National Comparative Audit of Blood Transfusion

Re-audit of Bedside Transfusion Practice

St Elsewhere's Hospital

2005

Acknowledgements
We wish to thank all those who have participated in the National Comparative Audit of the Blood Transfusion Process. We recognise that those giving up their time have been many and varied and that this will inevitably have been on top of a heavy workload. This audit would clearly not be possible with their support.

Funding
The National Comparative Audit of Blood Transfusion is funded by the National Blood Service.

Report prepared by the National Comparative Audit of Blood Transfusion Process Project Group

Dr Craig Taylor, Consultant Haematologist, National Blood Service and Dudley Group of Hospitals NHS Trust
Derek Lowe , Statistician, CEEU, Royal College of Physicians, London
John Grant-Casey, Project Manager, National Comparative Audit, National Blood Service
Elaine Parris, Transfusion Liaison Nurse, National Blood Service
Tanya Hawkins, Transfusion Practitioner, Specialist Practitioners of Transfusion
Penny Irwin**, Clinical Effectiveness Facilitator, CEEU, Royal College of Physicians**
David Dalton**, Audit Project Officer, National Comparative Audit, National Blood Service**

For correspondence, please contact
John Grant-Casey
Project Manager, National Comparative Audit of Blood Transfusion
FREEPOST (SCE 14677), BIRMINGHAM, B2 4BR
Email **john.grant-casey@nbs.nhs.uk**
Tel. 01865 440046

Contents

Executive Summary

Introduction

Major morbidity or death may result from the administration of blood to the wrong patient, or from failure to identify early enough a developing transfusion reaction. The British Committee for Standards in Haematology (BCSH) published guidelines in 1999 on the administration of blood to guide hospitals in minimising these risks. The National Comparative Audit of The Blood Transfusion Process has examined hospitals compliance with these guidelines and the first national audit was in 2003. The results of the 2005 re-audit are the subject of this report.

The first round of this audit in 2003 demonstrated that while most National Health Service (NHS) trusts have policy documents for the administration of blood based on the recommendations of the BCSH, compliance with these standards was poor. It highlighted that a small proportion of patients receiving blood transfusion were extremely vulnerable due to lack of adequate identification and observations. The Serious Hazards of Transfusion (SHOT) scheme started collecting data in 1996 and has repeatedly shown that failure of the bedside check is the single most important error in the transfusion process leading to the wrong blood being given.

The Health Service Circular (HSC) 2002/009 - Better Blood Transfusion: Appropriate use of Blood (BBT2) set out further recommendations on how hospitals should ensure safe transfusion practice. Since the last audit there have been continued efforts to comply with these recommendations with support from the National Blood Service, the National Blood Transfusion Committee and the Regional Transfusion Committees.

Methods

The audit took place over approximately 3 months from April 2005 and consisted of two parts: an organisational audit consisting of a questionnaire survey based on the recommendations of BBT2, and an audit of transfusion episodes based on the BCSH guidelines for blood administration 1999. Patients were identified prospectively, and the first part of the audit form was filled in at the bedside while the transfusion was taking place. The audit form was then completed retrospectively after the transfusion had finished. The results were analysed by the Clinical Effectiveness and Evaluation Unit at the Royal College of Physicians, London.

Key Results

See also the Summary of National Statistics on page iv.

Organisational audit

- Overall 98% of sites have established a Hospital Transfusion Committee (HTC)
- Attendance at HTCs is variable with especially poor representation from the medical specialities: only 11% having had a representative from care of the elderly and 15% from gastroenterology in the preceding 12 months. Clinical governance/risk was represented at 70%.
- 80% of sites had an established Hospital Transfusion Team.
- 75% have a transfusion practitioner in post.
- Training of nurses in blood transfusion remains poor with only 56% of sites having provided induction training, and 39% of sites annual retraining to at least 50% of their nurses.

Transfusion Episodes

- 8054 transfusion episodes were audited.
- A wristband was present in 94%, though in only 91% of wristbands were all details present (first name, surname, date of birth and hospital number). The most

commonly given reason for the nurses not having put on a wristband was that the patient was 'well known' and/or use of a wristband was not day unit policy.
- In 0.6% an alternative to the wristband was used. These alternatives included photo ID, wristbands on the cot and addressograph labels stuck on clothing.
- Of patients with no identification (466), the highest rates were seen in Paediatrics (32/119) and Special Care Baby Unit (SCBU) (11/42) though blood use, and the number of transfusions in these areas, is relatively small. The largest numbers were in medicine (127/466) and haematology (122/466). Outpatients accounted for 39% and were twice as likely as inpatients (10% v 5%) to have no wristband.
- The information on the wristband fully matched that on the unit of blood in 94%.
- Patient information was most frequently missing from the prescription sheet, and this was most commonly the date of birth (10%).
- Mismatches between the wristband and other documents occurred in 2.1-2.6% of cases. Mismatches were caused by: spelling errors, transposition of digits and the use of multiple identification numbers (duplicate hospital numbers, numbers from other hospitals and the use of A&E and NHS numbers).
- 15% had no record of vital signs observations during the transfusion. 34% had no record in the first 30 minutes.

Organisational score

Sites were scored according to their compliance with the recommendations of BBT2 in the organisational audit.

- Of a possible score of 16, the national median was 11 (inter-quartile range 9-12).

Risk assessment

All transfusion episodes were scored to assess the potential risk to the patient of misidentification and suffering an unobserved transfusion reaction. The scores were then stratified into risk categories. Overall:

- 23 cases (0.3%) were at severe risk – spread over 21 sites.
- 236 (3%) at high risk
- 1222 (15%) at moderate risk
- There was a trend for sites with a better organisational score to have fewer cases in the severe risk category.
- There was a trend for fewer severe risk cases among those sites that had achieved better rates of nurse training, and training tended to be better in those sites where a transfusion practitioner was in post.

Conclusions and Discussion

The results of this audit are not strictly comparable to those of 2003 due to some differences in the way questions were worded and differences in participation rates. Broadly speaking however, practice would appear to have improved with fewer patients not wearing a wristband (6% v 10% in 2003) and fewer at risk from lack of observations (34% with no observations in first 30 minutes of transfusion compared with 47% in 2003). Despite these improvements, the problems identified in 2003 persist, and patients continue to be put at risk of suffering avoidable complications of transfusion through misidentification and lack of proper observation. In addition, the risks of poor patient identification potentially extend to all aspects of patient care.

Risk profiles differed between the NHS and the private sector, presumably reflecting the differing environments. In the relative calm of the private hospital patients appear more likely to have a wristband on, though they are more likely to be in a private room.

A number of patients had been given an alternative form of identification to the conventional wristband. At present there is no national guidance as to what defines an acceptable form of

identification and many that are being used are not satisfactory. The National Patient Safety Agency (NPSA) is currently carrying out work in this area.

This audit has not looked at whether the appropriate identity checks are being done, but at the documentation that would enable them to be done. Overall, in 98% of cases the compatibility form was signed to confirm that the identity check had been done. In those who were essentially unidentifiable as they had no wristband and they were unconscious, the figure was 91%. One has to question how the check was made in these cases and what the significance is of a signature on the compatibility form.

Improving practice and patient safety through training of nurses is an important recommendation of BBT2. Despite progress in other areas of BBT2, training remains a problem, and untrained nurses continue to administer blood transfusions.

Recommendations
Based on the analysis of data in this audit, we recommend the following:

1. Hospitals must ensure that 100% of patients (both inpatients and outpatients) are positively identified with a wristband or an acceptable alternative. It is not acceptable for patients to receive a transfusion without positive identification in place.
2. Any alternative identification to the wristband must have a full risk assessment performed before implementation is considered.
3. Hospitals must ensure that 100% of staff involved in the administration of blood receive both induction and annual training. Adequate resources, and transfusion practitioner time, must be made available to achieve this, in line with BBT2 recommendations.
4. Training programmes must stress the importance of the bedside identity check between the wristband and the blood bag in preventing ‘wrong blood’ incidents.
5. Training must stress the importance of carrying out and recording observations in the first 30 minutes of a transfusion as a simple means of detecting transfusion reactions.
6. Hospital Transfusion Committees must ensure appropriate membership and attendance. Attendance appears particularly low from the medical specialities.
7. Hospital Transfusion Committees are encouraged to initiate further audits of the blood administration process. Observational audit of the administration process may be helpful in determining why some transfusions proceed in the presence of missing and mismatched identity information.
8. Hospitals should consider the implementation of new technologies (e.g. electronic systems using barcode technology) to improve safety of blood transfusion.
9. **In your hospital the highest risk cases were in the 'High' risk category. This suggests a failing in safe transfusion practice and it is recommended that these cases be investigated and remedial actions taken.**

Summary of National Statistics

Hospitals in England were invited to take part if they transfuse more than 5 units of blood per week. Wales, Scotland and Northern Ireland were asked to nominate hospitals to take part, and while some from Wales and Scotland did provide data, Northern Ireland declined as they had recently performed a similar exercise locally. One hospital from the Isle of Man and one from the Channel Islands agreed to take part.

		NHS HOSPITALS				Private Hospitals England	Your Hospital
		England	**Scotland**	**Wales**	**Islands**		
Numbers participating in audit	Organisational	217/274	3/6	10/17	2/2	38/75	**YES**
	Episodes	211/274	4/6	17/17	2/2	35/75	**40**
Organisational Score (0-16)	Median	12	9	11	4	9	**10**
	% <10	21	67	30	100	53	
Aspects of organisation:							
% Hospital Transfusion Committee (HTC)		99.5	100	100	100	89	**YES**
% Hospital Transfusion Team (HTT)		86	100	70	0	53	**YES**
% Transfusion Practitioner in post		82	100	70	50	39	**YES**
% Lead Consultant for transfusion		91	100	70	0	89	**YES**
% Induction training for >50% registered nurses		57	0	20	0	71	**26-50%**
% Annual re-training for >50% registered nurses		38	0	20	0	57	**<25%**
Episodes audit:	Cases	6750	113	432	54	705	**40**
Risk assessment – % SEVERE		0.3	0	0.9	0	0	**0**
Risk assessment – % HIGH/SEVERE		3.2	7.1	6.7	5.6	0.6	**5**
Risk assessment – % MODERATE/HIGH/SEVERE		18	25	22	11	24	**20**
% NO Identification		6	14	13	7	1	**13**
% NO monitoring of vital signs* during transfusion		13	4	12	9	17	**8**
% Patients presumed not visible to nurses		21	27	19	48	77	**13**
% Patients unconscious		7	11	6	0	6	**13**

***** temperature and pulse both not monitored

Main Audit

Introduction

The first round of this audit took place in 2003[1], and followed on from smaller initiatives[2] looking at the transfusion administration process. The 2003 audit[1] demonstrated that while most National Health Service (NHS) trusts have policy documents for the administration of blood that are in keeping with the British Committee for Standards in Haematology (BCSH) guidelines[3], compliance in practice with these standards was poor. In particular, it highlighted that a small proportion of patients receiving blood were extremely vulnerable to errors due to lack of adequate identification and observations while being unconscious or alone in a side room. Serious Hazards of Transfusion (SHOT) is a confidential reporting scheme set up to identify adverse outcomes from transfusion. SHOT started collecting data in 1996 and annual reports since then have repeatedly shown that failure of the bedside check is the single most important error in the transfusion process leading to the wrong blood being given.

Following the last audit, there have been continued efforts from hospitals to comply with the Health Service Circular (HSC) 2002/009 - Better Blood Transfusion: Appropriate use of Blood (BBT2)[4]. There has been support for hospitals to achieve these goals from the National Blood Service (NBS), Regional Transfusion Committees (RTC) and the National Blood Transfusion Committee (NBTC) with the intention of improving patient safety. Initiatives from the National Comparative Audit have consisted of a series of regional seminars for transfusion practitioners and nursing directors, and an awareness campaign in selected hospitals piloting various materials such as pens, posters and notepads carrying important transfusion safety messages. Feedback from these initiatives has been very positive and the National Blood Service has since made some of these materials available nationally to hospitals free of charge.

Aims of the audit

The key aim of this re-audit has been to determine whether the BCSH guidelines for the administration of blood are being followed at the bedside. In addition, it was to determine the extent to which the organisation within hospitals, as recommended in BBT2, is in place to facilitate safe transfusion practice and compliance with the guidelines.

The re-audit has looked at key aspects of the previous audit with the omission of some aspects that were not felt to be informative. Some additional changes have been made to improve on the previous audit and gather additional information.

With respect to the audit of transfusion episodes, the specific objectives were to audit:

- Presence of wristband
- Completeness and accuracy of wristband
- Reason for lack of wristband
- Presence of alternative form of identification
- The written record of pre-transfusion vital signs
- That compatibility forms and prescription sheets have been signed
- That date and time of transfusion have been recorded
- That observations of vital signs have been recorded during the transfusion
- That observations of vital signs have been recorded after the transfusion

Methods

The 2005 audit consisted of two components, the organisational questionnaire (Appendix 3) and the audit of transfusion episodes (Appendix 4). Episodes data collection was in March (1% of total), April (30%), May (29%), June (34%) and July (6%) of 2005. The organisational form was also completed during this time period.

Site selection and response

Hospitals in England were invited to take part if they transfuse more than 5 units of blood per week and these were identified from the NBS customer database, the Blood Stocks Management Scheme, the Royal College of Physicians and NHS directory sources. Of 280 eligible NHS hospitals, 80% (223) participated in the organisational audit, 76% (214) in the episodes audit and 71% (199) in both. Of 75 private hospitals 51% (38) participated in the organisational audit, 47% (35) in the episodes audit and 43% (32) in both.

The National Blood Services for Wales, Scotland and Northern Ireland were invited to nominate hospitals to take part, and 17 hospitals from Wales and 6 from Scotland were put forward. Northern Ireland however declined to participate having recently undertaken a similar exercise locally. In addition the Directors for Health for the Isle of Man and the Channel Islands were also asked to nominate hospitals. 1 hospital from the Isle of Man, and 1 from the Channel Islands were put forward. Of the 25 hospitals from outside England, 15 participated in the organisational audit and 23 in the episodes audit, with 13 in both.

The national denominator comprises all participating sites. Five English NHS Trusts wanted the results of their hospitals combined, and allowing for this the total National denominator of 'sites' was 270 for the organisational and 269 for the episodes audit, with 241 taking part in both.

There were 8054 episodes audited, with a median of 36 cases per site (inter-quartile range 19-40 cases).

Case selection and quotas

Participating hospitals were asked to audit 40 transfusion episodes. Some smaller sites where the main hospital in the trust was also taking part were asked to audit 20 episodes. To ensure a representative sample from major areas of red cell usage, hospitals were provided with a target quota of clinical areas to audit based on data they provided on red cell use over a three month period.

Overall, the actual cases audited were representative of the major areas of use:-

	Medical	Surgical	Haematology	Orthopaedics	Obs/Gyne	Oncology	Others
Quota %	21	22	21	15	10	3	8
Actual %	29	17	20	12	4	7	11

We did not specify the time at which cases should be audited, and most were audited within normal working hours. This is likely to have resulted in an under representation of emergency transfusions. Some auditors reported difficulty in fulfilling their quota due to high number of transfusions being given out of hours.

Use of the tool and guidance notes

The audit of transfusion episodes was carried out using an audit tool based on BCSH guidelines for blood administration[3]. Auditors were aided by the provision of extensive guidance notes (see references section). Transfusion episodes were identified prospectively through the transfusion laboratory and the first part of the audit tool was completed at the bedside while the transfusion was running. The median time of starting the audit was 55

minutes after the transfusion had started (inter-quartile range 20-105 minutes). The rest of the audit tool was completed retrospectively after the transfusion had finished.

Who did the audit?
Transfusion Practitioners audited the largest number of cases (58%), while the remainder were completed by Biomedical Scientists (11%), Clinical audit staff (11%), nurse/midwife staff (13%), and doctors (3%). In addition, various other professionals audited transfusion episodes, the most significant of whom were: blood transfusion support/training officer (2 sites, 66 cases), medical laboratory assistant/phlebotomist (3 sites, 53 cases), medical student (1 site, 39 cases), Operating department practitioner/perfusionist (6 sites, 28 cases). We didn't ask who did the organisational audit but independent feedback suggested that it was competed mainly by either the Transfusion Practitioner or the Consultant Haematologist in charge of the blood bank.

Organisational audit and scoring system
The organisational questionnaire is based largely on the recommendations of the Health Service Circulars HSC 1998/224[5] and HSC 2002/009[4], though some key aspects of these recommendations were excluded from this audit as previous surveys have demonstrated good compliance[6,7]. Additional questions, such as the number of SHOT reports completed in the last 12 months, have been directed at assessing 'good practice', and the activity of the transfusion team.

Compliance with the BBT2 recommendations was measured using a simple scoring system, one point being awarded for each question where there is compliance, with a maximum score of 16 achievable. Further details of the scoring system are given in Appendix 2.

Risk assessment of transfusion episodes
Two major risks associated with blood transfusion can be assessed from the audit data - the risk of receiving the wrong unit of blood, and the risk of suffering an unobserved transfusion reaction. A risk assessment for each transfusion episode has been carried out based on whether the patient was identifiable, conscious, had vital signs monitored, and whether they were visible to the nursing staff.

A scoring system (Appendix 1) has been applied to each transfusion episode and, the episode classified as low, moderate, high or severe risk.

Data entry, cleaning and validation
Completed forms were returned to the NBS and scanned into a spreadsheet (episodes) or entered manually (organisational). The quality of data scanning was checked for all forms in which the scanner highlighted problems. For a check on the whole data collation process 100 random episodes were selected from the final database and details for 47 questions checked against the original forms. The error rate at 0.5% was minimal - a total of 23 genuine discrepancies were found across 17 questions.

A subset of 57 sites participated in data reliability testing. We asked for 5 cases per site and there were 240 analysable forms. Agreement levels were moderate, highest regarding the presence of unit start and stop times on the compatibility report and prescription sheet, and lowest for whether vital sign monitoring had taken place before and after transfusion. The reliability testing was performed by a second auditor, who looked at case-notes retrospectively. The differing method, and the small numbers may explain the relatively poor agreement seen, and some caution is required in interpreting this data. For more details see Appendix 5.

Audit data was analysed at the Clinical Evaluation and Effectiveness Unit (CEEu) of the Royal College of Physicians, London. 0

Results of Organisational Audit

Infrastructure/Personnel

Better Blood Transfusion 2 (HSC 2002/009) recommends

- *Secure appropriate membership and functioning of Hospital Transfusion Committee (HTC)*
- *Secure appropriate composition and functioning of a Hospital Transfusion Team (HTT)*
- *The HTT should have lead consultant with sessions dedicated to transfusion, transfusion practitioner or equivalent and the blood bank manager +/- other members of HTC*

			National (N=270) %	National (N=270) N	Your site
Q1	Hospital Transfusion Committee (HTC)		98	265	**YES**
Q2	Number of meetings in last 12 months	None	1	2	**Three**
		One	3	7	
		Two	9	24	
	(Known for 262)	Three	23	60	
		Four	56	148	
		More than four	8	21	
Q3	Membership of HTC	Haematology	98	253	**YES**
		Anaesthetics	89	230	**YES**
	(Known for 259)	Vascular Surgery	32	83	**NO**
		General Surgery	42	109	**NO**
		Orthopaedic Surgery	47	121	**NO**
		Obstetrics & Gynaecology	66	170	**NO**
		Accident & Emergency	38	99	**NO**
		General Medicine	39	101	**NO**
		Care of the Elderly	11	28	**NO**
		Gastroenterology	15	38	**NO**
		Paediatrics	50	129	**NO**
		Senior Nurse	88	228	**YES**
		Audit Department	36	93	**NO**
		Clinical Governance/Risk	70	181	**NO**
		Blood Bank	98	255	**YES**
		Hospital Management	57	148	**NO**
Q4	Established Hospital Transfusion team (HTT)		80	217	**YES**
Q5	How many meetings of the HTT in the last 12 months	None	4	8	**4-6**
		1-3	23	47	
		4-6	25	51	
		7-9	13	27	
	(Known for 208)	10-12	24	50	
		More than 12	12	25	
Q6	Attendance at HTT in last 12 months	Consultant Haematologist	95	193	**YES**
		Transfusion Practitioner	92	186	**YES**
		Blood Bank Manager	95	192	**YES**
	(Known for 203)	HTC Chair (not Haematologist)	22	45	**NO**
Q7	Transfusion Practitioner in Post (Known for 268)		75	202	**YES**
Q8	If yes, WTE allocated to transfusion (Known for 191)	<1.0	25	47	**Exactly 1 WTE**
		Exactly 1.0	62	118	
		>1.0	14	26	
Q9	Lead consultant for transfusion (Known for 268)		90	240	**YES**
Q10	If yes, WTE allocated to transfusion: (Known for 184)	No official time	26	47	**>0.2 but <=0.5 WTE**
		<=0.2	33	60	
		>0.2 but <=0.5	24	44	
		>0.5	18	33	

Training in Blood Transfusion

Better Blood Transfusion 2(HSC 2002/009) recommends

- *Trusts should ensure that blood transfusion is included in the induction and orientation programmes for new staff*
- *Trusts should provide regular (annual) documented training*

			National (N=270)		Your site
			%	N	
Q11	% of registered nurses that have received induction training	<=25%	30	75	**26-50%**
		25-50%	15	37	
	(Known for 254)	51-75%	19	48	
		76-100%	37	94	
Q12	% of registered nurses that have received annual retraining	<=25%	36	92	**<25%**
		25-50%	25	63	
	(Known for 256)	51-75%	27	70	
		76-100%	12	31	
Q13	Nurses without training are allowed to administer blood transfusions	(264)	67	177	**YES**
Q14	Training available for agency registered nurses	(255)	60	154	**YES**
Q15	Untrained agency registered nurses are allowed to administer blood	(252)	58	146	**YES**

Audit

Better Blood Transfusion 2 (HSC 2002/009) recommends

- *Carry out regular multidisciplinary audit of transfusion practice and regularly feedback the results.....to the relevant staff*

		National (N=270)		Your site
	In the last 12 months trust has undertaken:	%	N	
Q16	At least one regional audit (258)	80	207	**YES**
Q17	At least 2 local audits (266)	80	212	**YES**
Q18	Audit department supported at least one audit (258)	65	167	**YES**
Q19	Results of audit have been fed back to at least one medical directorate (259)	77	199	**YES**
Q20	Results of audit have been fed back to at least one surgical directorate (262)	79	207	**YES**

Incident reporting

Better Blood Transfusion 2 (HSC 2002/009) recommends

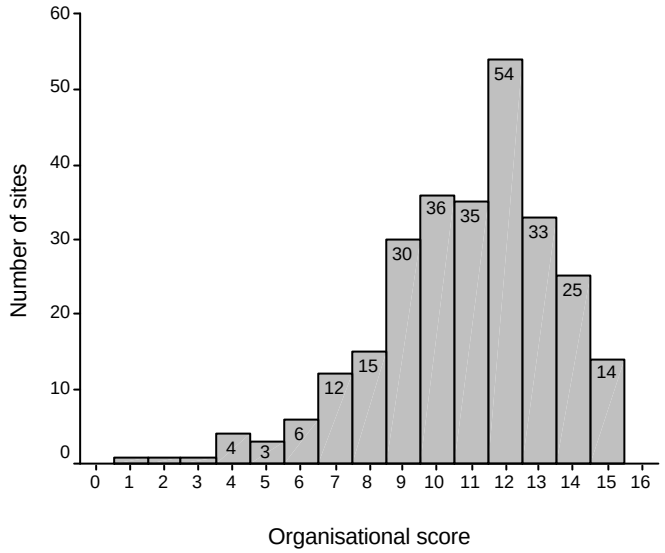
- *Ensure timely feedback to blood users on subsequent lessons learnt*
- *Ensure participation in SHOT*

		National (N=270)		Your site
		%	N	
Q21	HTC formally reviews critical incidents involving blood transfusion (265)	97	258	**YES**
Q22	Formal (e.g. written) feedback to users of the outcome of incidents (253)	68	172	**NO**
Q23	SHOT reports submitted in the last 12 months (248)	83	207	**3**

Risk Assessment

Organisational Score

Based on the compliance of your hospital with the aspects of BBT2 assessed in this audit, **your hospital scores 10** out of a potential of 16. This compares with a national median score of 11 (Inter-Quartile Range 9-12).



See Appendix 2 for details of the scoring system.

Risk Assessment of Transfusion Episodes

All transfusion episodes in this audit have been stratified into risk categories based on a scoring system taking into account the following criteria:

- Presence of complete and accurate wristband or presence of other form of identification
- Observations of vital signs after start of transfusion
- State of consciousness of the patient
- Whether the patient is likely to be visible to the nursing staff

Further details of the scoring system and definitions are given in Appendix 1.

The table below shows the risk stratification of the cases reported from your hospital compared to the national figures.

Risk Category	National (269 sites)		**Your Hospital**	
	%	N	**%**	**N**
Low Risk	82	6573	**80**	**32**
Moderate Risk	15	1222	**15**	**6**
High Risk	3	236	**5**	**2**
Severe Risk	0.3	23	**0**	**0**

The 23 severe risk cases were from 21 sites, the 259 at high or severe risk were from 125 sites and the 1481 at moderate, high or severe risk were from 244 sites.

There were 10 sites with 50% or more of audit cases at moderate, high or severe risk, and 75 sites with 25% or more at moderate, high or severe risk.

Organisational Factors affecting Transfusion Episode Risk Profile

The transfusion episode risk profiles of hospitals, their organisational score, and the individual organisational factors, were compared to identify any clear relationship between organisational factors and risk to the patient. 241 sites took part in both parts of the audit.

Statistically non-significant trends were seen in several areas.

Sites with lower organisational scores tended to have proportionately more cases in the severe risk category.

		Sites with at least one severe risk case	
		%	N
Organisational score	<10	11.1	7/63
	10-12	8.0	9/112
	13-15	6.1	4/66

There was a trend for there to be fewer severe risk cases in those sites where a higher proportion of nurses had received training (both induction training and annual retraining), and there tended to be more annual retraining of nurses in those sites where a transfusion practitioner was in post, though there appeared to be little difference with regard to induction training. Sites who did not allow non-trained nurses to administer blood did not appear to have fewer severe risk cases than those who did.

35 sites who reported having submitted no SHOT reports in the last 12 months had no severe risk cases. Of 184 sites who had submitted one or more SHOT reports, 12% (22 sites) overall had at least one case in the severe risk category. The risk however declined with increasing reports: 1-2 reports, 16% (8/50); 3-5 reports, 9% (6/65); 6-9 reports, 11% (4/36); >10 reports, 3% (1/32). This trend did not reach statistical significance.

Audit of Blood Transfusion Episodes

Data are expressed in percentage and absolute terms and where data were missing the denominator is adjusted accordingly.

Better Blood Transfusion 2 (HSC 2002/009) recommends

- *All Trusts should ensure that all patients (including out patients) receiving a blood transfusion have a patient identification wristband or equivalent, and are monitored during the transfusion according to national guidelines*

Description of sample

8054 transfusion episodes were audited in 269 locations. You audited 40 episodes.

		National (8054)		**Your Hospital (40)**
		%	N	**%**
Q2/3	Weekday	97	7774	**95**
	Weekday 8am-6pm	87	7015	**75**
Q5	In-patient	78	6242	**65**
	Day-case	22	1812	**35**
Q6	Clinical specialty:			
	Medical	29	2303	**10**
	Surgical	17	1330	**10**
	Haematology	20	1637	**35**
	Orthopaedic	12	938	**8**
	Obs & Gynae	4	357	**10**
	Oncology	7	557	**10**
	ITU(CCU)	6	457	**8**
	A&E	0.5	42	**5**
	Cardiac	2	149	**0**
	Paediatric	1.5	119	**5**
	Theatre	0.4	34	**0**
	SCBU	0.5	42	**0**
	Recovery	0.5	41	**0**
	GP arranged transfusions	0.3	23	**0**
	Other*/Unknown	0.3	25	**0**
Q7	Median age (IQR) of patient	72	(58-81)	**Median 50 y**

*Where other specialities were given, they were assigned to the above groups wherever appropriate. Those remaining in the 'other' category included those where no speciality was given as well as hospice transfusions (n=3), and foetal medicine (n=2).

The spread of clinical specialities is as expected from the quotas of cases (see methods section).

Location and consciousness of Patient

BCSH Guidelines 1999 recommend

- *Transfusions should be given in clinical areas where patients can be readily observed by members of the clinical staff*
- *Unconscious patients are more difficult to monitor for signs of transfusion reactions*

2024 (25%) of patients transfused were in a side room or in a bay on their own, and were presumed therefore to be potentially unobserved. Of these, 3.2% (65/2024) were unconscious (0.8% of the total episodes).

		National (8054)		**Your Hospital (40)**	
		%	N	**%**	**N**
Q8	Open ward	60	4802	**53**	**21**
	Side room	21	1721	**8**	**3**
	Bay on their own	4	303	**5**	**2**
	ITU/HDU	8	654	**8**	**3**
	SCBU	0.4	34	**0**	**0**
	Recovery	1.5	120	**5**	**2**
	Other/Unknown*	5	420	**23**	**9**
Q9	Patient unconscious	7	545	**13**	**5**

Of those 420 not coded for location by the data collectors about one-third were episodes in 2, 3, 4, 5,or 6 bedded bays/rooms. Another third took place in day case units, day hospitals or other outpatient facilities. Of the rest, 37 took place in theatre, 26 were described as taking place in a 'Day room', 11 in a 'Day lounge' or 'Hospital lounge', 7 in a sitting room and 3 in a 'Discharge lounge'. 2 episodes took place in a 'Play room', 2 in X-ray or scanning, 1 at home and 1 in the hospital garden.

For the assessment of risk, the comments given for these 420 indicated that 46 were potentially unobservable by nursing staff, bringing the total presumed unobserved episodes to 2070 (26%).

Patient identification

Eye-readable identification wristband

BCSH Guidelines 1999 recommend

- *It is essential that any patient having a blood transfusion has an identification wristband with the patients surname, first name, gender, date of birth and patient identification number*

Overall, only 22% of patients were wearing a wristband that fully complied with the BCSH standard. After gender, the most common omission was the patient identification number.

		National (8054)		**Your Hospital (40)**	
		%	N	**%**	**N**
Q10	Patient wearing an identification wristband that contains eye-readable information	94	7535	**80**	**32**
	If YES to Q10 then wristband contains a readable:				
Q11	Surname	99.4	7493	**100**	**32**
Q12	First name	99.3	7485	**100**	**32**
Q13	Gender	24	1841	**25**	**8**
Q14	Date of birth	96	7270	**100**	**32**
Q15	ID number	95	7136	**100**	**32**
	Surname, first name, date of birth, and ID number	91	6874	**100**	**32**

Reasons why an eye readable identity wristband was not being worn

In 516 (6%) cases there was no eye readable identification wristband. The reasons given for this were:

		National (516)		**Your Hospital (8)**
		%	N	**N**
Q20	Not put on by nursing staff	47	240	**4**
	Taken off by patient	3	14	**0**
	Taken off by staff and not replaced	15	78	**0**
	Patient is unable to wear an ID bracelet	7	34	**0**
	Carried by patient but not worn for transfusion	2	9	**0**
	Other/Unknown	27	141	**4**

Where the wristband was not put on by nursing staff, the most commonly stated reason was that the patient was well known to the staff and/or use of a wristband was not day unit policy. In addition, it was occasionally because the nurse had forgotten, had not got round to it or had been too busy. In three episodes (in different hospitals) it was because the unit/department had run out of wristbands. In some cases it was stated that a wristband was not felt necessary as only one transfusion was taking place in the unit. Wristbands were occasionally not put on, or removed because of dermatological conditions or oedema of the wrists and one patient had only one arm, and another had both arms in plaster. Several patients were said to be allergic to the plastic. Wristbands were occasionally refused by patients, or removed by them – usually due to confusion or agitation. The reason for babies not wearing wristbands was usually that the baby was too small or they had multiple access lines in. In these patients the wristband was often on, or in the incubator.
Other reasons given were that the wristband was present but not legible due to water damage, the transfusion was given at home, or another form of identification was used.

Alternative forms of identification

A form of identification other than a conventional wristband was being used in 226 cases. In 22% (50/226) this form of identification was being used instead of a wristband. This was in the following specialities - Haematology (25 cases), ICU/CCU (6), SCBU (5), Oncology (4), Medical (3), others (7).

The specialities with the highest rates of use of other forms of ID were SCBU (14%, 6/42), Orthopaedics (4.1%, 38/938), Haematology (3.3%, 54/1637), Cardiology (3.4%, 5/149), Medicine (2.2%, 50/2303) and Surgery (2.7%, 36/1330). Of those using other forms of ID, 26% (58) were day cases.

		National (8054)		**Your Hospital (40)**	
		%	N	**%**	**N**
Q21	Other forms of identity worn instead of wristband	0.6	50	**8**	**3**
	Other forms of identity worn as well as wristband	2.2	176	**0**	**0**
	If Yes to Q21:-		226		**3**
Q22	Photo ID	9	20		**3**
	Wristband with unique number (red label)	69	156		**0**
	Wristband on lanyard round neck	1	3		**0**
	Blank /Other forms of identity	21	47		**0**

Other forms of identification included a label, tag or wristband on the cot/incubator (6), silicone tape ID band (5), addressograph label on clothing (6), clip badge (5), ID band on nasopharangeal tube (1) and, an appointment card with ID label (1). In one episode involving an intra-uterine transfusion, it was commented that the mother was wearing the wristband, and not the recipient of the transfusion (the foetus).

Patients with no form of identification

Of the 516 cases with no wristband, 50 had other forms of identification, leaving 466 or 5.8% with no identification. **The rate for your site was 13%** with **5/40** episodes.

The lack of identification was not concentrated within a few sites but was widespread with the 466 cases found within 160 or 59% of the 269 participating sites. One site had 19 such cases (48% of their audit cases) and 13 sites had between 6-10 such cases.

Specialities with the highest rates for no identification were Paediatrics (27%, 32/119), SCBU (26%, 11/42), Recovery (10%, 4/41), Oncology (8%, 47/554), ITU/CCU (8%, 36/457), Haematology (7%, 122/1636), A&E (7%, 3/42). These are all relatively small users of blood however, and account for a small number of all the patients with no identification. For inpatients the rate was 5% (284/6237) while for outpatients it was 10% (182/1810).

Of the 466 with no identification, 27% were from medicine, 26% from haematology, 10% from oncology, 10% from surgery, 8% from ITU(CCU), 8% from paediatrics and 12% from elsewhere. 39% of those with no identification were outpatients.

The presence of identification appeared to increase with age. For those under 5 years, 21% (34/163) had no identification, while for those 5-14 years it was 17% (20/118). For those 15-44 years it was 7.0% (59/841), for 45-75 years 5.7% (188/3322), for 75-84 years 4.6% (108/2355) and for those 85 years and over the rate was only 4.4% (51/1158).

Do wristband details match other details?

BCSH Guidelines 1999 recommend

- *The following details (surname, first name, gender, date of birth, patient identification number) must be checked and found to be identical on: (i) the patient identification wristband; (ii) the blood transfusion compatibility report form; (iii) the compatibility label attached to the blood pack; (iv) the prescription chart; (v) the medical notes*

Following feedback from auditors at the beginning of the audit, extra data was collected on the nature of any mismatched or missing information between the wristband and the compatibility sheet, blood bag label, medical notes and the prescription sheet. This data was collected in the form of a table in place of questions 16-19 but was only available for 59% of cases. Without the detail from this table, it is not possible to distinguish between mismatched and absent information. Auditors also clearly differed in how they regarded lack of gender details on wristbands. The majority of those not using the additional table disregarded the lack of gender on the wristband and other documents and answered 'Yes' to Q16-19, contrary to the guidance notes. For consistency we have interpreted the tables in line with the original questions 16-19, and have amended the results to exclude lack of gender as causing a lack of matching data. For the 6874 cases for which a surname, first name, date of birth and hospital ID were all present:

		National (6874)		**Your Hospital (32)**	
	Items on wristband match with:	%	N*	**%**	**N**
Q16	Compatibility report form	97	6409/6610	**100**	**32/32**
Q17	Unit of blood	94	6175/6569	**100**	**32/32**
Q18	Medical records	95	6006/6291	**100**	**31/31**
Q19	Prescription sheet	89	5891/6600	**97**	**30/31**

*Denominators exclude cases where the particular document was either not used in the hospital or could not be found, or when the required information was not given by the auditor.

Table data was collected from 4790 episodes. The extra information is given in full in Annex A, and summarised here.

Information was most frequently missing from the prescription chart (11% of episodes) and less often from the blood pack (2.6%), medical records (2.3%) and the compatibility form (0.39%). Excepting the gender, the most frequently missing information was the date of birth (missing from 10% of prescription sheets) and then the hospital number (missing from 5.6% of prescription charts).

Information mismatches occurred with roughly equal frequency on all documents (2.1% to 2.6%), and the most frequently mismatched information was the hospital number. This was again with roughly equal frequency with all documents (1.0% to 1.4%). The reasons for mismatches included errors in spelling, transposition of numbers and dates of birth, water damaged and illegible wristbands, and the use of multiple identification numbers within hospitals (patients with duplicate hospital numbers, patients transferred between hospitals, and the use of Accident and Emergency numbers and NHS numbers).

Concerning the unit being transfused at the time of audit

Compatibility report and prescription sheet

BCSH Guidelines 1999 recommend

- *The blood transfusion compatibility form and/or the prescription sheet must be signed by the member of staff carrying out the identity check and the date and time of commencement of the transfusion of each unit of blood or blood component indicated on both*
- *The start and finish times of the infusion of each unit should be clearly indicated on the observation charts*

		National (8054)		**Your Hospital (40)**	
		%	N	**%**	**N**
Q23	Compatibility report or prescription sheet was signed by the person administering the blood	98	7776/7957	**100**	**40/40**
Q24	Date of transfusion was recorded on the compatibility report or prescription sheet	95	7566/7929	**98**	**39/40**
	Is the start time of the unit recorded on the:				
Q25	Compatibility report	66	5176/7835	**90**	**36/40**
Q26	Prescription sheet	88	6946/7867	**59**	**23/39**
	Start time recorded on either the compatibility report or on the prescription sheet	97	7694/7956	**98**	**39/40**
	Is the stop time of the unit recorded on the:				
Q27	Compatibility report (**See note below)**	17	1214/7328	**10**	**4/40**
Q28	Prescription sheet (**See note below)**	33	2436/7347	**21**	**8/39**

It should be noted that BCSH guidelines require that the stop time should be recorded on the observation chart, rather than on the compatibility form or the prescription sheet. Questions 27 and 28 were carried over from the previous audit in 2003, when it was felt that recording stop times on observation charts was not at all common practice. The questions may have caused some confusion, and some hospitals may have reported the stop time that was recorded on the observation chart and some not, even though it may have been present. The reported results of Questions 27 and 28 may therefore be an underestimate of the true recording of the stop time somewhere in the documentation.

In the 46 cases where the patient was unconscious and had no wristband, the compatibility report was signed in 91% (42/46). In all those without a wristband, the rate was 96% (497/516).

Monitoring of Vital Signs

Before the start of transfusion

BCSH Guidelines 1999 recommend

- *Vital signs (temperature, pulse and blood pressure) should be measured and recorded before the start of each unit of blood or blood component, and at the end of each transfusion episode*

For those cases for which it was stated whether signs were monitored:

	Monitoring before transfusion started	National (8054)		**Your Hospital (40)**	
		%	n	**%**	**n**
Q31	**BP** was recorded before transfusion started	91	7260/7972	**97**	**38/39**
Q32	If YES this was:				
	15 minutes or less before	65	4683	**84**	
	16-30 minutes before	13	929	**3**	
	31-60 minutes before	10	722	**3**	
	> 60 minutes before	11	786	**8**	
	Unknown	2	140	**3**	
Q33	**Temperature** was recorded before transfusion started	90	7172/7983	**93**	**37/40**
Q34	If YES this was:				
	15 minutes or less before	63	4529	**86**	
	16-30 minutes before	13	915	**3**	
	31-60 minutes before	10	731	**0**	
	> 60 minutes before	12	839	**8**	
	Unknown	2	158	**3**	
Q35	**Pulse** was recorded before transfusion started	91	7244/7972	**95**	**37/39**
Q36	If YES this was:				
	15 minutes or less before	64	4661	**86**	
	16-30 minutes before	13	937	**3**	
	31-60 minutes before	10	707	**0**	
	> 60 minutes before	11	783	**8**	
	Unknown	2	156	**3**	

Overall, 8% (641/7944) had no monitoring of BP, temperature or pulse, while 89% (7049/7944) had BP, temperature and pulse all recorded.

During the transfusion

BCSH Guidelines 1999 recommend

- *Temperature and pulse should be measured 15 minutes after the start of each unit of blood or blood component*
- *Transfusion reactions should be considered when assessing any change or deterioration in the patients condition, particularly during the first 15-20 min following the start of a unit of blood or blood component*

		National (8054)		Your Hospital (40)	
		%	n	%	n
Q37	**Temperature** was recorded after transfusion started	85	6876	**90**	**36**
	If YES this was first recorded:				
	15 minutes or less after	46	3178	**39**	
	16 – 30 minutes after	28	1939	**28**	
	31 – 60 minutes after	14	933	**19**	
	> 60 minutes after	12	826	**14**	
Q38	**Pulse** was recorded after transfusion started	85	6882	**93**	**37**
	If YES this was first recorded:				
	15 minutes or less after	47	3237	**41**	
	16 - 30 minutes after	28	1956	**30**	
	31 – 60 minutes after	13	923	**16**	
	> 60 minutes after	11	766	14	

15% of transfusion episodes had no record of vital signs during the transfusion while in 12% the first observation was made more than an hour after the transfusion had started. 34% had no record of either temperature or pulse in the first 30 minutes. The majority had a record of temperature and pulse recorded within 30 minutes of the start of the transfusion.

It should be noted that the tool did not ask specifically whether or not monitoring during the transfusion had taken place, unlike in the pre and post transfusion sections. Where a time is not given by the auditor, it is assumed that no monitoring took place. It may be that in some cases the actual time was no available due to missing documents at the time of the audit, even though the monitoring had clearly taken place. 85% may therefore be an underestimate of the actual monitoring.

At the end of the Transfusion

BCSH Guidelines 1999 recommend

- *Vital signs (temperature, pulse and blood pressure) should be measured and recorded before the start of each unit of blood or blood component, and at the end of each transfusion episode*

For those cases for which it was stated whether signs were monitored:

	Monitoring After Transfusion Finished	National (8054)		**Your Hospital (40)**	
		%	N	**%**	**n**
Q39	**BP** was recorded after transfusion ended	76	5443/7128	**95**	**37/39**
Q40	If YES this was:				
	15 minutes or less after	59	3185	**68**	
	16-30 minutes after	19	1016	**24**	
	31-60 minutes after	11	587	**0**	
	> 60 minutes after	8	442	**3**	
	Unknown	4	213	**5**	
Q41	**Temperature** was recorded after transfusion ended	76	5361/7097	**92**	**36/39**
Q42	If YES this was:				
	15 minutes or less after	58	3116	**64**	
	16-30 minutes after	18	985	**19**	
	31-60 minutes after	11	590	**6**	
	> 60 minutes after	9	461	**3**	
	Unknown	4	209	**8**	

Q43	**Pulse** was recorded after transfusion ended	77	5453/7084	**95**	**37/39**
Q44	If YES this was:				
	15 minutes or less after	58	3179	**68**	
	16-30 minutes after	18	985	**19**	
	31-60 minutes after	11	600	**5**	
	> 60 minutes after	8	451	**3**	
	Unknown	4	238	**5**	

In 22% (1543/7012) of episodes there was no monitoring of BP, temperature or pulse.
74% (5204/7012) had BP, temperature and pulse all recorded.

Continuous Monitoring of Blood Pressure, Pulse and temperature

BCSH Guidelines 1999 recommends

- *Vital signs related to transfusion should be recorded separately from routine observations and clearly dated to enable the information to be retrieved later, if necessary*

		National (8054)	
		%	N
Q29	Continuous monitoring of BP, Pulse & temperature	35	2745/7859

Continuous monitoring was reported across all specialities and locations and for both in and out patients. The intention was that this question would pick up those being monitored in the high dependency, ITU or theatre setting, and it is likely that the guidance notes were not adequately clear on this point given the results. It should be noted that compliance with the guidelines requires a record of the vital signs to be recorded in the notes for future reference, and it does not matter whether this has come from a continuous monitoring device or from elsewhere.

Conclusions and Discussion

There has been considerable participation in this round of the audit with 76% of eligible NHS hospitals, and 47% of private hospitals in England taking part in the audit of transfusion episodes. This is a marked improvement over participation in 2003 when only 55% of NHS and 11% of private hospitals in England provided data. It is disappointing however, that a significant number have still been unable to take part, despite initially expressing a desire to do so. The reason why data was not collected by these hospitals was most commonly given as a lack of available manpower. Participation by hospitals from outside England has been less than was hoped for and this has been down to the differences in methods of recruitment. The way in which hospitals from Wales, Scotland, Northern Ireland, and the Islands are recruited will be reviewed before any future re-run of this and other National Comparative Audits.

The organisational audit has highlighted some interesting points with regard to the relative representation of specialities within the HTC. Medical specialities such as gastroenterology and care of the elderly, as well as general medicine are relatively poorly represented in comparison with surgical specialities, yet they are significant users of blood. This may reflect a relative neglect of transfusion issues in the medical setting by HTCs, rather than a disinterest on the part of those specialities. The presence of clinical risk/clinical governance representation at only 70% of HTCs over a 12 month period is concerning. The organisational audit asked some of the same questions as previous surveys of progress with BBT2 performed on behalf of the NBTC[6,7]. While the results are not directly comparable because of differences in the questions and methods employed, our results do suggest that there has been on-going progress with recruitment of transfusion practitioners (75% v 68%) and having a lead consultant haematologist for transfusion (90% v 83%). However, over a quarter of these consultants have no official time set aside for this role. Training of nursing staff has previously been highlighted as a problem in these surveys, and this appears to remain a problem. Training of other staff was not addressed in this audit, but the surveys for the NBTC[6,7] showed that training of staff such as doctors and porters was also inadequate.

Due to differences in the way some questions were asked, and in the response rates, some caution must be applied in comparing the results of the audit of transfusion episodes in 2005 with that of the 2003 National Comparative Audit of Blood Transfusion[1]. However, broadly speaking, the results do suggest that there has been some improvement in most areas: Patients not wearing a wristband (6% in 2005 v 10% in 2003); Unconscious patients not wearing a wristband (8% v 14%); Patients with no observations taken within 30 minutes of start of transfusion (34% v 47%), and within 60 minutes (23% v 28%); patients with no wristband and no observations in the first 30 minutes (2.6% v 4%). Even if we accept these improvements to be real, the risk assessments show that some patients are being put at a severe, or high risk, by a combination of poor practice and the patients' own circumstances.

The differing risk profile between NHS hospitals and private hospitals in England is interesting, and presumably represents the differences in the structure of the organisations and the ward environments. Wristbands/Identification appears to be better in the private sector (only 1% with no wristband), and the reasons for this are not clear. The majority of patients however are in a side room.

The BCSH guidelines[3] give no guidance on alternatives to the wristband. In this audit 50 cases were reported as using an alternative form of identification (with no wristband), and although we have made no attempt to judge which of these might be appropriate, some of these are clearly hazardous. In the cases where the identification is attached to the bed or cot of the patient, or to their clothes (e.g. wristband on cot/incubator, or sticky label on jumper), there is a risk that the patient will become separated from it. In addition, the use of addressograph labels is worrying as these are commonly placed in the wrong notes and might not be properly checked before use. Addressograph labels were also responsible for some of

the missing and mismatched information when used on wristbands and digits were lost off the label when folded over, or where the wrong size label was used for the printer.

The information gathered on the missing or mismatched information between the wristband and other documents is also worrying. In 2.6% of cases where there was a fully completed wristband, the transfusion was given despite there being mismatched information between the wristband and the blood bag. It is not possible to know from this audit why this occurred. It is possible that the nurse administering the blood noticed the errors and continued regardless. It is also possible however that the check was not properly done. In 98% of transfusions overall, the compatibility form was signed to confirm that the identity check had been done. This was also true in 96% of those with no wristband and in 91% of those who were unconscious and had no wristband.

The most common reason given for a wristband not being put on by nurses was that the patient was well known and/or the day unit policy did not require the use of a wristband. While a patient may be well known to the nurse admitting a patient to the day unit, this may not be true for all the staff who may deal with that patient throughout the day. Likewise it is unacceptable to not put on a wristband because the patient is the only person having a transfusion that day. The problem of patients who cannot wear a wristband for legitimate medical reasons has been addressed by one site that has piloted the use of a silicone based tape in place of the wristband. While this approach requires full evaluation, it may represent an alternative to the conventional wristband in selected patients.

The relative risk of having no identification was highest in the young on paediatric wards and SCBU, and this is in keeping with SHOT findings of a disproportionate rate of adverse incidents in this group[8]. However, transfusions in this group comprise only a small proportion of all transfusions. The largest numbers (more than half) of patients without wristbands are transfused in haematology and medicine, and the most effective use of resources may therefore be in targeting these areas as a priority. There is a clear relationship between the presence of a transfusion practitioner and the proportion of nurses who have received annual training. While other associations are more tentative, they do suggest that sites that comply well with BBT2, and where more nurses have been trained, have proportionately fewer cases at severe risk.

Electronic systems utilising barcode technology and handheld scanners have been taken up by some hospitals. These systems have the potential to improve the reliability of the bedside check and patient safety, and it is likely that their use will become more widespread in the future.

The National Patient Safety Agency (NPSA)[9] is currently working on blood transfusion safety, and the initiatives being considered address some of the problems highlighted by this, and the 2003 audit. The BCSH guidelines against which this audit has been undertaken are currently being updated. The updated guidelines will need to take into account new developments in blood transfusion such as the introduction of electronic systems for administration, the use of alternative forms of identification and recommendations made by other national bodies such as the NPSA.

Recommendations

Based on the analysis of data in this audit, we recommend the following:

1. Hospitals must ensure that 100% of patients (both inpatients and outpatients) are positively identified with a wristband or an acceptable alternative. It is not acceptable for patients to receive a transfusion without positive identification in place.
2. Any alternative identification to the wristband must have a full risk assessment performed before implementation is considered.
3. Hospitals must ensure that 100% of staff involved in the administration of blood receive both induction and annual training. Adequate resources, and transfusion practitioner time, must be made available to achieve this, in line with BBT2 recommendations.
4. Training programmes must stress the importance of the bedside identity check between the wristband and the blood bag in preventing 'wrong blood' incidents.
5. Training must stress the importance of carrying out and recording observations in the first 30 minutes of a transfusion as a simple means of detecting transfusion reactions.
6. Hospital Transfusion Committees must ensure appropriate membership and attendance. Attendance appears particularly low from the medical specialities.
7. Hospital Transfusion Committees are encouraged to initiate further audits of the blood administration process. Observational audit of the administration process may be helpful in determining why some transfusions proceed in the presence of missing and mismatched identity information.
8. Hospitals should consider the implementation of new technologies (e.g. electronic systems using barcode technology) to improve safety of blood transfusion.
9. **In your hospital the highest risk cases were in the 'High' risk category. This suggests a failing in safe transfusion practice and it is recommended that these cases be investigated and remedial actions taken.**

References

1. National Comparative Audit of Blood Transfusion. Comparative Report for Blood Transfusion in England. National Blood Service and Royal College of Physicians, 2003.
http://www.blood.co.uk/hospitals/services/ClinAud/pdf%20St%20Elsewhere.pdf

2. Murphy MF et al. (2001). National Audit of the Transfusion Process. *Transfusion Medicine,* 11, 363-370

3. Guidelines for the administration of blood and blood components and the management of transfused patients. British Committee for Standards in Haematology. *Transfusion Medicine* 1999; 9, 227-239
http://www.bcshguidelines.co.uk/pdf/tme203.pdf

4. Health Service Circular 2002/009 - Better Blood Transfusion; Appropriate Use of Blood. Department of Health, 2002.
http://www.dh.gov.uk/assetRoot/04/01/22/93/04012293.pdf

5. Health Service Circular 1998/224 – Better Blood Transfusion. Department of Health, 1998.
http://www.dh.gov.uk/assetRoot/04/01/19/19/04011919.pdf

6. Results of a Questionnaire Survey on the Implementation of the Health Service Circular 2002/009 'Better Blood Transfusion – Appropriate Use of Blood'. For the National Blood Transfusion Committee. 2004.
http://www.blood.co.uk/hospitals/communications/Surveys/Surveys.htm

7. Murphy et al. Survey of the Implementation of the Recommendations in the Health Service Circular 2002/009 'Better Blood Transfusion'. In press.

8. Serious Hazards of Transfusion, Annual Report. 2003.
http://www.shotuk.org/SHOT%20Report%202003.pdf

9. Blood Matching project. National Patient Safety Agency. 2004.
http://www.npsa.nhs.uk/health/display?contentId=3577

Other National Comparative Audit Documents

Report on the 2004 Blood Transfusion Regional Seminars.
http://www.blood.co.uk/hospitals/services/ClinAud/BLOODT~1.PDF

Guidance notes for the National Comparative Audit of Blood Transfusion Process (2005).
A copy can be obtained by contacting the project manager at john.grant-casey@nbs.nhs.uk
They will also be posted on the following website;
http://www.blood.co.uk/hospitals/services/ClinAud/NatCompAud.htm

Appendix 1 - Risk Assessment details

The risks associated with transfusion are now well recognised, and in the worst case can result in the avoidable death of a patient. This audit has looked at two key elements of minimising these risks.

1. The risk of receiving the wrong unit of blood
2. The risk of suffering an unobserved transfusion reaction

The risk of receiving the wrong unit of blood is related to the correct identification of the patient, while the risk of suffering an unobserved transfusion reaction is related to whether the patient is conscious, visible to the nursing staff and whether they have observations performed during the transfusion. It is the responsibility of the nurse or clinician administering the transfusion to ensure that these risks are kept at a minimum.

A risk assessment for each transfusion episode has been carried out based on the following criteria:

Is the patient identifiable?
Is the patient conscious?
Are the patients vital signs monitored?
Is the patient visible to the nursing staff?

Using the data from the audit of transfusion episodes the, risk to the patient of each transfusion has been assessed according to the scheme in the table below. Greater weighting has been given to identification of the patient than any other aspect, as this is the single most important issue in ensuring that the right blood goes to the right patient. For the purposes of this risk assessment the absence of gender from the wristband and other documents has been ignored. This has been forced by the fact that the majority of sites do not put a gender on the wristband by policy, and the majority of data collectors chose therefore to not include it when answering questions 16 to 19.
Where the audit data required for the assessment is absent (e.g. the prescription sheet was not present on the ward when the auditor attended), a score of 0 has been given for that aspect, generally assuming the best rather than the worst.

A (Identification)		Yes	No but other ID	No ID
Q10, Q21 Q22	Wristband	0	1	3
Q11,12,14,15	Missing information on wristband (excluding gender)	0.75 per item missing to a maximum of 3		
If in Q11,12.14,15, all information was present on the wristband, the following has been applied.				
Q16-19	Lack of full match of information with compatibility form, unit of blood, medical records and prescription sheet. (assumes wristband is worn)	0.5 for each document not fully matching wristband to a maximum of 2		

B (Conscious state)		Yes	No
Q9	Conscious	0	1

C (Vital signs during transfusion)*		30 mins or less	30 – 60 mins	>60 mins	none
Q37, Q38	Pulse and Temp	0	0.5	1	1.5

*Where pulse and temperature were not recorded at the same time, the earlier recording has been used for this assessment.

D (Patient visible to nursing staff)*		Yes	No
Q8	Visible	0	1

* Patients in a side room or in a bay on their own have been considered as not visible to the nursing staff. Those in a bay with other patients may also not be visible to the nursing staff though the presence of other patients is likely to reduce the risk of an unobserved transfusion reaction. Patients transfused outside of clinical areas, such as at home, hospital garden, playroom or discharge lounge have been considered as not visible. This may not always be the case but the score does capture the likely increased risk of transfusion outside of the ward setting.

The scores in each section are then added together (A+B+C+D) to give the overall risk:

Low risk	<2
Moderate risk	2-3.75
High risk	4-5
Severe risk	>5

While we accept that his scoring system is somewhat arbitrary, we feel that it does give a useful indication of the overall risks that a patient is being placed at. The complicated nature of the data relating to identification and missing and mismatched information has made scoring of this aspect difficult. In the scheme used, single items missing from the wristband score less than errors in single items on the wristband. This reflects the feeling that erroneous information is more dangerous than no information.

It should be remembered that the details on the wristband and other documents were audited **after** the transfusion had started, and there had already been the opportunity for correction of omissions and errors. The presence of mismatched or missing information therefore suggests that the discrepancy has been ignored, or the checks have not been made properly, representing high risk behaviour on the part of the individual administering the blood transfusion.

Examples of how the scoring has been applied in the audit are given in the table on the next page.

Examples of risk assessment of transfusion episodes

All examples are genuine case from the audit of transfusion episodes.

Case details	Score	Total Score	Risk category
Patient in bay alone, unconscious, with no wristband or other form of ID and no observations recorded.	A=3 B=1 C=1.5 D=1	**6**	Severe
Patient in theatre, unconscious with no wristband or other form of ID, and no recorded observations	A=3 B=1 C=1.5 D=0	**5.5**	Severe
Patient in bay alone, conscious with no wristband or other ID. Observations done more than 60 minutes after start of transfusion	A=3 B=0 C=1 D=1	**5**	High
Patient in side room, conscious, no observations, wristband containing all details except gender, but half of date of birth and surname washed off. Prescription sheet not available.	A=0.5x3 B=0 C=1.5 D=1	**4**	High
Day case on an open ward, conscious, no observations, wristband with all details but incorrect date of birth.	A=0.5x4 B=0 C=1.5 D=0	**3.5**	Moderate
Baby on SCBU, unconscious, no observations, no wristband but details on cot.	A=1 B=1 C=1.5 D=0	**3.5**	Moderate
Patient in side room, conscious, observations at 16-30 minutes, wristband with all details except hospital number.	A=0.75 B=0 C=0 D=1	**1.75**	Low
Patient on open ward, conscious, observations at 15 minutes, wristband with all details. Date of birth incorrect on prescription sheet.	A=0.5 B=0 C=0 D=0	**0.5**	Low

Appendix 2 - Organisational Score

Logic would suggest that the risk of a patient suffering an avoidable transfusion reaction should in some way be related to the organisation in which the transfusion is taking place. Health care organisations are however complicated organisations and the relationship between risk and aspects of the organisation that might be contributing to this are not always clear. In this audit we have scored hospitals against those questions in the organisational audit that are recommendations from HSC 2002/009 – Better Blood Transfusion. These recommendations are intended to ensure an infrastructure within hospitals that ensures safe transfusion practice. The scoring has been applied equally to all hospitals (or sites) taking part in the audit. The audit has been primarily directed at large multidisciplinary hospitals within the NHS, and that some of the questions (and scores) relating to specific specialities are not appropriate, or achievable by some smaller specialised hospitals. Most of the points are however generic and should be in place at all sites.

It should be noted that the audit did not address all aspects of the recommendations of BBT2 and a good score in this assessment does not necessarily mean good overall compliance with BBT2.

The following details the scoring system used. A maximum score of 16 is achievable.

Infrastructure

- HTC established — 1 point
- Attendance at HTC of at least 8 of the list in the last 12 months — 1 point
- HTT established — 1 point
- Transfusion Practitioner in post — 1 point
- Lead consultant in transfusion — 1 point

Nurse Training

- 51-75% received induction training — 1 point
- Over 75% received induction training — 2 points
- 51-75% received annual retraining — 1 point
- Over 75% received annual retraining — 2 points

Audit

- At least one regional audit in last 12 months — 1 point
- At least 2 local audits in last 12 months — 1 point
- Results fed back to medical directorate in last 12 months — 1 point
- Results fed back to Surgical directorate in last 12 months — 1 point

Critical incidents

- Formal review of incidents — 1 point
- Formal feedback of incidents — 1 point
- At least 1 SHOT report submitted in last 12 months — 1 point

Where data was missing, a score of 0 has been given.

Appendix 3. The organisational Audit Questionnaire

National Comparative Audit of Blood Transfusion

CLINICAL EFFECTIVENESS & EVALUATION UNIT

Royal College of Physicians
Setting higher medical standards

Organisational Audit Questionnaire

It is suggested that this questionnaire is best completed with the help of either the hospital transfusion practitioner or the chair of the hospital transfusion committee.

Infrastructure / Personnel

Q1. Is there a Hospital Transfusion Committee (HTC)? Yes ☐ 1 No ☐ 2
If yes, go to the next question. If no, go to Q4

Q2. In the last 12 months, how many times has the HTC met?

Not met ☐ 1 Once ☐ 2 Twice ☐ 3 Three times ☐ 4 Four times ☐ 5 More ☐ 6
If you selected 'Not met', go to Q4. Otherwise, please continue below

Q3. In the last 12 months, has there been attendance at the HTC on **at least one occasion** from **each** of the following groups?

Group	Yes 1
Haematology 1	
Anaesthetics 2	
Vascular surgery 3	
General surgery 4	
Orthopaedic surgery 5	
Obstetrics & Gynaecology 6	
Accident & Emergency 7	
General medicine 8	
Care of the elderly 9	
Gastroenterology 10	
Paediatrics 11	
Senior Nurse 12	
Audit Department 13	
Clinical Governance / Risk 14	
Blood Bank 15	
Hospital Management 16	

Tick 'Yes'' for each group listed in the table opposite if they have attended the HTC. If you are unable to find out if a group has attended, please leave the 'Yes' section blank for that group.

Q4. Is there a Hospital Transfusion Team (HTT) established? Yes ☐ 1 No ☐ 2

If you answered 'Yes' to Q4, please go to Q5. If you answered 'No', please go to Q7.

Q5. In the last 12 months, how many times has the HTT met?

Not met ☐ 1 1-3 ☐ 2 4-6 ☐ 3 7-9 ☐ 4 10-12 ☐ 5 More ☐ 6

If you selected 'Not met', go to Q7. Otherwise, please continue below

Q6. Who has attended the HTT?

Job title	Yes 1
Consultant Haematologist 1	
Transfusion Practitioner 2	
Blood Bank Manager 3	
HTC Chair (*if not Haematologist)* 4	
Other *(please specify)*	

Please tick 'Yes' for each person listed in the table opposite if they attended the HTT. If you are unable to find out if a they had attended, please leave the 'Yes' section blank for that person.

Q7. Is there a transfusion practitioner in post? Yes ☐ 1 No ☐ 2

If you answered 'Yes' to Q7, please go to Q8. Otherwise, go to Q9

Q8. How many whole time equivalents perform the transfusion practitioner role? . wte

Q9. Do you have a lead consultant for transfusion? Yes ☐ 1 No ☐ 2

If you answered 'Yes' to Q9, please go to Q10. Otherwise, go to Q11

Q10. How many whole time equivalents are dedicated to transfusion? . wte

Training in blood administration

What percentage of registered nurses have received the following training? (Estimated figures are acceptable)

Tick a box as appropriate	<25% 1	26-50% 2	51-75% 3	76-100% 4
Q11. Induction training?				
Q12. Annual retraining?				

Q13. Are registered nurses who have not undergone training allowed to administer blood? Yes ☐ 1 No ☐ 2

Q14. Is training available for agency registered nurses? Yes ☐ 1 No ☐ 2

Q15. Are agency registered nurses who have not undergone training allowed to administer blood? Yes ☐ 1 No ☐ 2

Audit

In the last 12 months

Q16. Has there been participation in at least one regional clinical audit in transfusion? Yes ☐ 1 No ☐ 2

Q17. Has there been participation in at least two local (hospital/trust) clinical audits in transfusion? Yes ☐ 1 No ☐ 2

Q18. Has your clinical audit department provided support for at least one audit? Yes ☐ 1 No ☐ 2

Q19. Have the results of clinical audit in transfusion been fed back to at least one medical directorate? Yes ☐ 1 No ☐ 2

Q20. Have the results of clinical audit in transfusion been fed back to at least one surgical directorate? Yes ☐ 1 No ☐ 2

Incident reporting

Q21. Does the HTC formally review critical incidents involving blood transfusion? Yes ☐ 1 No ☐ 2

Q22. Is there formal (e.g. written) feedback to the users of the outcome of the review of incidents? Yes ☐ 1 No ☐ 2

+

Q23. In the last 12 months, how many SHOT reports have been submitted?

☐ reports

Thank you for taking the time to complete this questionnaire.

Please now return it to
David Dalton, National Comparative Audit of Blood Transfusion, FREEPOST (SCE14677), Birmingham B2 4BR.

The results from this questionnaire will be fedback to you in a report that also contains your report on the quality of transfusion practice in your hospital. We will relate those findings to this data, where possible, to provide information on what organisational aspects may impact on the quality of blood transfusion practice.

If you have any queries about the National Comparative Audit of Blood Transfusion, please contact John Grant-Casey, Project Manager, on 01865 440046

Appendix 4. Tool for audit of transfusion episodes

National Comparative Audit of Blood Transfusion

CLINICAL EFFECTIVENESS & EVALUATION UNIT

Royal College of Physicians
Setting higher medical standards

Sitecode | | PC | Episode |

AUDIT OF BLOOD TRANSFUSION EPISODES +

Q1. Auditor Job Title ☐ 1 TP ☐ 2 BMS ☐ 3 Dr. ☐ 4 Clinical Auditor ☐ 5 Nurse/ Midwife

Other (*please state)*

Q2. Date you audited this transfusion D D M M Y Y

Q3. Was this a Weekday? ☐ 1 Weekend? ☐ 2

Q4. Time audit started H H m m *(Please use 24-hour clock)*

Please write an X in one box +

Q5. This patient is an in-patient ☐ 1 a day case ☐ 2

Q6. Clinical Speciality: *(Please write an X in one box)*

Medical ☐ 1 Surgical ☐ 2 Haematology ☐ 3 Orthopaedic ☐ 4

Obs & Gynae ☐ 5 Oncology ☐ 6 ITU(CCU) ☐ 7 A&E ☐ 8

Cardiac ☐ 9 Paediatrics ☐ 10 Theatre ☐ 11 SCBU ☐ 12

Recovery ☐ 13 GP arranged transfusions ☐ 14

Other (please state)

Q7. What is the patient's year of birth? Y Y Y Y

Q8. Is the patient in: (*Please select one option only)*

An open ward? ☐ 1 A bay on their own? ☐ 2 A side room? ☐ 3

ITU/HDU? ☐ 4 SCBU? ☐ 5 Recovery? ☐ 6

Other (please state)

Q9. Is patient conscious? Yes ☐ 1 No ☐ 2

Q10. Is the patient wearing an identification wristband that contains eye-readable information? Yes ☐ 1 No ☐ 2
If yes, continue below, if no go to Q20 +

Q11. If yes, does it contain a readable patient's surname? Yes ☐ 1 No ☐ 2

Q12. if yes, does it contain a readable patient's first name? Yes ☐ 1 No ☐ 2

Q13. if yes, does it contain a readable patient's gender? Yes ☐ 1 No ☐ 2

Q14. if yes, does it contain a readable date of birth? Yes ☐ 1 No ☐ 2

Q15. if yes, does it contain a readable Patient ID Number? Yes ☐ 1 No ☐ 2

Do the details required for Q11 – Q15 match with the details on the:

Q16. Compatibility report form?

Q17. Unit of blood?

Q18. Medical records?

Please reply to these questions using the Q16-Q19 table overleaf. Then go to Q20

+ +

Q19. Prescription sheet?

SiteCode

Episode

+ +

Q20. *If the patient is **not** wearing an eye readable identity wristband, identify, if possible, the reason why, using the checklist below, and give details:*

Please write an X in one box

Don't know	1	
Not put on by nursing staff	2	
Taken off by patient	3	
Taken off by staff and not replaced	4	
Patient is unable to wear an ID bracelet	5	
Carried by patient but not worn for transfusion	6	
Wristband has a barcode only	7	
Further details of why wristband not worn		
Other reason, *please state*:		

Q21. Is another form of patient identity being worn instead of or in addition to a wristband? Yes ☐ 1 No ☐ 2

If yes, please select one or more from the options below or state details in the box:

Q22. 1 Photo ID ☐

2 Wristband with unique number (red label) ☐

3 Wristband on lanyard round neck ☐

+ **Q22 Other** +

+ +

Concerning the unit actually being transfused at the time of the audit:

Q23. Is the compatibility report or the prescription sheet signed by the person administering the blood? Yes ☐ 1 No ☐ 2

Q24. Is the date of transfusion recorded on the Compatibility report or prescription sheet? Yes ☐ 1 No ☐ 2

Is the start time of the unit recorded on the

Q25. Compatibility report? Yes ☐ 1 No ☐ 2

Q26. Prescription sheet? Yes ☐ 1 No ☐ 2

Is the stop time of the unit recorded on the

Q27. Compatibility report? Yes ☐ 1 No ☐ 2

Q28. Prescription sheet? Yes ☐ 1 No ☐ 2

+

Q29. Are the patient's BP and Pulse and Temperature being continually monitored? Yes ☐ 1 No ☐ 2

Concerning the unit actually being transfused at the time of the audit:

Q30. What time did this unit start being transfused?

H	H	m	m

Q31. Was a pre-transfusion BP recorded? Yes ☐ 1 No ☐ 2

Q32. *If yes, was it*

15 minutes or less before the transfusion started? ☐ 1

16 – 30 minutes before the transfusion started? ☐ 2

31 – 60 minutes before the transfusion started? ☐ 3

More than 60 minutes before the transfusion started? ☐ 4

+ +

+ +

Q33. Was a pre-transfusion temperature recorded? Yes ☐ 1 No ☐ 2

Q34. *If yes, was it*

15 minutes or less before the transfusion started? ☐ 1

16 – 30 minutes before the transfusion started? ☐ 2

31 – 60 minutes before the transfusion started? ☐ 3

More than 60 minutes before the transfusion started? ☐ 4

Q35. Was a pre-transfusion pulse recorded? Yes ☐ 1 No ☐ 2

Q36. *If yes, was it*

15 minutes or less before the transfusion started? ☐ 1

16 – 30 minutes before the transfusion started? ☐ 2

31 – 60 minutes before the transfusion started? ☐ 3

More than 60 minutes before the transfusion started? ☐ 4

+

After the current unit began transfusing:

Q37. When was the first **temperature** reading recorded? H H m m

Q38. When was the first **pulse** reading recorded? H H m m

After the current unit had finished transfusing:

Q39. Was a post-transfusion BP recorded? Yes ☐ 1 No ☐ 2

Q40. *If yes, was it*

15 minutes or less after the transfusion ended? ☐ 1

16 – 30 minutes after the transfusion ended? ☐ 2

31 – 60 minutes after the transfusion ended? ☐ 3

More than 60 minutes after the transfusion ended? ☐ 4

+ +

+ +

Q41. Was a post-transfusion temperature recorded? Yes ☐ 1 No ☐ 2

Q42. *If yes, was it*

15 minutes or less after the transfusion ended? ☐

16 – 30 minutes after the transfusion ended? ☐ 2

31 – 60 minutes after the transfusion ended? ☐ 3

More than 60 minutes after the transfusion ended? ☐ 4

Q43. Was a post-transfusion pulse recorded? Yes ☐ 1 No ☐ 2

Q44. *If yes, was it*

15 minutes or less after the transfusion ended? ☐ 1

16 – 30 minutes after the transfusion ended? ☐ 2

31 – 60 minutes after the transfusion ended? ☐ 3

More than 60 minutes after the transfusion ended? ☐ 4

+

Other notes *This section is for you to use as you wish.*

Please write here the number of the unit of blood that is being transfused as you are doing this audit

Sitecode

Q16-Q19 Table

+

Episode

Instructions for use

Only fill this form in for the items that appear on the wristband (i.e. where you answered 'Yes' to Q11-15)

If your hospital does not ever use a compatibility report form, tick the not used box underneath the words 'Compatibility report'

	Is this item present?		Surname	First Name	Gender	Date of Birth	Patient ID
Compatibility report Not used ☐	Yes	On the report & matches					
		On the report but does not match					
	No	Not present on the report					
Unit of blood		On the unit & matches					
		On the unit but does not match					
		Not present on the unit					
Medical records	Yes	In the record & matches					
		In the record & does not match					
	No	Not present In the record					
Prescription sheet	Yes	On the prescription & matches					
		On the prescription & does not match					
	No	Not present on the prescription					

Appendix 5. Data Reliability Analyses

Sites were asked to re-audit 5 cases retrospectively, using a different auditor, for those questions it was possible to do so. 57 sites submitted 274 cases, some of which were difficult to match to the original case, leaving 240 for the analysis of agreement.

Reliability (agreement between auditors) is not the same as validity (accuracy of measure). However establishing good agreement between auditors is an important part of the process of validation as valid data by definition will be reliable. If reliability is poor then this weakens the accuracy of a single measurement and in so doing it also reduces the ability to characterise relationships between variables.

There are two separate components of agreement. One is the agreement between auditors in whether their data is known or missing, and the other is the agreement in their answers when both have given data.

The kappa statistic measures agreement in excess of the amount expected by chance. Kappa values over 0.60 are good and over 0.80 are very good. In practice any kappa much below 0.50 suggests inadequate agreement. Kappa won't tell us about the *nature* of disagreement - this should be discerned separately from results.

SUMMARY OF FINDINGS:

The level of agreement between auditors was generally of moderate order.

Agreement was highest regarding the presence of unit start and stop times on the compatibility report and prescription sheet (kappa range 0.49-0.85) and for the timings for vital sign monitoring (range 0.43-0.68) when both auditors agreed that monitoring had taken place. Agreement was lower (0.28-0.44) on whether monitoring had actually taken place.

Detailed statistics follow on the next page.

1. Categorical YES/NO data:

	Missing data				Data was available from both auditors				
Item	DD	DM	MD	MM	Kappa if data from both auditors	YY	YN	NY	NN
Q23 Compatibility report or prescription sheet signed by person administering the blood	237	2	1	-	0.45	227	4	3	3
Q24 Date of transfusion recorded on the compatibility report or prescription sheet	236	-	4	-	0.17	218	6	-	2
Q25 Unit start time on compatibility report	227	11	2	-	0.75	127	23	4	73
Q26 Unit start time on prescription sheet	221	11	8	-	0.49	191	14	5	11
Q27 Unit stop time on compatibility report	210	11	19	-	0.85	28	6	2	174
Q28 Unit stop time on prescription sheet	213	7	20	-	0.74	53	15	9	136
Q31 Was a pre-transfusion BP recorded	237	3	-	-	0.38	195	23	7	12
Q33 Was a pre-transfusion temperature recorded	236	4	-	-	0.44	189	24	7	16
Q35 was a pre-transfusion pulse recorded	236	4	-	-	0.33	193	21	11	11
Q39 was a post-transfusion BP recorded	184	32	6	18	0.29	113	36	14	21
Q41 Was a post-transfusion temperature recorded	186	31	5	18	0.30	118	34	14	20
Q43 was a post-transfusion pulse recorded	186	32	5	17	0.28	118	35	14	19

Key:

DD Data from both auditors
DM Data from original auditor but Missing from repeat auditor
MD Data missing from original auditor but available from repeat auditor
MM Data missing from both auditors

YY data from both auditors and both saying YES
YN data from both auditors, original auditor says YES, repeat auditor says NO
NY data from both auditors, original auditor says NO, repeat auditor says YES
NN data from both auditors and both saying NO

2. Timing of vital sign monitoring data:

There were a few instances of auditors saying vital signs had been monitored but that the timings were not known. The following table is based on times given by both original and repeat auditors:

		Cases	Kappa
Pre-transfusion	BP	193	0.55
<=15m, 16-30m, 31-60m, >60m before unit started	Temperature	186	0.54
	Pulse	191	0.52
During Transfusion	Temperature	208	0.68
<=15m, 16-30m, 31-60m, >60m after unit started	Pulse	205	0.65
Post Transfusion	BP	108	0.56
<=15m, 16-30m, 31-60m, >60m after unit ended	Temperature	112	0.43
	Pulse	107	0.47

Annex A – Detailed breakdown of Missing and Mismatched patient information on transfusion documents

After the start of the audit it was decided to collect additional data on the nature of any mismatched or missing information between the wristband and the compatibility sheet, blood bag label, medical notes and the prescription sheet. This data was collected for 4790 of the 8054 episodes in the form of a table in the place of questions 16-19. The data from this table has been further analysed as set out below.

Denominators relate to cases where items are on the wristband. Excluded are cases where the item was not on the wristband, cases where either the document was not used in the hospital or the document was absent, or the patient was not wearing a wristband.

Missing information on other documents (where present on wristband)

	Surname		First Name		Gender		Date of Birth		Hospital Number		Any of surname, first name, DOB or Hospital # missing*	
	%	N	%	N	%	N	%	N	%	N	%	N*
Compatibility report form	0.02	1/4453	0	0/4446	13	112/878	0.05	2/4281	0.38	16/4192	0.39	14/3552
Unit of Blood	0.07	3/4406	0.09	4/4398	66	551/833	2.4	102/4229	0.39	16/4137	2.6	92/3552
Medical records	0.05	2/4196	0.17	7/4191	6.7	56/831	2.4	97/4033	0.96	38/3954	2.3	82/3552
Prescription sheet	0.20	9/4468	0.25	11/4462	19	169/877	10	422/4274	5.6	233/4189	11	403/3552

*Denominator for the last column is for when surname, first name, DOB and Hospital number were all present on wristband and either on or missing from the other 4 documents

Mismatches between the wristband and other documents (where present on wristband)

	Surname		First Name		Gender		Date of Birth		Hospital Number		Any mismatch of surname, first name, DOB or Hospital ID	
	%	N	%	N	%	N	%	N	%	N	%	N*
Compatibility report form	0.47	21/4453	0.40	18/4446	0	0/878	0.51	22/4281	1.24	52/4192	2.5	75/3047
Unit of Blood	0.52	23/4406	0.45	20/4398	0	0/833	0.52	22/4229	1.40	58/4137	2.6	80/3047
Medical records	0.45	19/4196	0.33	14/4191	0	0/831	0.52	21/4033	1.01	40/3954	2.1	64/3047
Prescription sheet	0.51	23/4468	0.56	25/4462	0	0/877	0.75	32/4274	1.22	51/4189	2.6	78/3047

*Denominator for the last column is for when surname, first name, DOB and Hospital number were all present on wristband and on all the 4 other documents.

Causes of mismatches where comments were given by auditors.

Mismatches in hospital numbers occurred in 55 cases. In 23 of these the mismatch was because of the use of an accident and emergency number as well as the hospital ID number. A similar mismatch also occurred in some cases involving the use of the NHS number, a duplicate hospital number or a wristband (and number) issued in another trust before the patient was transferred. In addition there were transposed and missing digits.
There were misspelling of names in 26 cases and transposition of digits in the date of birth in 15. In 6 cases the wristband was illegible – most often due to water damage. Use of addressograph labels causes some of the errors. In one case the wrong label was put on a prescription sheet. In 5 cases information on the label was truncated due to misalignment in printing or the use of the wrong size labels, and in 2 cases folding of the label on the wristband caused a similar problem.