

Blood Stocks Management Scheme



Annual Report 2005 - 2006

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2. Foreword

The BSMS had another successful year with many achievements accomplished including the release of a new version of VANESA, the data management software, the redesign of the website, and the introduction of an online help system.

The annual Open meeting was facilitated by Professor Richard Wilding, Professor of Supply Chain Risk Management, Cranfield University. It included table top workshops where delegates examined all aspects of the blood supply chain. A number of short term projects were developed as an outcome of the day.

The Scheme welcomed the Welsh Blood Service and hospitals as new participants in April 2005. Interest in the Scheme continues both within the UK and internationally, and a number of presentations have been given at a variety of meetings.

I'd like to thank all of you who participate in the Scheme, providing a great bank of data on blood inventory management.

In this report you will find details of the Scheme Steering Group members. If you have any comments about the Scheme, please do not hesitate to contact myself or other members of the Steering Group.

Stuart Penny

Steering Group Chair

Blood Stocks Management Scheme

August 2006

3. Headline Summary

3.1. Red cells issues

- 1,940,000 adult red cell units were issued by the National Blood Service (NBS) in England and North Wales, a reduction of 4.4% from 2004-2005.
- 61,058 adult red cell units were issued by the Northern Ireland Blood Transfusion Service (NIBTS) a reduction of 3.7% from 2004-2005.
- 92,231 adult red cell units were issued by the Welsh Blood Service (WBS); no comparative data is available.

3.2. Red cell wastage

- Total NBS wastage was 11,890 units, a reduction of 10,782 units (47%) from 2004-2005. Average monthly wastage as a percentage of issues (WAPI) was 0.6%.
- Total NIBTS wastage was 2,322 units, a reduction of 130 units (5%) from 2004-2005. Average monthly WAPI was 3.8%.
- Total WBS wastage was 9,924. Average monthly WAPI was 3.6%.
- Average wastage per NBS BSMS participants was 142 units, a reduction of 33 units per participant. Average monthly WAPI was 4.3%.
- Average wastage per NIBTS BSMS participants was 255 units, an increase of 25 units per participant. Average monthly WAPI was 7.8%.
- No WBS hospital information is available because insufficient hospitals are currently participating to ensure the integrity of the data.

3.3. Platelet issues

- 217,270 adult platelet units were issued by the NBS, an increase of 0.8% from 2004-2005.
- 7,236 adult platelet units were issued by the NIBTS, an increase of 3.6% from 2004-2005.

3.4. Platelet wastage

- 25,502 platelet units were wasted by the NBS; a reduction of 1,799 (6.5%) from 2004-2005. Average monthly WAPI was 12.2%.
- Average platelet wastage per NBS BSMS participants remained stable at 34 units. Average monthly WAPI was 6.9%.
- 2,038 platelet units were wasted by the NIBTS an increase of 543 units (36%) from 2004-2005. Average monthly WAPI was 21.1%
- Average platelet wastage per NIBTS BSMS participant was 53 units an increase of 3 units. Average monthly WAPI was 10%.
- Platelet data is not available from the WBS.

3.5. O Neg

- O Neg as a percentage of total issues was 10.2% for NBS supplied hospitals, 11.8% for NIBTS supplied hospitals, and 8.2% for WBS supplied hospitals.
- Average monthly O Neg WAPI for NBS supplied hospitals was 5.8% and for NIBTS supplied hospitals 12.2%.
- Average monthly O Neg WAPI was 0.5% in the NBS, 2.3% in the NIBTS (includes pre-validation wastage), and 0.3% in the WBS.

4. Purpose

The Blood Stocks Management Scheme is a partnership between hospitals and blood services to maximise the use of donated blood by increasing understanding of blood supply management. It was implemented in April 2001 with the NBS and the hospitals it supplies. In April 2004 the NIBTS and the hospitals it supplies joined the scheme; in April 2005 the Welsh Blood Service and the hospitals it supplies joined.

5. BSMS achievements 2005-2006

During 2005-2006 the BSMS: -

- Introduced activity statements to report to individual hospitals their data entry activity during a six month period (July 2005).
- Redesigned the six monthly hospital reports to include year on year red cell issue comparison data for all blood groups and redeveloped to include auto entry of text (October 2005).
- Redesigned www.bloodstocks.co.uk. (March 2006).
- Released a new version of VANESA (BSMS data management system) with software improvements (August 2005).
- Launched an online help facility for VANESA.
- Held fourteen VANESA 4 DUMMIES courses with 101 participants.
- Wrote the specification, tested and piloted surgical benchmarking software.
- Initiated the fate of donation project.
- Facilitated the release of the electronic delivery note information.
- Was an invited speaker at the International Society of Blood Transfusion meeting (ISBT), Athens, June 2005.
- Presented posters at ISBT, British Blood Transfusion Society and American Association of Blood Banks annual scientific meetings.

6. Current Activity

Membership: 277 out of 297 hospitals directly supplied by the NBS, 12 out of 12 hospitals supplied by the NIBTS and 14 out of 14 hospitals supplied by the WBS are registered.

Hospital data entry activity by supplying blood service is shown in Table 1.

Table 1 Hospital activity by supplying Blood Service

Blood Service/ hospitals	Activity status	No. of hospitals	Percentage
NBS	Regular	176	64
	Partial	81	29
	None	20	7
NIBTS	Regular	9	75
	Partial	3	25
WBS	Regular	3	21
	Partial	3	21
	None	8	57

Regular - 16 or more entries per month (red cell stock) red cell wastage and platelet wastage

Partial - less than 16 entries per month (red cell stock) or no data entry for red cell or platelet wastage

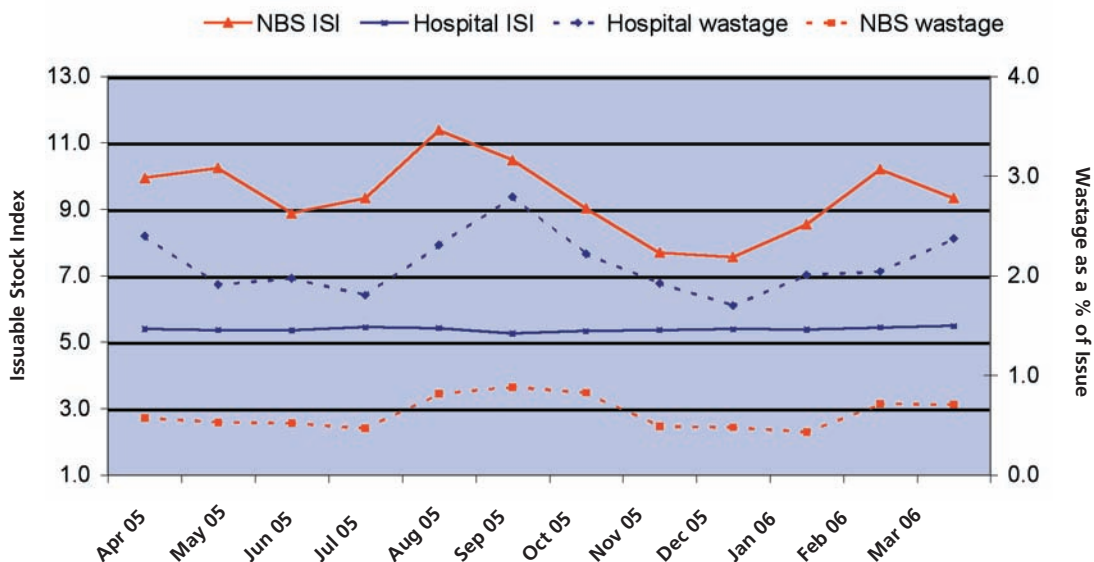
None - no data has been entered

7. Red Cell Blood Supply System

7.1. England and North Wales (NBS)

An overview of the red cell supply chain using data taken from NBS BSMS participants and the NBS as a whole is shown in Fig1. The graph highlights the relationships across the supply chain.

Fig 1 Total red cell stock (ISI) held in all NBS BSMS hospitals and in the NBS and total WAPI for all NBS BSMS hospitals and the NBS.



When the NBS inventory level is on target (50,000 - 60,000 units) there will be between 80,000 and 90,000 available units in the blood supply system. NBS and hospital wastage continues to mirror the NBS stock level. 51,200 units were wasted in hospitals and the NBS combined.

7.1.1. NBS Issuable stock index (ISI)

No red cell shortages were declared. The NBS ISI was generally lower during 2005-2006 than in 2004-2005. The highest ISI was reached in August 05 but then fell for five consecutive months reaching a low of 7.5 in December 05 (Fig 1).

7.1.2. England and North Wales Hospital ISI

The average ISI by hospital category remains variable. The lowest ISI continues to be found in the 'High usage' hospital categories (Table 2).

For group O Neg the ISI for the 'Private' and 'Low Usage' categories is higher than hospitals in the 'High and Moderate Usage' categories, but lower than in 2004-2005.

Table 2 Average ISI by hospital category for NBS BSMS hospitals

	High DGH	High Teaching	Mod Usage	Low Usage	Private
All Groups	5.1	4.7	5.7	7.8	8.2
O Neg	6.1	6.4	7.7	10.1	10.9

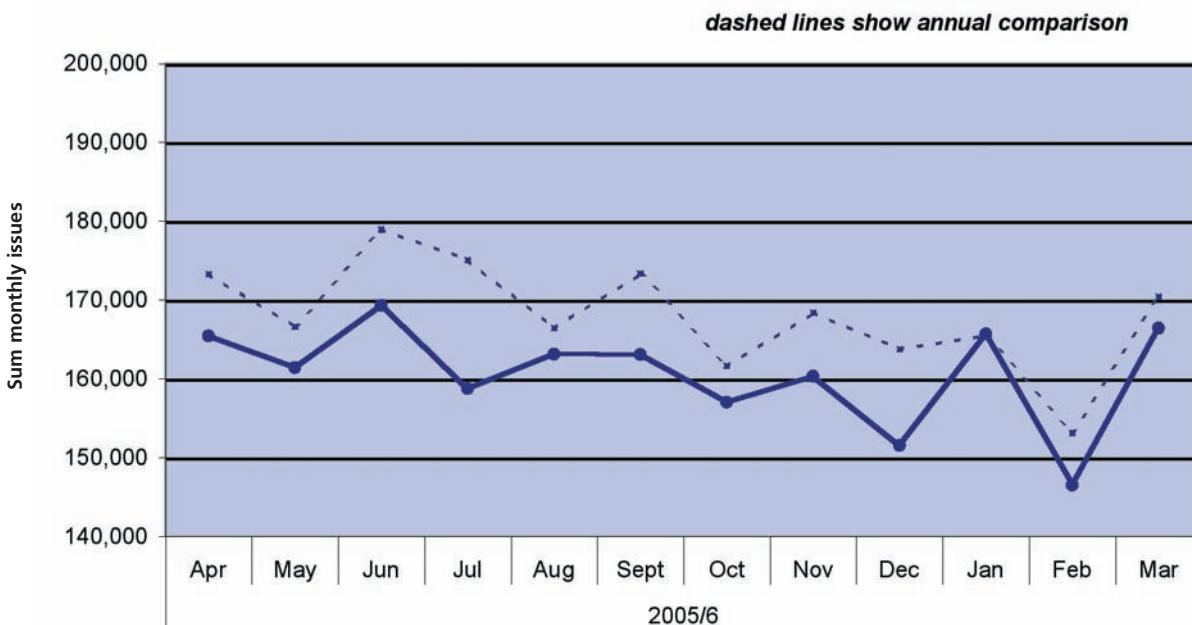
High Usage - >11,000 red cell units per annum, Mod Usage - 6,000 - 11,000 units per annum, Low Usage - < 6,000 units per annum

7.1.3. NBS Red cell issues

The NBS issued 1,940,000 adult red cell units between April 2005 and March 2006, a decrease on the previous year of 4.4% (cf. 2,030,000).

Red cell issues varied by month with a general decrease in trend (Fig 2).

Fig 2 Total red cell monthly issues with annual comparison



The median number of days to expiry at issue was 21 days in 2005-06 compared to 19 days in 2004-2005. The percentage of units with at least 20 days to expiry ranged from 42% of issues in September 05 to 80% of issues in December 2005 and was higher than during the same period in 2004-2005.

Total monthly issues of group O Neg showed a smaller reduction from 2004-2005 of 1.7% compared to the reduction of 4.4% for all groups. O Neg issues as a percentage of total issues was 10.2%. The incidence in the general population is 8.5%. Hospitals are encouraged to reduce their use of O Neg to the 8.5% level recommended in the clinical guidelines (1).

7.1.4. NBS Wastage

NBS wastage is separated into two categories; TIMEX (time expiry) and MISC. MISC wastage is composed of any unit that is available for issue and has subsequently been discarded for a reason other than 'time expired'. This may include pre-validation wastage that was discovered post validation e.g. pack label fault. Total NBS wastage for 2005-2006 with four year comparisons is shown in table 3.

Table 3 Total NBS wastage by wastage category with one and two year comparisons

Year	MISC	TIMEX	Total	WAPI (%)
2005/6	7009	4881	11890	0.6
2004/5	17348	5324	22672	1.1
2003/4	4955	5768	10723	0.4
2002/3	7374	5141	12515	0.6
2001/2	1402	9208	10610	0.1

MISC - miscellaneous

*WAPI - wastage as a percentage of issue

Average NBS WAPI for all blood groups fell by 50% in 2004-2005 to 0.6%. TIMEX WAPI from April 2005 to March 2006 was 0.4% compared to 0.8% during the same period in 2004-2005. The reduction in TIMEX WAPI is associated with the lower NBS ISI.

7.1.5. England and North Wales Hospital wastage

Average TIMEX wastage per participant hospital for all blood groups showed a decrease from 2004-2005 (Table 4). As stated in previous reports the NBS stock level drives hospital TIMEX and any change in average TIMEX per BSMS participant generally reflects changes in stock level rather than hospital practice. Overall, wastage decreased by 33 units per participant from 2004-2005, this was mainly due to the fall in TIMEX wastage.

Average hospital WAPI for all blood groups was 4.3% in 2005-2006 compared to 4.9% in 2004-2005.

The percentage of all issues that were recorded as wasted was 2.2% in 2005-2006 compared to 2.5% in 2004-2005.

There is a difference between the average hospital WAPI and the percentage of all issues recorded as wasted for the following reasons. The average hospital WAPI is an unweighted average of all BSMS hospitals' WAPI in which every hospital has an equal influence on the figure. This means that the very biggest hospitals and the very smallest hospitals each have the same influence, even though they have very different wastage rates (typically small hospitals have much higher WAPI than large hospitals). Thus the percentage of all units issued that are recorded as wasted will be lower than the average hospital WAPI.

O Neg WAPI was 5.8%; almost 2% higher than WAPI for all blood groups. The percentage of all O Neg units that were recorded as wasted was 3.8% in 2005-2006; up from 3.6% in 2004-2005.

Table 4 England and North Wales BSMS hospitals wastage, by wastage category and average per participant

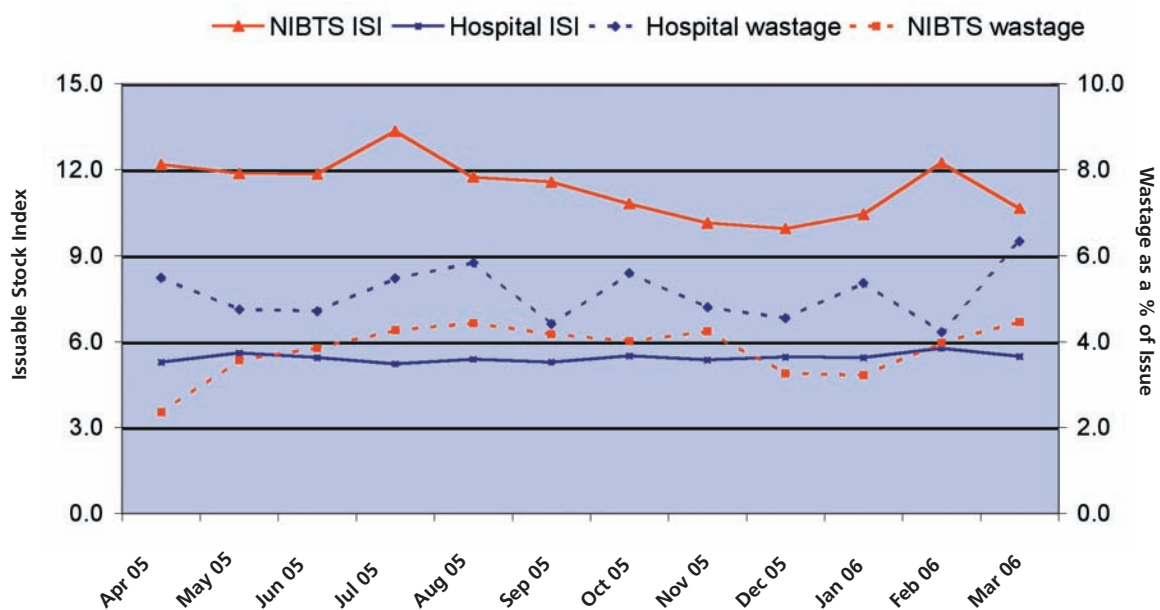
	TIMEX	OTCOL	MISC	Fridge Fail	Total
Total 05-06	28835	7247	2283	945	39310
Ave. per BSMS participant 2005-06	104	26	8	3	142
Ave. per BSMS participant 2004-05	139	25	8	3	175
Ave. per BSMS participant 2003-04	91	23	7	2	125
Ave. per BSMS participant 2002-03	103	21	7*	N/A	135

TIMEX - Time expiry, **OTCOL** - out of temperature control outside the laboratory, **MISC** - miscellaneous, **Fridge Fail** - fridge failure

* includes fridge failure

7.2. Northern Ireland (NIBTS)

Fig 3 Total red cell stock (ISI) held in all BSMS NIBTS hospitals and in the NIBTS and the total WAPI for all BSMS NIBTS hospitals and the NIBTS



Approximately 2,700 available red cell units are held in the blood supply system at any one time, about 1,000 in the hospitals and 1,700 in the blood service. 5,219 red cell units were wasted in hospitals and the NIBTS combined.

7.2.1. NIBTS ISI

The NIBTS ISI was at its highest in July 05 (13.3) then fell steadily to its lowest point in December 2005 (9.9). It rose slightly in January and February 2006 before falling again in March 06 (Fig 3).

7.2.2. Northern Ireland Hospital ISI

Hospital inventory levels were stable at 5.5 days (Fig 3). The lowest ISI was found in the 'High Teaching' category and is similar to the 'High Teaching' hospitals supplied by the NBS. The ISI for O Neg for the 'High Teaching' and 'Moderate Usage' hospitals supplied by the NIBTS is lower than in NBS supplied hospitals (Table 5).

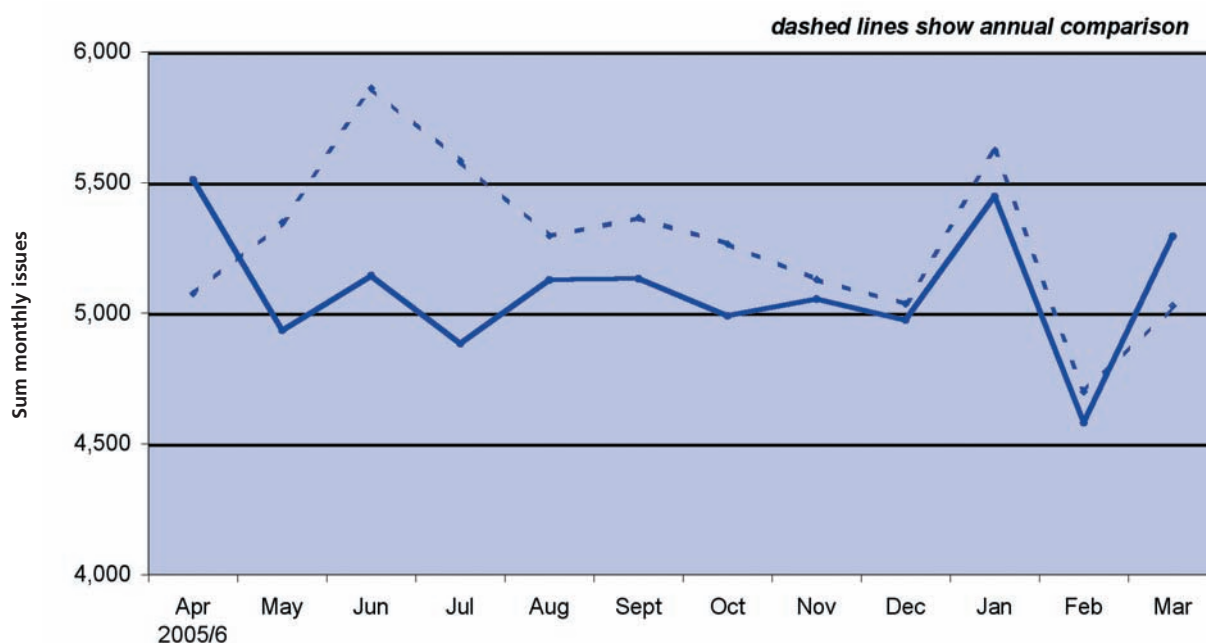
Table 5 Average ISI by hospital category for NI BSMS Hospitals

	High Teaching	Mod Usage	Low Usage
All Groups	4.3	5.4	8.8
O Neg	5.5	6.9	11.1

7.2.3. NIBTS Red cell issues

The NIBTS issued 61,058 adult red cell units between April 2005 and March 2006 a reduction of 3.5% from 2004-05. Issues showed a similar pattern to 2004-2005; relatively stable from April 2005 to December 2005, but fluctuating between December 2005 and March 2006 (Fig 4).

Fig 4 Total red cell monthly issues with annual comparison.



The median number days to expiry at issue was 22 days compared to 20 days in 2004-2005.

Total monthly issues of group O Neg showed only a small reduction from 2004-2005 of 0.7% compared with a 3.5% reduction for all groups. O Neg issues as a percentage of total issues was 11.8%. The incidence in the general population is 8.5%.

7.2.4. NIBTS wastage

Wastage is separated into two categories; TIMEX and MISC. MISC wastage is composed of any unit that is available for issue and has been discarded for a reason other than 'time expired'. Unlike NBS MISC, which only includes post validation wastage, NIBTS MISC includes pre and post validation wastage. Total NIBTS wastage with a one-year comparison is shown in Table 6. NIBTS wastage decreased by 130 units, this was due to the decrease in MISC wastage. TIMEX wastage increased by 116 units.

Table 6 Total NIBTS wastage by wastage category.

	TIMEX	MISC	Grand Total
2005/6	1,214	1,108	2,322
2004/5	1,098	1,354	2,452

TIMEX - Time expiry,

MISC - miscellaneous,

NIBTS average WAPI fell by 2.5% from 2004-2005 to 3.8%. TIMEX WAPI was 2.0% compared to 1.8% in 2004-2005, a reduction of 11%.

7.2.5. Northern Ireland hospital wastage

Average TIMEX wastage per participant hospital for all blood groups showed an increase from 2004-2005 (Table 7). Overall wastage increased by 25 units per participant from 2004-2005, TIMEX increased by 13 units per participant and OTCOL by 8 units per participant.

Table 7 Northern Ireland BSMS hospitals wastage by wastage category and average per participant

	TIMEX	OTCOL	MISC	FF	Total
2005-06	2517	401	115	37	3070
Ave. per BSMS participant 2005-06	210	33	9	3	255
Ave. per BSMS participant 2004-05	197	25	7	1	230

TIMEX - Time expiry, **OTCOL** - out of temperature control outside the laboratory,

MISC - miscellaneous, **FF**- fridge failure

Hospital average WAPI was 7.8%, 1 percentage point lower than 2004-2005.

The percentage of all issues that were recorded as wasted was 5.4% in 2005-2006 compared to 4.5% in 2004-2005. For an explanation of the difference between hospital average WAPI and percentage of issues wasted, see section 7.1.5.

O Neg average WAPI was 12.2%, 5 percentage points higher than 2004-2005. The percentage of all O Neg units that were recorded as wasted was 8.0% in 2005-2006; compared to 6.2% in 2004-2005.

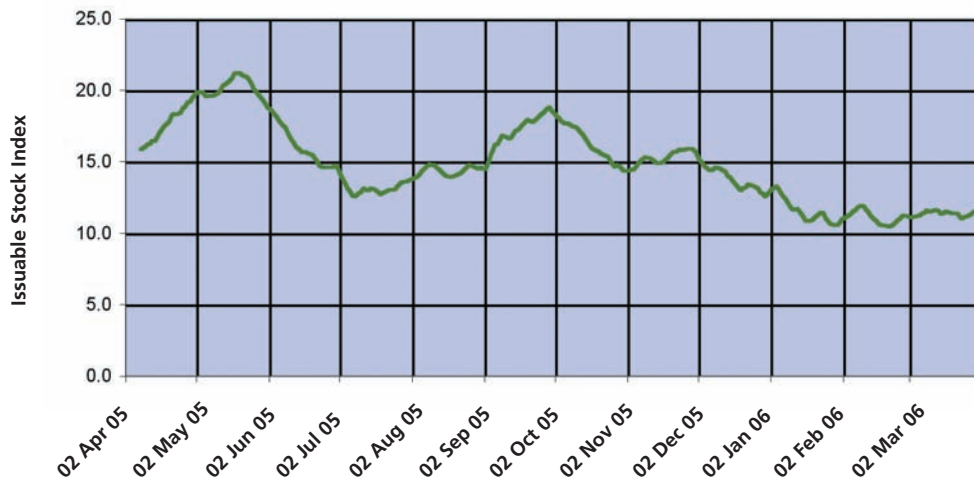
7.3. South Wales (WBS)

There are insufficient hospitals supplied by the WBS participating in the BSMS to include a red cell supply system chart and information related to hospitals.

7.3.1. WBS ISI

The WBS ISI fell from a high of 21 in May 2006 to a low of 11.5 in January and remained steady at 12 in February and March (Fig 5).

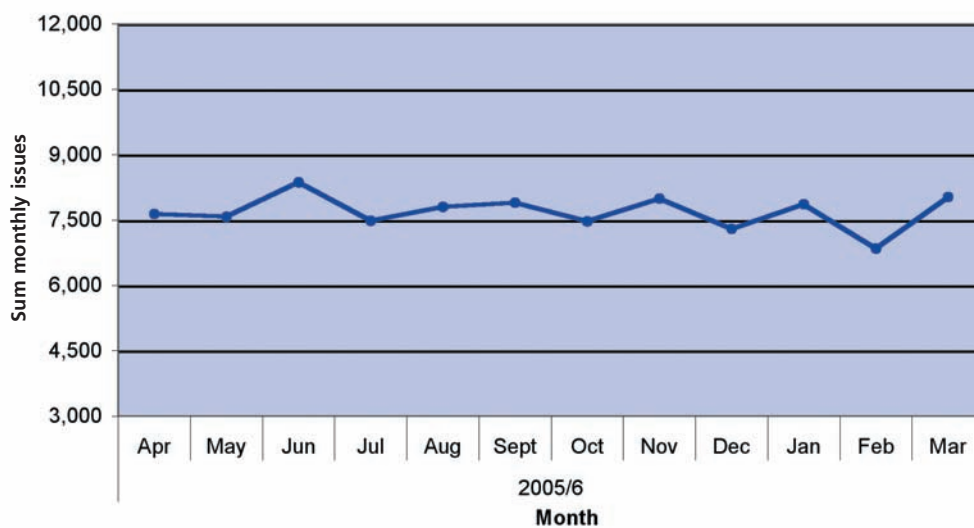
Fig 5 WBS ISI



7.3.2. WBS Red cell issues

The WBS issued 92,231 adult red cell units between April 2005 and March 2006. Issues were relatively stable throughout the year (Fig 6). No comparative data is available as the WBS has only participated from April 2005.

Fig 6 Total red cell monthly issues



The median number of days to expiry at issue was 19 days. O Neg issues as a percentage of total issues was 9.4%. The incidence of O Neg in the general population is 8.5%.

7.3.3. WBS wastage

Wastage is separated into two categories; TIMEX and MISC. MISC wastage is composed of any unit that is available for issue and has been discarded for a reason other than 'time expired'. WBS wastage is shown in Table 8.

Table 8 Total WBS wastage by wastage category.

	TIMEX	MISC	Grand Total
2005-06	9,444	480	9,924

TIMEX - Time expiry,

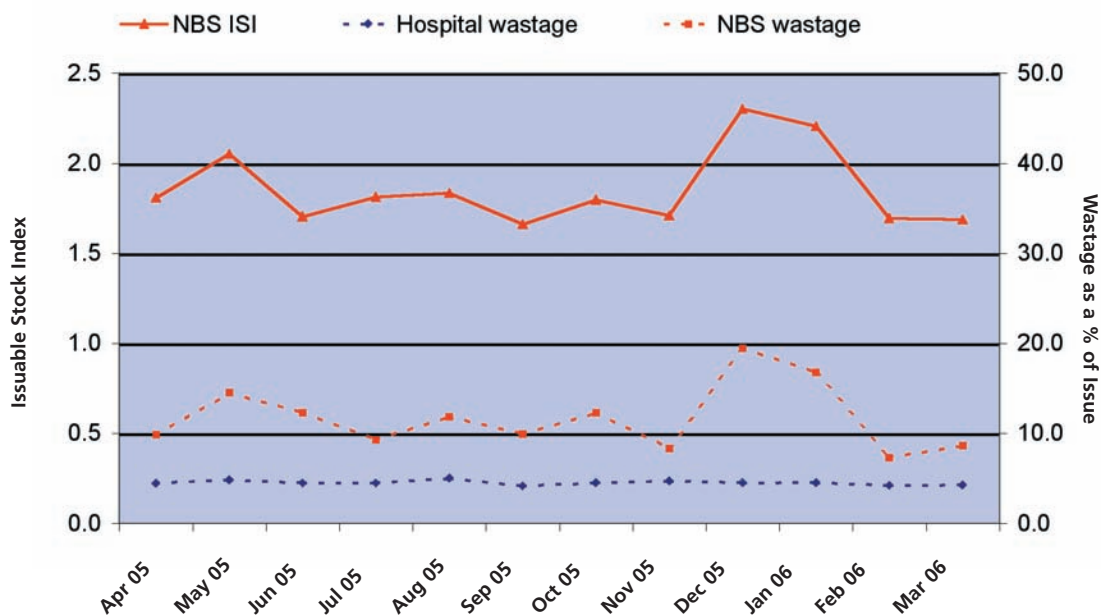
MISC - miscellaneous,

WBS average WAPI was 3.6%. TIMEX WAPI was 3.4%. No annual comparison is available.

8. Platelet Supply System

8.1. England and North Wales (NBS)

Fig 7 Total platelet stock (ISI) held in the NBS and the total wastage as a WAPI for all NBS BSMS hospitals and the NBS



8.1.1. NBS ISI

The NBS platelet ISI remained relatively stable at 1.7-1.8 apart from Bank holiday periods when it increased to ensure an adequate supply during periods of reduced collection activity (Fig 7).

8.1.2. NBS Issues

The NBS issued 217,270 adult platelet units between April 2005 and March 2006, an increase of 0.8% on 2004-2005.

8.1.3. NBS wastage

Platelet wastage is separated into two categories TIMEX and MISC (See section 7.1.4) Total NBS wastage for 2005-06 with one and two year comparisons is shown in Table 9. Total platelet wastage for 2004-2005 was 6.5% lower than 2004-2005. Platelet average WAPI for all groups was 12.2%.

Table 9 Total NBS platelet wastage by platelet wastage category

Year	TIMEX	MISC	Total	WAPI (%)
2005-06	15,115	10,387	25,502	12.2
2004-05	17,099	10,202	27,301	13.0
2003-04	15,780	12,887	28,667	13.0
2002-03	16,558	14,518	31,076	14.0

TIMEX - Time expiry,

MISC - miscellaneous,

8.1.4. NBS BSMS Hospital wastage

Hospital platelet average WAPI was 6.9%, 1.9% higher than 2004-2005.

The percentage of all issues that were recorded as wasted was 4.6% in 2006-06 compared to 4.2% in 2004-05. For an explanation of the difference between hospital average WAPI and % of issues wasted, see section 7.1.5. The average hospital platelet wastage per participant remained stable at 34 units. The highest wastage was due to 'medically ordered not used' as it was in 2004-2005 (Table 10). SONU wastage decreased by 4 units per participant.

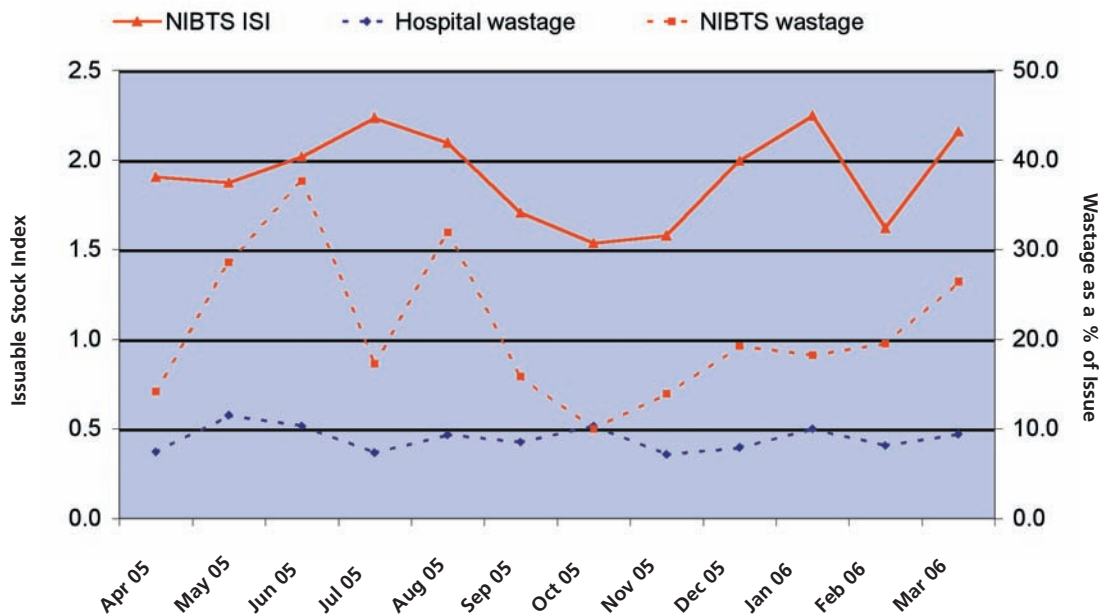
Table 10 Total NBS BSMS hospital platelet wastage by wastage category and average platelet wastage per NBS BSMS participant 2005-06 for all blood groups.

Total	STEX	MISC	MONU	SONU	WOL	WI	Total
2005-06	1,946	317	5,283	1,880	164	29	9,619
Ave. per BSMS participant 2005-06	7	1.8	19	11	<1	<1	34
Ave. per BSMS participant 2004-05	6	1.6	19	7	<1	<1	34
Ave. per BSMS participant 2003-04	4	16	6	1	<1	<1	0

STEX – time expired, MONU – medically ordered, not used, SONU – surgically ordered not used, MISC – miscellaneous, WOL – wasted out of the laboratory, WI – wasted import

8.2. Northern Ireland (NIBTS)

Fig 8 Total platelet stock (ISI) held in the NIBTS and the total WAPI for all NIBTS BSMS hospitals and the NIBTS



8.2.1. NIBTS ISI

The NIBTS platelet ISI was relatively stable at 1.8 apart from the May and Christmas and New Year bank holiday periods when it increased to ensure supply during periods of reduced collection activity.

8.2.2. NIBTS Issues

The NIBTS issued 7,236 platelet units between April 2005 and March 2006, an increase of 3.6%.

8.2.3. NIBTS Wastage

Platelet wastage is separated into two categories: TIMEX and MISC (see section 7.2.4). Total NIBTS platelet wastage is shown in Table 11. Total platelet wastage decreased by 543 units.

Table 11 Total NIBTS platelet wastage by platelet wastage category.

	TIMEX	MISC	Grand Total
2004-05	1,608	430	2,038
2005-06	1,198	297	1,495

TIMEX - Time expiry,

MISC - miscellaneous,

NIBTS platelet average WAPI was 21.1% for all blood groups.

Average hospital platelet wastage per participant was 53 units compared to 50 units in 2004-2005 (Table 12). This was mainly due to an increase in TIMEX wastage. SONU wastage decreased by 4 units per participant, similar to NBS hospital SONU wastage. The main wastage reason was for 'Medically Ordered Not Used' (MONU).

8.2.4. Northern Ireland Hospital wastage

Table 12 Total NI BSMS hospital platelet wastage by wastage category and average platelet wastage per NIBTS hospital participant in 2005-06 for all blood groups

Total	STEX	MISC	MONU	SONU	WOL	WI	Total
2005-06	273	14	260	89	6	0	642
Ave. per participant 2005-06	22	1	21	7	<1	<1	53
Ave. per participant 2004-05	16	1	21	11	<1	<1	50

STEX – time expired, **MONU** – medically ordered, not used, **SONU** – surgically ordered not used, **MISC** – miscellaneous, **WOL** – wasted out of the laboratory, **WI** – wasted import

Hospital platelet average WAPI was 10% compared to 12.2% in 2004-2005.

The percentage of all issues that were recorded as wasted was 8.9% in 2006-06 compared to 8.6% in 2004-05. For an explanation of the difference between hospital average WAPI and % of issues wasted, see section 7.1.5.

8.3. South Wales (WBS)

Platelet data is not available from South Wales.

9. Open Meeting 2005

190 people attended the 2005 open meeting held at the Paragon Hotel, Birmingham. The meeting was facilitated by Professor Richard Wilding, Cranfield University School of Management. The programme gave the opportunity to address some of the problems in the blood supply chain and to explore methods for how it could be developed to become more agile, reactive, and capable of responding to the unknown. The meeting consisted of morning plenary lectures including presentations from the BSMS manager, who gave an overview of the supply chain in 2004-2005. The managing director of the NBS, and two hospital blood transfusion laboratory managers also gave their perspectives on the blood supply chain. Professor Wilding introduced the format for the 3T's, Trust, Transparency and Time workshops. These are considered to be the three essential elements of highly effective supply chains. The workshops explored four areas, understanding the stakeholder; the data sharing requirements; the agreed joint processes; and the shared key performance indicators. Within these areas three questions were addressed: what is required, what do we have now and how do we bridge the gap? The topics and agenda for discussion for each workshop were: -

- hospital partnerships - how can we develop hospital partnerships to ensure effective and safe management of blood? What are appropriate processes for moving blood within and between hospitals?
- predicting demand - how much blood will be required in future years? What information can be provided?

- blood ordering and issue - the whole process of how hospitals order/request blood from the blood services.
- use of information and communications technology - is information and communication technology used effectively throughout the blood supply chain? Are there developments we should be embracing?
- relationships across the supply chain - the awareness of all components of the blood supply chain by all stakeholders from donor carers to nurses administering the transfusion.
- what is an appropriate stock level - how much blood should hospitals and the blood services be holding? If and when is wastage appropriate?
- delivery and transport - the process for despatching and transporting blood from the blood services to hospitals.

An outcome of the workshops was the establishment of five BiteSize projects which reported to the 2006 meeting.

The plenary presentations and reports from the 3T's workshops are available on www.bloodstocks.co.uk/openmeetings/openmeeting2005/

10. Further information

Information including steering and operations group membership can be found on the BSMS website www.bloodstocks.co.uk

11. Steering Group members

Stuart Penny, National Blood Service, Chairman

Ann Benton, Morrision Hospital, Swansea

Judith Chapman, Blood Stocks Management Scheme

Rob Hick, Blood Stocks Management Scheme

Clive Hyam, Blood Stocks Management Scheme


Jane Leftley, Maidstone Hospital, Maidstone, Kent

Audrey Savage, Royal Victoria Hospital, Belfast

Craig Taylor, Russells Hall Hospital, West Midlands

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