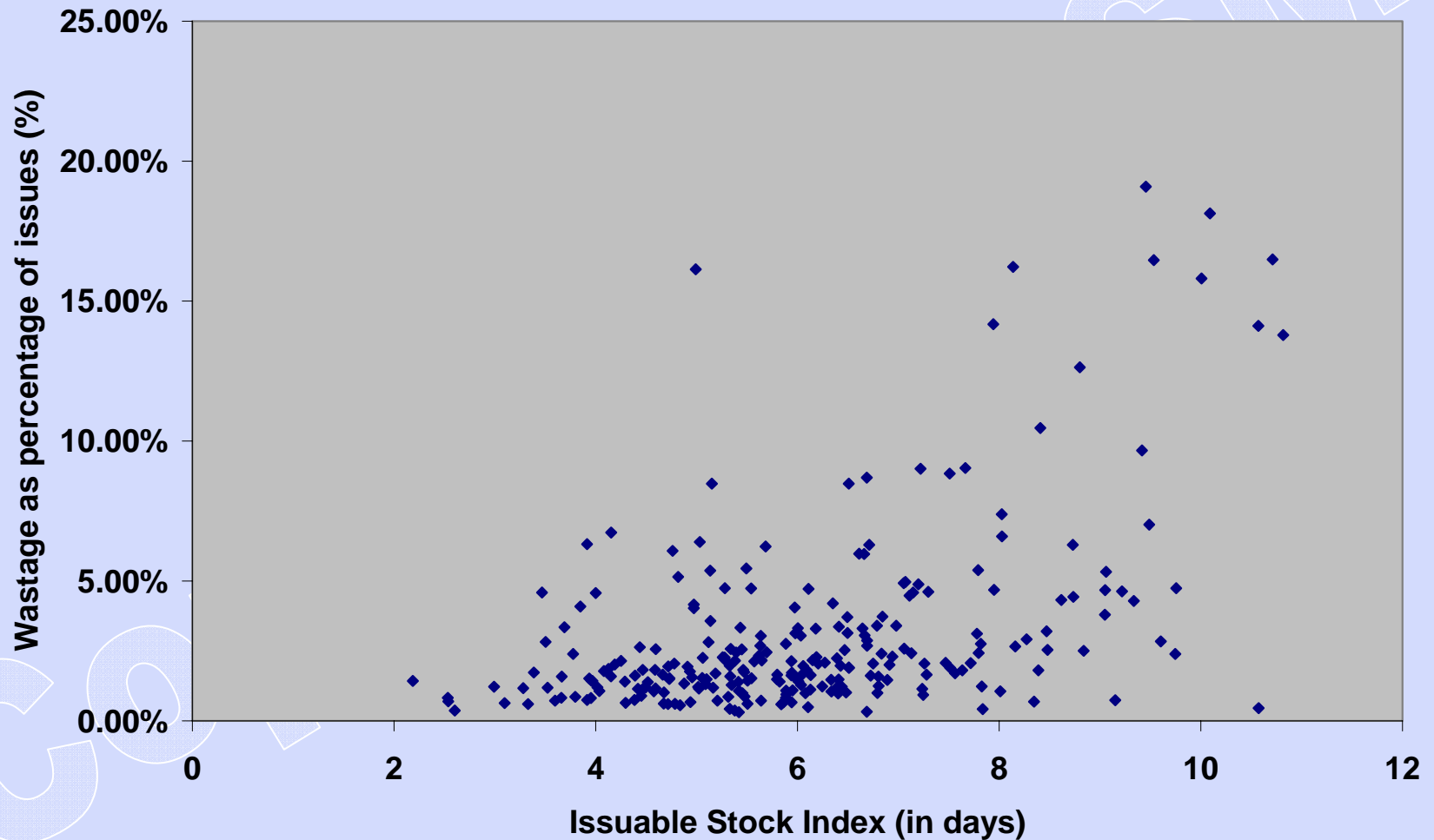
- 68 months worth of BSMS data were used for detailed analysis
- Variables were constructed and analysed by standard statistical techniques available in Excel, STATA and SPlus

Relationship between Blood Centre Inventory Level and Supply Chain Wastage



- As the blood service inventory level increases the amount of time expiry wastage in hospitals increases
- This is particularly apparent when the blood service inventory is significantly higher than the normal range.

Relationship between Hospital Inventory Level and Hospital Wastage



Out of Temperature Control Wastage as a % of Issue April 06 – March 07

■ OTCOL

— 1 Yr AC Average

— Period Average

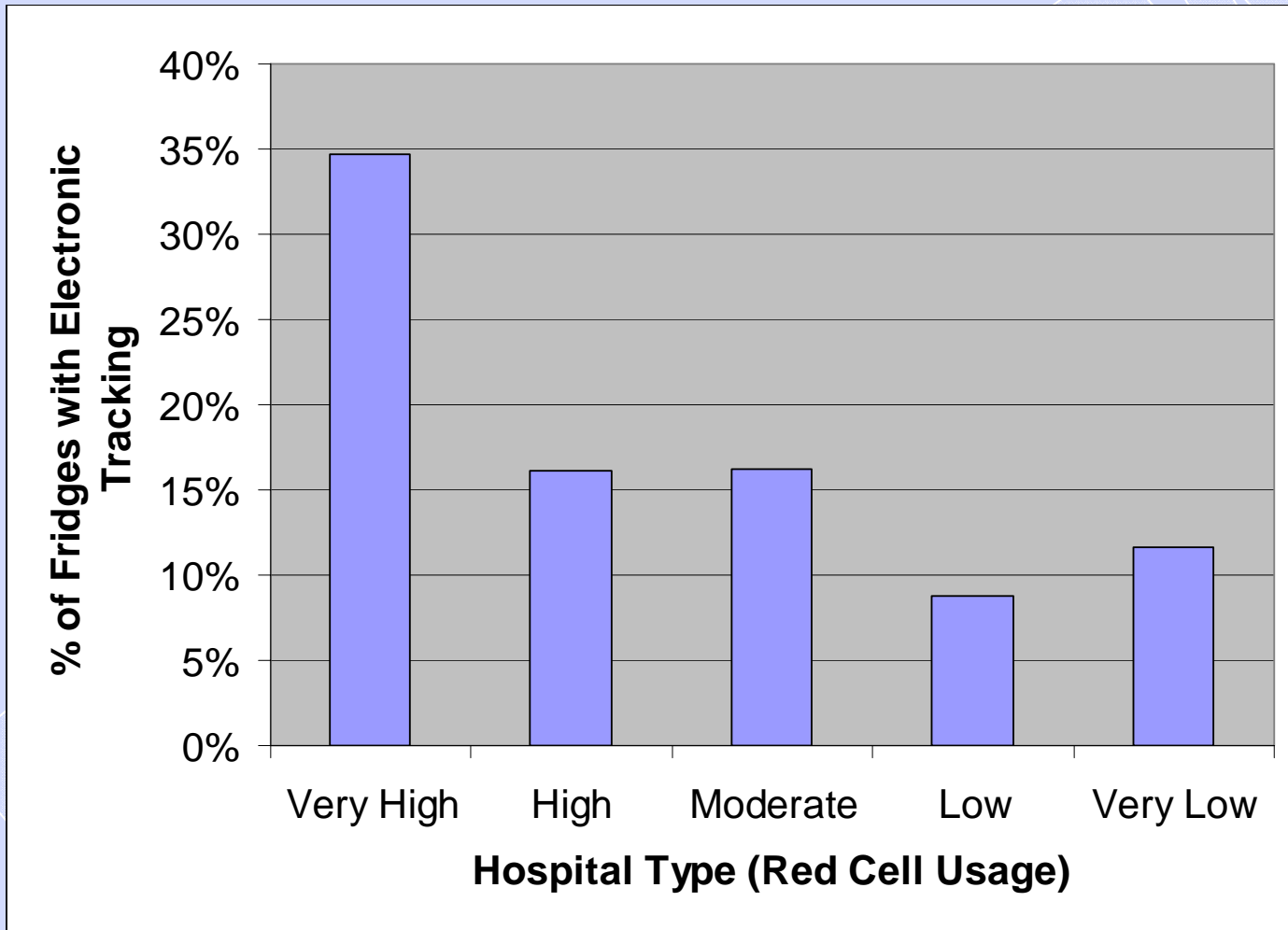
Harlequined bars show annual comparison for 1 year ago



Out of Temperature Control Wastage by Hospital Category

Hospital Category	Red cell issues per annum	% OTCOL Wastage as a % of Issue
Very High	10,000>	0.53%
High	6,501 – 10,000	0.39%
Moderate	4,001 – 6,500	0.38%
Low	801 – 4,000	0.34%
Very Low	0 - 800	0.35%

Fridges with Electronic Tracking by Hospital Type



Blood Fridges and Storage

Ave. per participant	TIMEX	OTCOL	Misc.	Fridge Fail	Total
2006-07	97	28	10	2	138
2005-06	104	26	8	3	142
2004-05	139	25	8	3	175
2003-04	91	23	7	2	125

Blood Fridges and Storage

The 2004 and 2007 Inventory Practice Surveys included questions on:

- *The number and age of fridges*
- *Compliance with the British Standard*
- *Emergency supply for fridges and alarms*
- *Alarm testing*

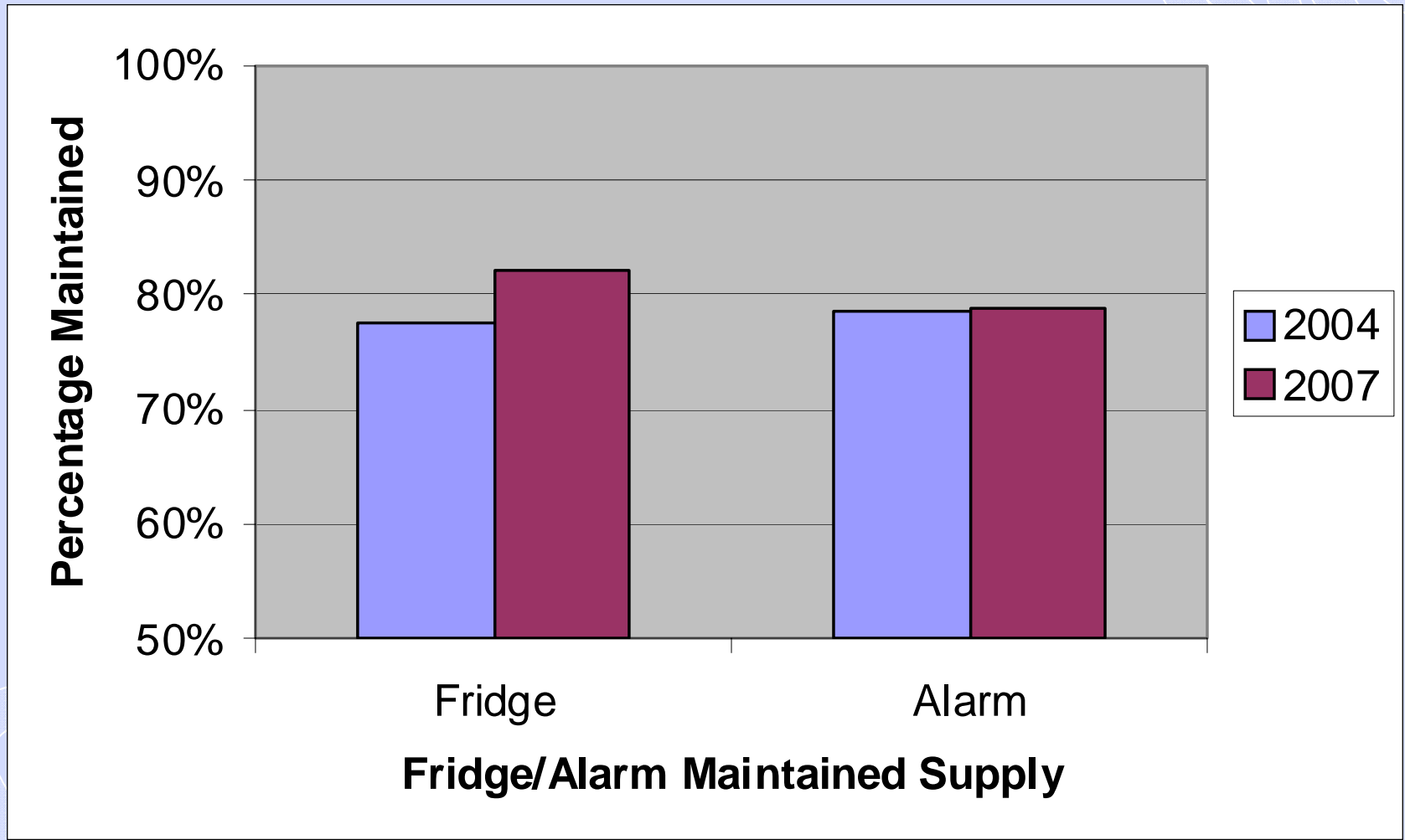


Impact of Storage on Wastage

Fridge failures may occur and remain undetected due to:

- Non maintained power supply
- Non functioning alarms
- Alarms only sounding in remote locations

Comparison of Maintained Supply Status



TIMEX, OTCOL and FF Wastage as a % of Total Wastage

	TIMEX	OTCOL	Fridge Fail
2006-07	70.4%	20.7%	1.5%
2005-06	73.3%	18.4%	2.4%
2004-05	79.3%	14.3%	1.7%
2003-04	73.3%	18.7%	1.9%

TIMEX = Time Expiry

OTCOL = Out of temperature control away from the laboratory

Inventory Management Practice



The 2006 Inventory Practice Survey included questions on:

- *Blood ordering*
- *Stock control*
- *Stock sharing*
- *Training*

Crossmatch Reservation period – 24 hours or 48 hours?

- Null hypothesis- There is no difference in ISI or WAPI between hospitals that have a 24 hour reservation period (n=79) and 48 hour reservation period (n=178).

Crossmatch Reservation period – 24 hours or 48 hours?

Measure	Mean difference	p value
ISI	1.01 days higher in 48 hours	0.02
WAPI	1.32 % higher in 48 hours	0.04

Both p values are < 0.05

Mean difference in ISI and WAPI for hospitals that have a 24 hour reservation period is significantly lower compared to hospitals with a 48 hour reservation period

Method of calculating quantity of blood for blood ordering

- Null hypothesis- there is no difference in mean ISI and mean WAPI between hospitals that use computer calculation and those that use visual review

Method of calculating quantity of blood for blood ordering

Measurement	Sample Size	Mean Difference	P value
ISI	Calculations n=68 Visual Review n= 34	-1.7 days	0.02
WAPI	Calculations n=68 Visual Review n= 34	-3.72%	p<0.001

P< 0.05 for both ISI and WAPI.

Mean ISI and WAPI was significantly lower for hospitals that used computer calculation for blood ordering compared to hospitals that used visual review

Conclusions (i)

- The Blood Stocks Management Scheme gives hospitals the ability to monitor and benchmark red cell and platelet wastage
- There is a relationship between time expiry wastage and the blood service and hospital inventory level especially when the level is very high

Conclusions (ii)

- Out of temperature control (OTCOL) wastage has increased probably due to the installation of blood tracking systems
- Ward based education and training can address OTCOL
- The introduction of the 2005 Blood Safety and Quality regulations should ensure improvements in cold chain validation and lead to a reduction in fridge failures

Acknowledgements

- The 309 hospitals supplying data
- The BSMS team

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Welcome to BSMS

The Blood Stocks Management Scheme was established in 2001 to understand and improve blood inventory management across the blood supply chain. Hospitals and Blood Centres from England, Wales, and Northern Ireland are currently participating in the scheme.

Central to our work is VANESA, a data management system, where hospital and blood service data is collected. In return participants can view real time data and charts.

What's New?

BSMS Reports

During 2008/09 the BSMS hospital reports will change.

The two six monthly reports will be replaced by a quarterly statement related to individual hospital red cell and platelet issue data. The statement will also include national and peer group comparator data. The six monthly reports will continue to be issued but they will be shorter and more focused.

[Link to the annual report section](#)

Latest Publications

08 January 2008

Issue 22 - November 2007...

[View Newswire](#)

Training Courses

BSMS Regional Roadshows 2008

The final Road Show will be held on July 8th in Leeds. There are a few places still available. An application form is available via the link.

Successful Regional Road Shows have been held in Manchester, Birmingham, Cardiff, Newcastle and Colindale.

Presentations and workshop feedback will be available online after the Leeds Road Show

[Visit: Open Meeting 2008](#)

www.bloodstocks.co.uk