The Royal College of Physicians

National Comparative Audit of Blood Transfusion

Comparative Report for Blood Transfusion in England

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EXECUTIVE SUMMARY

Key comment 1
Most NHS Trusts (71%) and some hospitals from the main private sector healthcare providers participated in this audit of blood administration. The data submitted were from a representative sample of clinical specialities that use blood.

1. Background
There are many precautions and safety nets used to minimise the risk of an adverse outcome to patients from blood transfusion. The patient's identity is checked at many stages from taking the cross-match sample to administering blood to a patient, to prevent incompatible blood from being given.

Clinical observations are made during transfusion to detect early any adverse reaction due to bacterial infection, Transfusion-Related Acute Lung Injury (TRALI), allergic or anaphylactic reactions, ABO incompatibility, etc. Many models can be used to illustrate the risks as a result of failure of such measures, but essentially, if there are holes in several defences, the risk of harm to patients increases.

For transfusion of red cells, the incidence of complications is:

- ABO incompatible transfusion in the UK - 1 in 30,000 units[1];
- Bacterial infection - 1 in 500,000[2];
- Allergic reactions - 1 in 3,293[3];
- Severe/anaphylactic reactions - 1 in 57,000[3];

The incidence of TRALI is estimated to be approximately 1 in 5,000 plasma-containing blood components[4]. Overall, the chance of a significant transfusion reaction is around 1 in every 25,000 units and there are 10,000 units transfused each day in England.

2. Wristband worn during transfusion
The British Committee for Standards in Haematology (BCSH) guidelines on the administration of blood, which are the standards on which hospitals base their protocols for blood administration, state that it is essential that any patient having a blood transfusion has an identification wristband in place[5].

<u>Key comment 2</u>
90% of 5014 patients were wearing wristbands during transfusion, which is encouraging. Of the 10% who were not, 52 (10% of these) were also unconscious. This is of concern, as clearly these patients would not be able to confirm their identity before blood was administered. This group of 52 constituted 1% of all patients audited and 14% of all unconscious patients.

These unconscious patients were therefore at an increased risk of receiving a potentially fatal ABO incompatible blood transfusion. Should the wrong blood have been given, 12 of the 52 patients were in a side room or bay alone and would not be readily observed.

In some hospitals more than 30% of patients had no wristband.

Patients without wristbands most commonly belonged to paediatrics/Special Care Baby Units, oncology, ITU and haematology specialities.

Key comment 3
The audit confirms that it is common practice not to ask outpatients to wear wristbands for a blood transfusion. A common reason given was that staff were very familiar with the patient so a wristband was unnecessary, but it is known that patient identification errors occur in this setting. There is a clear need to reinforce the importance of outpatients wearing wristbands.

In haematology, oncology and renal day units, it is often argued that staff know their patients well and would not make a mistake. However, two items need to be correct: staff need to select the correct patient and the correct unit of blood. It may be true that staff know their patient well and would not approach the wrong patient, but they must still check that the unit of blood obtained is correct, by asking the patient (if they are conscious) to state their full name and DOB, and to check that these and the hospital number are the same on the wristband and the compatibility label on the blood[5]. These checks should not be any less thorough as it has been shown that there are patients with the same full name and date of birth under the care of one hospital [6].

Staff have also stated that they do not like to ask patients they know very well to state their name and date of birth, as 'it is insulting'. We would argue that if patients understood that it was a routine check to avoid human error, few would object. All patients receiving a transfusion should have an identification wristband.

Neonates on Special Care Baby Units often do not have wristbands in place, for reasons of delicate skin. These patients clearly cannot identify themselves, are often of a similar age and may have a surname only and no forename. Wristbands are sometimes attached to the incubator hood, but there remains a small risk that a baby may be put back into the wrong incubator. We would recommend that neonatal experts pursue a robust alternative if a wristband cannot be worn, as the potential for other errors due to misidentification exists, for example drug administration errors.

Wristbands are sometimes cut off, particularly in the theatre or ITU settings, either for reasons of venous access or excessive oedema. As many of these patients are unconscious and cannot identify themselves, wristbands should be replaced immediately and, if necessary, attached securely to an area of the body other than a limb.

Key comment 4
In patients who were wearing wristbands, minor discrepancies in patient details between the wristband, compatibility report and unit of blood were present in 15 cases, and in only 4 had the discrepancy been checked with the laboratory. All discrepancies must be resolved before the transfusion is started; even minor discrepancies may be a warning of a major error.

3. Observations during transfusion

Key comment 5
Excluding patients on continuous monitoring from the analysis, baseline pre-transfusion observations were not recorded in 23% of all patients and in 10% of unconscious patients. Without baseline observations, it is impossible to detect any subsequent change in observations, which can give an early warning of a potentially severe transfusion reaction. This is particularly important in unconscious patients, who cannot report symptoms of a transfusion reaction.

Key comment 6
As most, but not all transfusion reactions start within 15 minutes of beginning a transfusion, it is recommended that observations should be taken around 15 minutes after the start. Excluding patients on continuous monitoring, 47% had neither temperature nor pulse observations within 30 minutes, 28% had neither within an hour, and 11% had no observations taken during the whole transfusion.

It is of concern that in unconscious patients who cannot report symptoms, no observations were done within 30 minutes for 48% (43) patients; and within 60 minutes for 26% (23 patients).

In 4% of all patients, spread over 80 hospitals, there was a combined risk that no wristband was in place and no observations were taken within 30 minutes: a quarter were in a side-room or bay on their own. Of unconscious patients transfused, 8% had no wristband and no observations taken within 30 minutes and most (5/7) were in a side-room or bay on their own. Had the wrong blood been given in error, there would have been no opportunity for early detection of a potentially fatal reaction.

Key comment 7
Post-transfusion observations are useful for detecting any transfusion reactions that start late in the transfusion episode. If these observations are not done, an adverse reaction may not be treated early and its relationship to transfusion may not be recognised. In 39% of patients, no post-transfusion observations were done.

Key comment 8
The compatibility report or prescription sheet were signed in almost all cases, to indicate that a particular unit of blood had been given to a specific patient, which is important if patients have to be traced retrospectively, e.g. if the possibility of transmission of an infection from a donor arises. These signatures are also meant to indicate that the identity of the patient has been checked against the details on the blood for transfusion.

52 (1%) of all patients were unconscious and had no wristband, yet in 49 of them, signatures were present to indicate that the patient's identification had been properly verified. The date and time at which blood was transfused was recorded in 94% of cases. The time the transfusion ended was recorded in only 24% of cases. Failure to record these renders investigations into possible transfusion reactions difficult.

Key comment 9
In 75% (3753) of transfusions there was a clear statement in the notes giving the reason for transfusion. If the rationale for transfusion is not clear, it may be harder, in the event of a severe adverse reaction, to justify its use.

4. Hospital Transfusion Policies

Key comment 10
Most hospitals had policies that complied with the requirements of BCSH guidelines[5]. Without a documented policy clarifying what is required during transfusion, staff errors due to ignorance of correct procedures may persist. Having correct policy is the first step toward safe transfusion, but compliance with it is also needed.

5. Conclusion and recommendations:

Key Comment 11
The audit did not set out to detect adverse reactions but it has identified settings in which patients are more vulnerable if such a reaction occurs. There is clearly a discrepancy between the requirements of hospitals' policies and their actual practice.

There are many potential reasons for this, which may vary among Trusts.
The audit did not address these, but one can speculate that these may include a lack of awareness of the correct procedures, a failure to understand the risks involved if they are not followed and issues relating to workload and staffing levels. In Trusts where the policies and organisation or procedures appear poor, further investigation is needed, as there is an increased risk of an adverse outcome in patients being transfused.

INTRODUCTION

Successive annual reports on the Serious Hazards of Transfusion (SHOT) in the UK[7] have shown an increase in reported episodes of transfusing incorrect blood to patients. Initiatives to try to improve practice followed the first two annual reports and a comparative transfusion audit[8], and included the development of national BCSH guidelines on the administration of blood[5]. In spite of this, episodes of incorrect blood transfusion continue to occur[7]. The National Comparative Audit of Blood Transfusion reported here enables identification of specific areas of practice nationally, which merit review, complementing the work undertaken by SHOT. The audit results also allow each hospital to look at its own practice individually to identify areas for improvement and compare its own performance against that of its peers. This audit was undertaken collaboratively between the National Blood Service and the Royal College of Physicians, who have a history of success with national comparative audit in asthma, stroke and other areas. Hospitals in England, Wales and Northern Ireland agreed to participate in the audit. Scottish hospitals had recently participated in a similar audit undertaken by the Scottish National Blood Transfusion Service, so did not participate. This report summarises the English audit. Audits in Wales and Northern Ireland began later and will be reported later.

METHOD

This was principally a prospective, audit which derived information on specific criteria from case notes and patient charts in current use. An audit tool (Appendix A) was used to measure aspects of bedside transfusion practice and a questionnaire (Appendix B) measured content of hospital transfusion policy. Standards and criteria were created (Appendix C), based on BCSH guidelines[5]. A pilot study was conducted during 2002 to test the audit tool and organisational methods. The main data collection took place during the first half of 2003.

Selection of sites

345 English hospitals that transfused 5 or more units of blood per week were selected from the Directory of Hospitals and Trusts 2001/2, published by Informa Healthcare, London. Community and Ambulance Trusts were automatically excluded, as they do not transfuse blood. Of the 345 hospitals, 289 were within the NHS and 56 were in the private sector.

Training audit staff

Prior to data collection, hospitals were invited to a training event at a hospital within a 50-mile radius of their own site. One or two staff members nominated by each hospital attended training workshops during which they received information on the audit, the use of the tool, how to return the data, and how to obtain support. They also used the tool to audit sets of dummy data at the end of which task the completed audit tools were compared against model answers. A variety of grades of staff took part in the training and in the subsequent audit – nurses, clinical audit staff, transfusion laboratory staff, and doctors.

The pilot experience taught us that there were 3 main reasons why auditors might disagree with the model answers: misunderstanding the questions or data asked for by the audit tool, misreading the case-notes, or making assumptions about what is written. The dummy case-notes were designed to simulate typical case notes and incorporated examples of potential difficulties for auditors. Results were then discussed at a plenary session. Once trained, and once the quota of cases for audit had been agreed, the audit was ready to start in the hospital concerned. The NBS

provided all the paperwork necessary for the audit, together with a FREEPOST address for completed forms to be returned for data entry and analysis.

Selection of cases
Participating hospitals were asked to audit prospectively 40 transfusion episodes, according to a pre-defined quota based on their previous blood bank usage. The audit quota was designed to give a sample of practice that was as representative as possible, both locally and nationally. Hospital transfusion laboratories were asked to provide figures for the red cell transfusions that had taken place over the last three months in the various clinical areas within the hospital. The major areas of red cell use were targeted for the audit.

An example of one hospital's red cell use and resulting audit quota is shown in the table below:-

Clinical area	Units transfused in last 3 months		Audit quota
Medical	265	(18%)	7
Surgical	965	(64%)	26
Gynaecology	80	(5%)	2
Haematology	190	(13%)	5
Total	*1500*	*(100%)*	*40*

The cases chosen should reflect current practice. Hospitals were also asked to consider looking at transfusions taking place out of hours as well as during normal hours, and to avoid auditing the work of the same staff supervising a transfusion episode on more than one occasion.

Response
Initially, 213 of 289 (74%) NHS hospitals intended to participate in the audit of transfusion episodes but finally, 55% (160) of NHS hospitals and 11% (6) of private hospitals took part. 56% (163) of 289 English NHS hospitals and 46% (26) of 56 private hospitals returned policy questionnaires. 75% (217/289) of NHS hospitals were in one or other or both audits.

Further details on response rate by type of NHS hospital are shown in the table below:

Type of NHS Hospital (Source: Dept of Health Trust Clusters*)	Policy % Response	(n/N)	Episodes % Response	(n/N)
Acute non-teaching outside London	51%	79/156	56%	88/156
Acute non-teaching in London	58%	14/24	67%	16/24
Specialist (e.g. Acute/Children's/Orthopaedic)	62%	8/13	62%	8/13
Acute teaching outside London	65%	26/40	53%	21/40
Acute teaching in London	63%	10/16	44%	7/16
Multi-service	66%	23/35	54%	19/35
PCT	50%	2/4	0%	0/4

**Trusts are defined by the DoH in groups on the basis of the main activities they undertake. 'Multi-service' hospitals provide a full range of acute services as well as some community and mental health services.*

The 289 NHS hospitals were from 173 Trusts. 70% (121/173) of these Trusts were represented by at least one of their hospitals in the Policy audit and 71% (122/173) in the audit of transfusion episodes. 88% (153/173) participated in one or other or both audits.

Data entry
The policy data was entered using a questionnaire scanner and patient episode data was entered manually by keyboard at the NBS Birmingham Centre by two people, one who did about 70% and the other 30%. Finally, the data was collated and analysed by the Clinical Evaluation and Effectiveness unit (CEEU) at the Royal College of Physicians.

Data quality
Several data quality checks were carried out to see how representative and reliable the episode data were. These checks indicate that hospitals did adhere closely to their quotas for collecting data from defined clinical areas, that transfusions were audited at times which confirm the prospective nature of the audit, and that error rates from external reliability, double-entry and other checks were acceptably low. Full details are given in Appendix D.

Statistical note
The presentation of results is primarily descriptive through the use of overall percentages of patients at the national level. For key results the variation between hospitals is summarised by their median and inter-quartile range (IQR) and shown graphically by box-plots. The box (shaded area) displays the variation in results of the middle half of hospitals (i.e. the inter-quartile range). The box is divided into two by the median result – if results for hospitals are placed in ascending order the result for the hospital in the middle becomes the median. The bottom quarter of hospitals and the top quarter lie outside the box on either side. There are also two categories of outlying hospitals each uniquely identified. These are designated by O and *, with * being the more extreme.

Note about Welsh & Northern Ireland hospitals
Rather than inviting all hospitals to participate, Welsh hospitals were nominated by the Rational Blood Committee for Wales. They advised that all the major users of blood in the Principality were included among those 17 hospitals. They did not include any private sector hospitals, and only one hospital from North Wales has been included at present. Similarly the Northern Ireland Blood Transfusion Service nominated hospitals in Northern Ireland and those 9 hospitals included all the major users of blood in the Province. They did not include any private sector hospitals. Since the audits in Wales and Northern Ireland began later, their results will be reported separately.

RESULTS - Audit of Blood Transfusion Episodes in NHS hospitals

1. Description of sample

5014 transfusion episodes from 160 hospitals, median: 39 per hospital, Inter-quartile range 23-40, range 1-41 were submitted by the end of July 2003. 159 of these hospitals were English NHS hospitals, as indicated in the table below and one other hospital from the Channel Islands was included as it receives blood from England. We asked auditors to include patients in different settings including side rooms, open wards, etc. but numbers will not provide accurate figures on how frequently transfusion takes place in each type of location.

Your hospital audited 40 episodes

Key comment 1
Most NHS Trusts and hospitals from the main private sector participated in this audit and the data submitted were from a representative sample of clinical specialities in which blood is used. This mostly reflected hospitals' own practice, except for the relatively low number of episodes audited in theatres and recovery

The majority of transfusion episodes audited took place between 9am and 5pm, but 22% (1109) of episodes audited took place outside these hours.

		5014 episodes		Yours = 40	
		%.	n	%	n
Inpatient OR Outpatient / Day case	IP	79	3957	85	34
	OP/DC	21	1048	15	6
	Not known	-	9	0	0
Clinical Speciality	Medical	28	1420	35	14
	Surgical	20	1014	15	6
	Haematology	19	956	20	8
	Orthopaedic	11	560	8	3
	Obs & Gynae	5	255	8	3
	Oncology	5	231	0	0
	ITU(CCU)	3	157	0	0
	A&E	2	101	3	1
	Cardiac	2	97	3	1
	Paediatrics	1	45	8	3
	Theatre	0.5	26	0	0
	SCBU	0.5	25	3	1
	Recovery	0.2	11	0	0
	GP arranged transfusions	0.1	5	0	0
	Unknown	2	111	0	0
Location of patient	Open ward	65	3249	78	31
	Side room	20	983	18	7
	ITU/HDU	7	340	0	0
	Bay on own	5	263	0	0
	Theatre	2	96	0	0
	Not known	1	61	3	1
	SCBU	0.4	22	3	1
Consciousness of patient	Conscious	92	4614	98	39
	Unconscious	7.4	369	3	1
	Blank	0.6	31	0	0

The relationship between location and transfusion safety
Several measures are recommended to minimise the likelihood of an adverse outcome associated with blood transfusion. These include patient identity checks before starting a transfusion and observing the patient during transfusion, so that if an adverse reaction occurs it can be managed promptly and harm to the patient can be minimised. There is an added risk of a transfusion reaction being missed if the patient is in a side room or in a bay on their own, as such patients would not be readily seen either by staff or other patients. 8% (29/369) of unconscious patients were in a side room, and hence potentially more at risk of reactions being undetected if formal observations were not done.

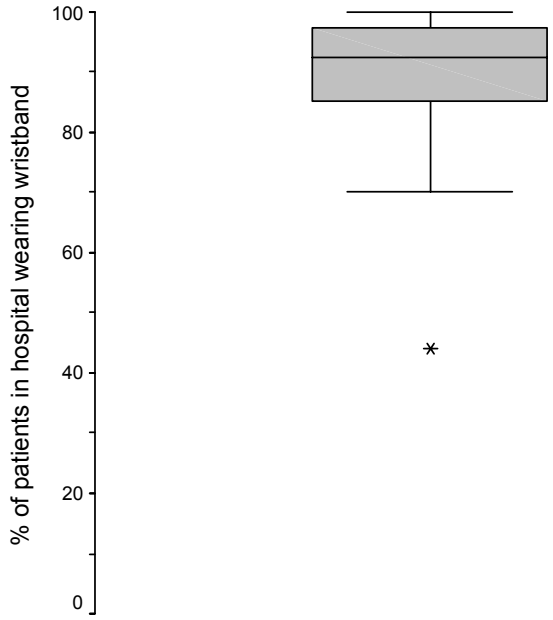
From the information in the previous table, and from further information provided on the audit tools we estimated that 10% (517/5014) of patients were being continuously monitored during the episodes audited, which was taken into account when analysing observations made during transfusion.

2. Identification wristbands

Key comment 2
90% of 5014 patients were wearing wristbands during transfusion, which is encouraging. Of the 10% who were not, 52 (10% of these) were also unconscious. This is of concern, as clearly these patients would not be able to confirm their identity before blood was administered. This group of 52 constituted 1% of all patients audited.

In some hospitals more than 30% of patients had no wristband.

ALL PATIENTS	5014 episodes		Yours = 40	
	%.	n	%	n
Patient was wearing wristband	**90**	**4516**	**95**	**38**
Of those wearing a wristband				
Wristband contained:				
Surname	99.6	4499	100	38
First name	99.2	4481	100	38
Gender	16	724	37	14
Date of Birth	94	4250	97	37
Patient ID number	92	4137	97	37
All five details	14	691	37	14
Surname, first name, DOB & ID number.	**86**	**3864**	**95**	**36**
If surname, first name or DOB absent, was patient an unknown person via A&E	4.1	12/291	0	0



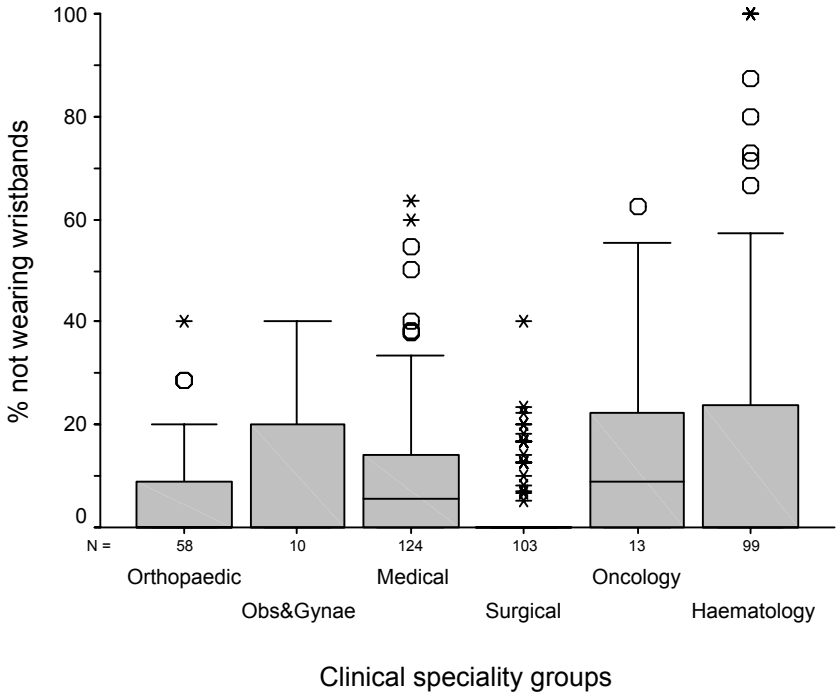
Your site: 5% from 40 episodes

Hospital variation: The above box-plot shows the variation in the percentage of patients wearing wristbands, among the 130 hospitals that audited 20 or more episodes. The median rate of wristband presence was 92%, IQR 85-97%, range 44-100%. The plot shows one extreme outlier hospital (denoted by *) where 44% of audit patients wore wristbands. One quarter of these 130 hospitals had results of below 85% (i.e. were below the shaded box area) – in other words in one quarter of these hospitals fewer than 85% of their audited patients wore wristbands.

(A) Where wristbands are <u>not</u> being worn

The audit found that 10% (498) patients were not wearing a wristband during their transfusion. In investigating the clinical areas where patients were not wearing wristbands, the audit found that practice varied considerably by speciality with highest absence of wristbands reported for Paediatrics, SCBU, Oncology, ITU (CCU) and Haematology. The following table illustrates the clinical areas where wristbands were absent:-

Speciality	5014 episodes % with no wristband	n
Paediatrics	29	13/45
SCBU	20	5/25
Oncology	22	50/231
ITU(CCU)	21	33/157
Haematology	15	146/956
Medical	10	141/1420
A&E	9	9/101
Obs & Gynae	6	15/255
Orthopaedic	5	26/560
Surgical	4	36/1014
Cardiac	3	3/97
Theatre	8	2/26
Recovery	0	0/11
GP arranged transfusions	20	1/5
Unknown	14	16/111
OVERALL	10%	496/5014



Hospital variation: The above box plot shows variation between hospitals in the % **not wearing** wristbands by clinical speciality. Only hospitals with at least 5 episodes in a given specialty were included. The numbers at the base of each bar indicate the number of hospitals contributing data from the speciality concerned. For example there were 99 hospitals that had 5 or more haematology specialty episodes in the audit.

For haematology the circles O and asterisks * highlight a few sites where most audit patients were not wearing wristbands. However the median hospital result for haematology was 0% and in 52 of 99 hospitals all haematology audit patients wore wristbands. The median result for medical patients was greater than 0%, and for 65 of 124 hospitals at least one medical patient did not wear a wristband. The median result for surgery was 0% and in 23 of 103 sites at least one patient did not wear a wristband.

Hospitals with high overall rates for wristbands missing did include a higher percentage of haematology and oncology patients in their audit, but not a higher percentage of outpatients. In these hospitals, absence of wristbands was high in both inpatients and outpatients. Among the 130 hospitals that audited 20 or more episodes:

- 4 hospitals in which >30% of patients were without wristbands audited 154 episodes in all, and 47% of their cases were from haematology & oncology (as compared with 24% in all participating hospitals). For these 4 hospitals, 21% (32/154) of patients audited were outpatients (which is the same as the national figure of 21%) but 30 of their 32 outpatients did not wear wristbands (which is much higher than the national figure of 21%). Of their inpatients, 20% (25/122) did not wear wristbands which is again much higher than 7% nationally).

- Similarly 15 hospitals with >20% of patients without wristbands, audited 530 episodes, and included 33% from haematology & oncology. 24% (127) of all their patients audited were outpatients and 65% (82/127) of these did not wear wristbands. 14% of inpatients (58/403) did not wear wristbands.

The audit tool did not ask why a wristband was not worn but auditors sometimes volunteered information.

For the 5 SCBU patients without wristbands the wristband was:
- in the incubator with baby (1),
- on a label stuck to the outside of the incubator (1),
- on a label on the incubator with first name and surname only (1),
- attached to the cot (1)
- not known (1).

For the 13 paediatric patients without wristbands:
- the ID band was stuck to the side of the incubator (1),
- the cot was labelled with patient details (1),
- No reason was offered (11).

Typical examples from the various specialities are given in Annex A.

One hospital attaches a ‘sticky label’ containing the patient’s details to all day patients being transfused, instead of wristbands. This is a reasonable alternative provided the sticky label is initially confirmed as belonging to the correct patient, as sometimes the wrong labels are filed in patients’ notes.

Key comment 3
The audit confirms that it is common practice not to ask outpatients to wear wristbands for a blood transfusion. A common reason given was that staff were very familiar with the patient so a wristband was unnecessary, but it is known that patient identification errors occur in this setting. There is a clear need to reinforce the importance of outpatients wearing wristbands.
It is notable that 90 % of the wristbands worn by unconscious patients carried 4 items of demographic information, making the patient identification process relatively secure.

The optimum way believed to ensure that the right blood goes to the right patient is for the patient to wear an identity wristband containing identifying information, and for that data to be checked against the information on the unit of blood to be transfused. However, with unconscious patients it is of paramount importance to ensure that they wear an adequately detailed wristband because, unlike conscious patients, they cannot readily identify themselves, so this alternative method of checking the patient's identity is not an option. To assess the degree of risk presented to patients, the audit looked at the details present on the wristbands in both unconscious and conscious patients.

(B) Comparison of wristband worn by unconscious & conscious patients

Unconscious patients (n=369)

	369 episodes		Yours = 1	
	%.	N	%	n
Patient was wearing wristband	**86**	**317**	**100**	**1**
Of those wearing a wristband				
Wristband contained:				
Surname	99	313	100	1
First name	97	308	100	1
Gender	17	53	100	1
Date of Birth	96	303	100	1
Patient ID number	95	302	100	1
All five details	15	47	100	1
Surname, First Name, DOB & ID number	**90**	**284**	**100**	**1**
If surname, first name or DOB absent, was patient an unknown person via A&E	16	3/19	-	0/0

Conscious patients (n=4614)

	4614 episodes		Yours = 39	
	%.	N	%	n
Patient was wearing wristband	**90**	**4170**	**95**	**37**
Of those wearing a wristband Wristband contained:				
Surname	99.7	4157	100	37
First name	99.4	4144	100	37
Gender	16	666	35	13
Date of Birth	94	3919	97	36
Patient ID number	91	3808	97	36
All five details	15	639	35	13
Surname First Name, DOB & ID number	**85**	**3554**	**95**	**35**
If surname, first name or DOB absent, was patient an unknown person via A&E	3	9/271	0	0/1

In only a minority of cases where pieces of information were missing on the wristband, were patients 'unknown persons' in A&E.

Nationally 10% (496) of patients were not wearing wristbands. They were not worn by:

- 14% (52/369) of unconscious patients
- 10% (444/4614) of conscious patients
- 7% (272/3957) of inpatients
- 21% (224/1048) of outpatients.

There was little difference between wearing of wristbands in patients located on open wards (9%, 293/3249), side rooms (11%, 108/983) or a bay on their own (10%, 26/263). 7% (5/75) of unconscious patients located in an open ward did not have a wristband; however 27% (12/44) of unconscious patients located in either a side room or a bay on their own did not have wristbands.

A significant observation from the tables above is that 52 unconscious patients were transfused without being readily identifiable by wristbands. In addition, of 317 unconscious patients who did wear a wristband, there were 33 that did not have name, any unique hospital or A&E number on the wristband that eliminate the small risk of misidentifying patients with the same names and dates of birth.

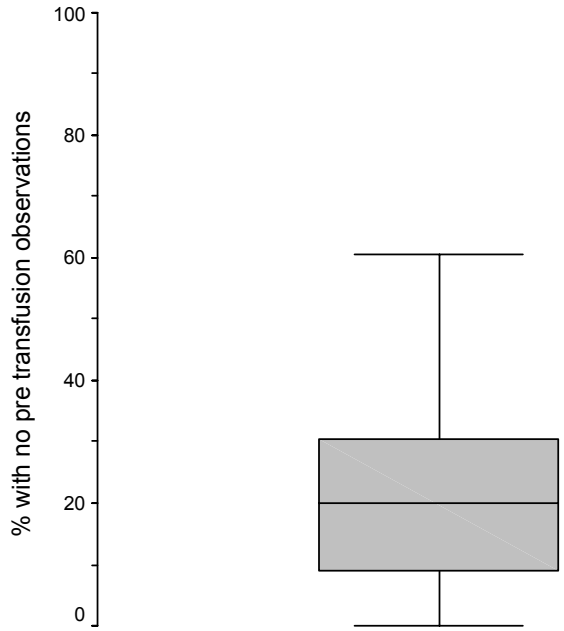
3. Observations before, during & after transfusion of current unit

(A) Pre-transfusion observations and the start time of the transfusion

Key comment 4
Excluding patients on continuous monitoring from the analysis, baseline pre-transfusion observations were not recorded in 23% of all patients and in 10% of unconscious patients. Without baseline observations, it is impossible to detect any subsequent change in observations, which can give an early warning of a potentially severe transfusion reaction. This is particularly important in unconscious patients, who cannot report symptoms of a transfusion reaction.

	5014 episodes		Yours = 40	
	%.	N	%	n
A pre-transfusion BP was recorded	75	3758	90	36
A pre-transfusion pulse was recorded	76	3830	90	36
A pre-transfusion temperature was recorded	74	3724	85	34
BP, pulse & temperature all recorded	71	3535	85	34
BP, pulse & temperature all NOT recorded (all patients)	22	1090	10	4
BP, pulse & temperature all **NOT** recorded, in those who were not on continuous monitoring	**23**	**1022/4496**	**8**	**3/39**
Unconscious patients	10	10/98	-	0/0
Conscious patients	23	1004/4370	8	3/39
Inconclusive, as no time was given for the start of the unit	2	116	0	0

The table above indicates that only about three quarters of transfused patients have baseline vital signs observations recorded **before** their transfusion starts. For the remainder, detecting transfusion reactions through a change in pulse and temperature would have been impossible. The 10 unconscious patients were at particular risk because, unlike conscious patients, they could not have reported symptoms suggestive of a transfusion reaction. As the table in the next section illustrates, some unconscious patients had no observations recorded **during** their transfusion, so increasing the chance that a transfusion reaction would go undetected.



Hospital variation: The above box-plot shows the variation between hospitals in the percentage of their patients, not on continuous monitoring, who **did not have** pre-transfusion observations, among the 130 hospitals who audited 20 or more episodes. The median rate was 20%, IQR 9-31%, range 0-61%. Thus for one quarter of these hospitals (those above the shaded area) there were no pre transfusion observations for at least one-third of patients.

(B) Observations after start of unit

All results in this section (b) are for patients without continuous monitoring

Key comment 5
As most, but not all transfusion reactions start within 15 minutes of beginning a transfusion, it is recommended that observations should be taken around 15 minutes after the start. Excluding patients on continuous monitoring, 47% had neither temperature nor pulse observations within 30 minutes, 28% had neither within an hour, and 11% had no observations taken during the whole transfusion.

It is of concern that in unconscious patients who cannot report symptoms, no observations were done within 30 minutes for 48% (43/90) patients; and within 60 minutes for 26% (23/90) patients although there were none who had no observations at all during transfusion.

In 4% of all patients, spread over 80 hospitals, there was a combined risk that no wristband was in place and no observations were taken within 30 minutes: a quarter were in a side-room or bay on their own. Of unconscious patients transfused, 8% had no wristband and no observations taken within 30 minutes and most (5/7) were in a side-room or bay on their own. Had the wrong blood been given in error, there would have been no opportunity for early detection of a potentially fatal reaction.

Continuous monitoring
From information about speciality and location, and from information volunteered on the audit tools, we estimated that 10% (517/5014) of patients were probably being continuously monitored during the transfusion episode. These patients were within intensive care, coronary care, neonatal unit/SCBU, or in theatre. We wanted to focus on those without continuous monitoring: it is presumed that with continuous monitoring in place, staff would have been able to act promptly on any change in observations. It is also presumed that to obtain a record of this in the event of a transfusion reaction, staff would either need to record the observations (and intervention) in the clinical notes or get a print out of observations from the monitor, where available, though many computer-held measurements are unavailable after 24 hours.

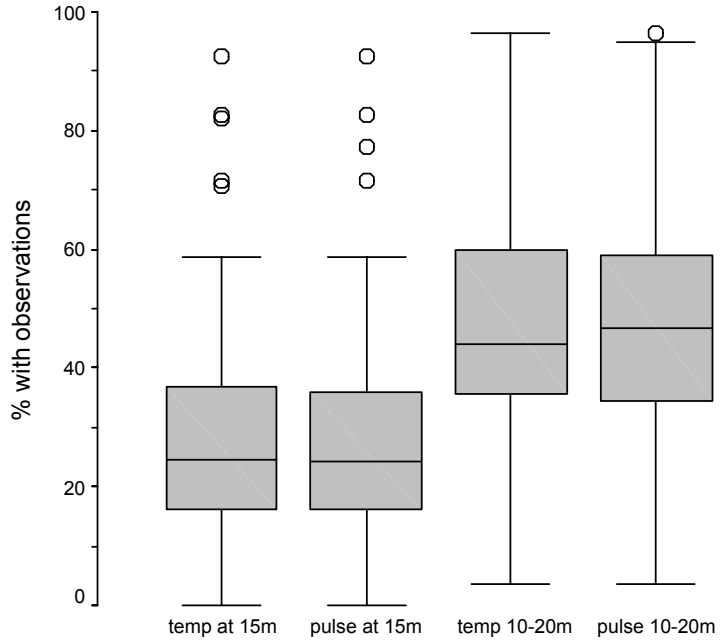
For the 90% (4497) of episodes without continuous monitoring:-

Times to first observation	Temperature observations		Pulse observations	
	4497 episodes	Yours = 39	4497 episodes	Yours = 39
Times recorded	3899 (87%)	30	3904 (87%)	32
Median (mins)	20	20	20	30
< 15 minutes	15%	7%	16%	6%
<30 minutes	59%	53%	60%	47%
<60 minutes	81%	77%	81%	75%
Exactly at 15 mins	29%	40%	28%	34%
Within 10-20 mins	47%	53%	48%	47%

Start times were identifiable in 98% (4400/4497), patients. The times at which observations were taken were identifiable in 87%.

For 53% (2387/4497) a temperature or pulse observation was made within 30 minutes, for a further 19% (864/4497) the observation was made at 30-59 minutes whilst for 17% (749/4497) the observation was first made after 60 minutes. For 11% (497/4497) no observations were taken during the whole transfusion. Usually, both temperature and pulse observations were carried out simultaneously.

Looking at the 21% of transfusion episodes that took place out of hours, 46% (394/853) had no observations done within 30 minutes, whereas for patients transfused between 9 a.m. and 5 p.m only, 38% (1188/3116) had no observations done within 30 minutes.



Hospital variation: The above box-plot shows the variation between hospitals in the percentage of patients, not on continuous monitoring, who had observations exactly at 15 minutes, and those within 10-20 minutes of the start of transfusion, among the 130 hospitals who audited 20 or more episodes. The median rate for observations at exactly 15 minutes was 25%, IQR 16-36%; the median rate for 10-20 minutes was 45% IQR 35-60%. The circles on the box plot indicate that for a few hospitals it was possible to take observations consistently at 15 minutes, but for most hospitals this was not so. In the bottom quarter of hospitals (those below the shaded box) observations were taken at 15 minutes in less than 1 in 5 patients and between 10 and 20 minutes in less than 2 in 5 patients.

Combined risks: greater potential for error

For the 90% (4497) of all episodes without continuous monitoring:-

	4497 episodes		Yours = 39	
	%.	n	%	n
No wristband	9	421	5	2
When times were recorded	3968 episodes		Yours = 32	
• No observations (pulse or temperature) recorded < 30 mins.	40	1581	50	16
• No observations (pulse or temperature) recorded < 4 hours (typical length of transfusion)	1	36	3	1
• No wristband and No observations recorded < 30 mins	4	159	0	0
• No wristband and No observations recorded < 30 mins, and in either a side room or in a bay of their own	1	54	0	0

421 patients from 122 hospitals had no wristband. Policy questionnaires were returned for 84 of these 122 hospitals and in all but 6 there was a written policy regarding the wearing of wristbands for ALL patients *(see Q6a-Policy Questionnaire - Appendix B)*

529 patients from 127 hospitals had no observations taken at all during transfusion. Policy questionnaires were returned for 84 of these 127 hospitals and in all but 4 there was a policy statement *(see Q9b-PolicyQuestionnaire - Appendix B)* that pulse and temperature are taken 15 minutes after the start of each unit transfused.

1581 patients from 155 hospitals had no observations taken within 30 minutes of starting transfusion. Policy questionnaires were returned for 103 of these 155 and in all but 5 there was a policy statement *(see Q9b-Policy Questionnaire - Appendix B)* that pulse and temperature are taken 15 minutes after the start of each unit transfused. Overall, there were 159 (4%) patients from 80 hospitals who had no wristband and no observations taken within 30 minutes of starting transfusion.

Unconscious patients (369)

271 of the unconscious patients were probably being continually monitored. The other 98 patients were not continuously monitored:

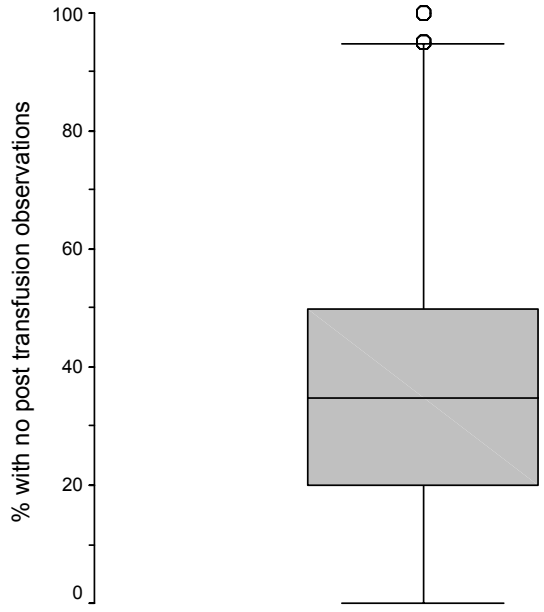
	98 episodes		Yours = 0	
	%.	n	%	n
No wristband	10	10	-	0
No times recorded for pulse and temperature observations*	8	8	-	0
When times were recorded	90 episodes		Yours = 0	
• No observations (pulse or temperature) recorded < 30 mins.	48	43	-	0
• No observations (pulse or temperature) recorded < 60 mins.	26	23	-	0
• No observations (pulse or temperature) recorded < 4 hours (typical length of transfusion)	0	0	0	0
• No wristband and No observations recorded < 30 mins	8	7	-	0
• No wristband and No observations recorded < 30 mins, and in either a side room or in a bay of their own	6	5	-	0

** Note that there is no evidence from the information about specialty nor from auditor notes that these 8 patients were terminally ill. Specialties were medical (3), surgical (3), A&E (1) and theatre/recovery (1).*

(C) Observations after transfusion of the current unit

Key comment 6
Post-transfusion observations are useful for detecting any transfusion reactions that start late in the transfusion episode. If these observations are not done, an adverse reaction may not be treated early and its relationship to transfusion may not be recognised. In 39% of patients, no post-transfusion observations were done.

	5014 episodes		Yours = 40	
	%.	n	%	n
A post-transfusion BP was recorded	59	2938	60	24
A post-transfusion pulse was recorded	60	3010	53	21
A post-transfusion temperature was recorded	59	2947	60	24
BP, pulse & temperature all recorded	56	2795	53	21
BP, pulse & temperature all **NOT** recorded	**39**	**1937**	**40**	**16**



Hospital variation: The above box-plot shows the variation in the percentage of patients who **did not have** post-transfusion observations, among the 130 hospitals with 20 or more episodes. The median rate for missing observations was 35%, IQR 20-50%, range 0-100%. For one quarter of hospitals (those above the shaded area) more than half of their audit patients were not observed after the transfusion.

4. Compatibility check

Key comment 7
The compatibility report or prescription sheet were signed in almost all cases, to indicate that a particular unit of blood had been given to a specific patient, which is important if patients have to be traced retrospectively, e.g. if the possibility of transmission of an infection from a donor arises. These signatures are also meant to indicate that the identity of the patient has been checked against the details on the blood for transfusion.

52 (1%) of all patients were unconscious and had no wristband, yet in 49 of them, signatures were present to indicate that the patient's identification had been properly verified.

The date and time at which blood was transfused was recorded in 94% of cases. The time the transfusion ended was recorded in only 24% of cases. Failure to record these renders investigations into possible transfusion reactions difficult.

	5014 episodes		Yours = 40	
	%.	n	%	n
Compatibility report or prescription sheet was signed by the person administering the blood	98	4895	100	40
Date of transfusion was recorded on compatibility report or prescription sheet?	94	4734	70	28
Start time was recorded EITHER on the compatibility sheet OR on the prescription sheet	94	4703	100	40
Stop time was recorded EITHER on the compatibility sheet OR on the prescription sheet	24	1227	30	12

In 98% of patients, signatures were given; 52 (1%) of all patients were unconscious and had no wristband, yet in 49 of them, signatures were present to suggest that the patient's identification had been verified.

<u>It should be noted here</u> that BCSH guidelines recommends that transfusion stop times are recorded on the observation charts, but in practice the audit found that the majority of hospitals recorded them on either the compatibility report form or the prescription sheet. Consequently, since the auditors did not look for stop times on observations charts, there may be some underreporting of the number of transfusions for which stop time information was available.

Also, a number of hospitals use compatibility reports or prescription sheets on which there is no space to record the transfusion stop time, which partly accounts for the low rate of compliance. Hence this lack of information is sometimes because staff do not take the observations, but may also result from the systems within which staff work. Further debate on the value of recording transfusion stop times may be

appropriate with subsequent, amendment of documents used in some hospitals if necessary.

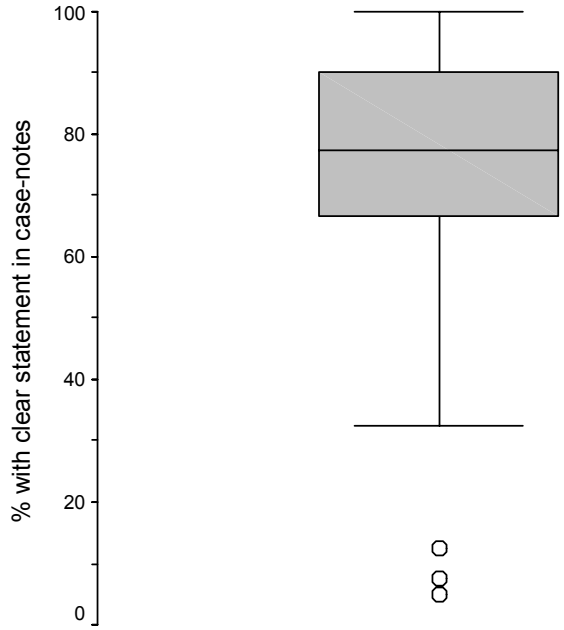
5. Further documentation

(A) Reason for the transfusion

Key comment 8
In 75% (3753) of transfusions there was a clear statement in the notes giving the reason for transfusion. If the rationale for transfusion is not clear, it may be harder, in the event of a severe adverse reaction, to justify its use.

The auditor was asked to say whether there was a clear statement in the medical notes giving the reason for the transfusion.

	5014 episodes		Yours = 40	
	%.	n	%	n
There was a clear statement in the medical notes giving the reason for the transfusion	75	3753	73	29



Hospital variation: The above box-plot shows the variation between hospitals in the percentage of episodes for which there was a clear statement in the medical notes, among the 130 hospitals that audited 20 or more episodes. The median rate was 78%, IQR 66-90%, range 5-100%. In one quarter of hospitals (those below the shaded box) one-third or more of patients had no clear reason for their transfusion within their case-notes.

If the rationale for transfusion is not clear, it may be harder, in the event of a severe adverse reaction, to justify its use.

(B) Adverse reactions

These were defined as “symptoms/ signs including: fever>1.5°C above baseline pre transfusion, rigors, pain in the chest or abdomen, hypotension (↓BP), tachycardia (↑ pulse), rash/ itching, breathlessness, nausea/ vomiting, or haemoglobinuria”

We did not measure the frequency of adverse reactions but in the 2% (122/5014) patients where an adverse reaction was recorded it was recorded in EITHER the medical OR the nursing notes (107/110) OR on the observation chart (3/110).

(C) Patient identity match

Key comment 9
In patients who were wearing wristbands, minor discrepancies in patient details between the wristband, compatibility report and unit of blood were present in 15 cases, and in only 4 had the discrepancy been checked with the laboratory. All discrepancies must be resolved before the transfusion is started; even minor discrepancies maybe a warning of a major error.

Apart from absence of wristbands, there were discrepancies between the identity of the patient on the wristband, the compatibility report and the blood being transfused in 15 cases. There were minor discrepancies in spelling in 5 (in only one was it checked with laboratory staff); in 10 the date of birth or hospital number were wrong or missing (in only 3 were discrepancies checked with laboratory staff to verify that blood was being given to the correct patient). There was only one report in which details on the patient’s wristband were incorrect – the date of birth was wrong.

RESULTS - Audit of Blood Transfusion Episodes in private hospitals

6 private sector hospitals submitted data on 147 patients undergoing transfusion.
It is uncertain how representative these 6 private hospitals are of all private hospitals.
The key results from the private sector are broadly similar to those from the NHS – except it was harder to find a clear rationale for the transfusion from case-notes.

	160 NHS Hospitals	6 Private Hospitals
% Wearing wristbands	90% (4516/5014)	98% (144/147)
Pre-transfusion: BP, pulse & temperature all NOT recorded, in those who were not on continuous monitoring	23% (1022/4505)	12% (12/104)
Patients who were not on continuous monitoring **during transfusion**:		
Temperature and Pulse observations done at exactly 15 minutes	24% (1072/4497)	20% (21/104)
Temperature and Pulse observations done < 30 minutes	53% (2287/4497)	57% (59/104)
Temperature and Pulse observations done < 60 minutes	72% (3251/4497)	79% (82/104)
Post-transfusion: BP, pulse & temperature all NOT recorded	39% (1937/5014)	12% (18/147)
Compatibility report or prescription sheet was signed by the person administering the blood	98% (4895/5014)	97% (143/147)
There was a clear statement in the medical notes giving the reason for the transfusion	75% (3753/5014)	46% (67/147)

Results - Audit of hospital Policy on Blood Transfusion Practice

Your hospital **DID** take part in the policy audit

Description of sample

Policy returns from 190 hospitals were included in the analysis. These comprised 163 English NHS hospitals (including 3 PCTs), 26 private hospitals and 1 hospital from the Channel Islands. The national summary statistics below distinguish between NHS (164) and private (26) hospitals. The hospital from the Channel Islands has been included with the English NHS hospitals as it receives blood from England. The response rate for Policy questionnaires was 56% (163) of 289 English NHS hospitals and 46% (26) of 56 private hospitals.

Consultant haematologists completed 58% (111/190) of the policy audit forms received. A further 13% (25) were completed by a senior biomedical scientist, 12% (22) by a transfusion/haematology clinical nurse specialist/nurse co-ordinator/link/research nurse, 4% (7) by a blood bank manager, 4% (7) by the head/manager of pathology, with others completed by a clinical effectiveness nurse, director of nursing, ward sister, senior nurse manager, technical manager of haematology, head of blood transfusion, quality manager, with the rest unknown.

Key comment 10
Without a documented policy clarifying what is required during transfusion, staff errors due to ignorance of correct procedures may persist. Having correct policy is the first step toward safe transfusion, but compliance with it is also needed.

Q1. Does your hospital have any written policies on blood transfusion practice?

NHS hospitals (164)	Private Hospitals (26)	Your hospital
164 (100%)	26 (100%)	**Yes**

All hospitals who replied had policies in place, but this represented only 56% for NHS and 46% of private hospitals in England.

Q2. Is there a written policy statement on the labelling of blood samples for blood grouping and cross matching?

NHS hospitals (164)	Private Hospitals (26)	Your hospital
161/163 (99%)	26 (100%)	**Yes**

Q3. Is there a written policy statement on which staff can take samples for blood grouping and cross-matching?

NHS hospitals (164)	Private Hospitals (26)	Your hospital
122/162 (75%)	20 (77%)	**Yes**

Q4. Is there a written policy statement on what training should be given to staff who can take samples for blood grouping and cross matching?

NHS hospitals (164)	Private Hospitals (26)	Your hospital
81/161 (50%)	12/25 (48%)	**No**

Q5. Is there a written policy stating that staff who take blood are given a copy of the policy for taking blood?

NHS hospitals (164)	Private Hospitals (26)	Your hospital
47/159 (30%)	7/25 (28%)	**No**

5 NHS hospitals and 1 private hospital gave no reply to this question.

Q6. Is there a written policy stating that wristbands should be worn during transfusion by:

a) All patients?

b) All patients unless a specified alternative method is used? (e.g. asking patient to state name and date of birth)

Response to Q6A	Response to Q6B	NHS hospitals (164)	Private Hospitals (26)	Your hospital
YES to either		156/163 (96%)	25 (96%)	**Yes**
NO to both		7/163 (4%)	1 (4%	

Of the 8 hospitals who did not have a policy as above, 3 took part in auditing transfusion episodes: 91% of their patients (range 85-95%) had wristbands in place.

Q7. Is there a policy statement about the administration of blood in your hospital? (Either a central policy or policies in clinical areas)

NHS hospitals (164)	Private Hospitals (26)	Your hospital
163 (99%)	26 (100%)	**Yes**

NOTE: Questions 8 to 10 were only applicable if the answer to Q7 was YES

Q8. Is there a policy statement on how the identity of the patient is verified prior to transfusion?

NHS hospitals (163)	Private Hospitals (26)	Your hospital
162 (99%)	26 (100%)	**Yes**

If YES does it contain the following for conscious patients?

a) Ask the patients to state forename and surname and DOB

NHS hospitals (162)	Private Hospitals (26)	Your hospital
149/160 (93%)	24/25 (96%)	**Yes**

b) Check the patient's wristband?

NHS hospitals (162)	Private Hospitals (26)	Your hospital
160 (99%)	26 (100%)	**Yes**

If Yes (to Q8) does it contain the following for unconscious patients?

c) Check the patients wristband for forename and surname

NHS hospitals (162)	Private Hospitals (26)	Your hospital
141/158 (89%)	22 (85%)	**Yes**

d) Check the patient's wristband for DOB and hospital number

NHS hospitals (162)	Private Hospitals (26)	Your hospital
144/160 (90%)	23 (88%)	**Yes**

Of the 19 hospitals whose policies did not contain these elements, 12 audited transfusion episodes. There were 27 unconscious patients from 10 of the12 hospitals and25/27 (93%) wore wristbands.

Q9a) Is there a policy statement that pre-transfusion observations should be made?

NHS hospitals (163)	Private Hospitals (26)	Your hospital
161 (99%)	24 (92%)	**Yes**

If Yes, do these observations include:

i. Pulse?

NHS hospitals (161)	Private Hospitals (24)	Your hospital
160/160 (100%)	24 (100%)	**Yes**

ii. Temperature?

NHS hospitals (161)	Private Hospitals (24)	Your hospital
160/160 (100%)	24 (100%)	**Yes**

iii. BP?

NHS hospitals (161)	Private Hospitals (24)	Your hospital
159/160 (99%)	24 (100%)	**Yes**

Q9b) Is there a policy statement that pulse and temperature are taken 15 minutes after the start of each unit transfused?

NHS hospitals (163)	Private Hospitals (26)	Your hospital
153 (94%)	23 (88%)	**Yes**

Q9c) Is there a policy statement that specifies what to do in the event of a transfusion reaction

NHS hospitals (163)	Private Hospitals (26)	Your hospital
160 (98%)	26 (100%)	**Yes**

If YES, does it include:

i. Stop transfusion?

NHS hospitals (160)	Private Hospitals (26)	Your hospital
159 (99%)	26 (100%)	**Yes**

ii. Contact blood bank?

NHS hospitals (160)	Private Hospitals (26)	Your hospital
152 (95%)	24 (92%)	**Yes**

iii. Seek advice from nursing/medical staff?

NHS hospitals (160)	Private Hospitals (26)	Your hospital
157 (98%)	26 (100%)	**Yes**

Q9d) Is there a policy statement that specifies that the compatibility report should be signed?

NHS hospitals (163)	Private Hospitals (26)	Your hospital
127/159 (80%)	20/25 (80%)	**No**

Q9e) Is there a policy statement that specifies that the date of each unit transfused should be written on the compatibility form?

NHS hospitals (163)	Private Hospitals (26)	Your hospital
115/158 (73%)	21 (81%)	**No**

For Q9d&e, signing the compatibility report indicates that the checks to ensure that the correct blood is being given to the correct patient have been done. Without these signatures, it may be harder to demonstrate this retrospectively, although it is possible that in some hospitals, such signatures are put on another document instead.

Q10. Does the written policy state that hospital staff routinely give information to patients about blood transfusions before the blood transfusion?

NHS hospitals (163)	Private Hospitals (26)	Your hospital
100/162 (62%)	14 (54%)	**Yes**

IF Yes, does it advise that they use:

i. NBS Information Leaflet?

NHS hospitals (100)	Private Hospitals (14)	Your hospital
74 (74%)	8 (57%)	**No**

ii. Local Information Leaflet?

NHS hospitals (100)	Private Hospitals (14)	Your hospital
18/99 (18%)	2 (7%)	**No**

iii. Other

NHS hospitals (100)	Private Hospitals (14)	Your hospital
7/99 (7%)	3 (21%)	**No**

This "other" information:

NHS hospitals (7)	Private Hospitals (3)
• Does not specify method but does specify must be given (usually oral) • Informed consent • Just mentions a patient information leaflet • Verbal information (2)	• Verbal information • Consent form • Local NHS hospital info – as ratified by Blood Transfusion Centre

<u>Key comment 11</u>
Most hospitals have policies that include most of the elements above. It is clear that in spite of this, in practice these things are not always done. There may be many different reasons for this, but which were not addressed by this audit.

OVERVIEW OF POLICY AUDIT

This next table lists various desirable elements of blood transfusion policy and the % of participating hospitals who have included each criteria. to which they Only a small amount of data was missing from questionnaires: it was assumed that these criteria were missing from the policy.

	Feature of written policy	164 NHS % with feature	26 Private % with feature	Your hospital
Q1	Does hospital have any written policies on blood transfusion practice	100	100	**Yes**
Q2	Written policy statement-labelling of samples for grouping /crossmatching	98	100	**Yes**
Q3	Written policy statement-who can take samples for grouping/crossmatching	74	77	**Yes**
Q4	Written policy statement-training for taking samples for grouping/crossmatch	49	46	**No**
Q5	Written policy statement-staff taking blood given copy of policy for taking blood	29	27	**No**
Q6a	Written policy stating wristbands worn during transfusion by all patients	87	88	**Yes**
Q7	Policy statement about administration of blood in hospital	99	100	**Yes**
Q8	Policy statement on how patient identity is verified before transfusion	99	100	**Yes**
Q8a	Conscious patients: patients to state forename & surname & DOB	91	92	**Yes**
Q8b	Conscious patients: wristband to be checked	98	100	**Yes**
Q8c	Unconscious patients: wristband checked for surname/forename	85	85	**Yes**
Q8d	Unconscious patients: wristband checked for DOB/Hospital number	87	88	**Yes**
Q9a	Policy statement that pre-transfusion observations be made	98	92	**Yes**
Q9ai	These include Pulse	98	92	**Yes**
Q9aii	These include Temperature	98	92	**Yes**
Q9aiii	These include BP	97	92	**Yes**
Q9b	Policy statement that pulse & temperature taken 15 mins after start of unit	93	88	**Yes**
Q9c	Policy statement as to what to do in event of a transfusion reaction	98	100	**Yes**
Q9ci	It includes Stop Transfusion	97	100	**Yes**
Q9cii	It includes Contact blood bank	93	92	**Yes**
Q9ciii	It includes Seeking advice from nursing/medical staff	96	100	**Yes**
Q9d	Policy statement specifies that the compatibility report should be signed	77	77	**No**
Q9e	Policy statement specifies the date of each unit be written on compatibility form	70	81	**No**
Q10	Written policy - staff routinely give transfusion info to patients before transfusion	61	54	**Yes**
Q11	Hospital has a maximum Surgical Blood Order Schedule	87	73	**Yes**

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Annex A - Typical examples why wristbands are not worn

Paediatrics/SCBU	• Premature baby. ID band stuck to side of incubator as wristbands tend to cut babies skin • Pt is a one-month-old child. Cot is labelled with patient details as per a wristband.
Oncology	• No ID band. Patient able to identify himself. • Patient's photograph used as identity instead of wristband • Protocol for chemotherapy unit states that wristbands do not need to be worn • Patient is well known to ward staff
ITU (CCU)	• Patient too oedematous for wristband. Staff know patient they're looking after. • No wristband visible at initial visit. Patient following day had wristband with name, DOB and number. Possible it was under bandaging • Oedema so bad that not possible to put wristband on pt (cuts off blood circulation)
Haematology	• No wristbands are worn on haematology unit • Haematology day dept – patients do not wear ID bands as day patients – expected to know their patient number. • Current practice in Haematology day care unit is to use sticky labels instead of wristbands • Patient carried ID wristband in his bag • No ID band but patient able to verbalise name and DOB. Nurse informed and has put one on. • Wristband cut off because arm needed rebandaging • Pt had a laminated card with their hospital details on it instead of wristband because it's a day ward only • Pt not given wristband as short-staffed!! • No identity bracelet as pt is a regular day case admission for a top up tx and ID bands are not routinely worn for top-up transfusion in regular patients. • Wristband clipped on bottom of bed but contains surname, first name, DOB and PIN • Pt removed wristband because of allergic reaction the previous day • This unit has a policy for not wearing ID bracelets. Patients asked to confirm details.
Medical	• Pt name band had been removed. It was on trolley next to bed but hospital number folded over difficult to read. • No wristband but patients do have identity stuck onto their clothing which has surname, forename, DOB, reg no. & gender • Still no wristband following day. Found under cannula bandage after discussion with nurse - could not have been checked during transfusion • Renal dialysis patient that nurses say they know • Wristband was removed as the pt's wrist was very swollen. Not replaced. The wristband had been thrown away by the nurse reporting that the band was cut off. • Wristband on bedside table with all details on it (except gender). Bandages and cannula in each wrist.

	• Patient took the wristband off though nurse said wristband was checked before blood was given • Patient had no wristband as they were transferred from another hospital • Name band attached at point of audit • Pt 91 years old very confused and disorientated. No wristband but relatives confirmed identity. • Nurse stated pt had a bath that morning and wristband removed and not yet replaced
A&E	• Identity checked by verbally confirming with patient • Lack of wristband pointed out to A&E /Anaesthetist checking blood. They felt it was not a problem, as they knew who the pt was as they had been there for 2 hours and had had numerous units of blood/platelets/FFP. Pt was unconscious/intubated.
Orthopaedic	• Pt is in recovery. Pt is not conscious. The pt's wristband was cut off in theatre to gain access for cannula • Identification wristband is stuck to the bedside cabinet, the A&E pt number is entered on it as pt identification number. • Pt had asked for ID wristband to be removed, as their wrist was sore. Wristband was in situ at end of tx. • Pts ID band on bed table • ID wristband removed in surgery for access to veins • Wristband ID removed as arms sore – one with open wound
Surgical	• Wristband removed to insert cannula • ID wristband removed in theatre and not put back onto patient • Wristband was in the cot. Had been cut off to obtain venous access. Wristband contained name, hospital number, and DOB. • Pt has learning difficulties and lives in a psychiatric unit. Refused to wear wristband although on end of bed • Wristband with full name & date of birth placed on pt after tx commenced
Cardiac	• Pt had been in CICU for 60 days - he asked to have his ID band removed as it was too tight

SiteCode	**Appendix A**	Episode

AUDIT OF BLOOD TRANSFUSION EPISODES

Name of auditor

Date of Audit: _____ Time of Audit: _____

Day of week: **Mon** **Tues** **Wed** **Thurs** **Fri** **Sat** **Sun** Time: **AM** **PM**

Please tick as appropriate

☐ **In patient** ☐ **Out patient / Day case**

Clinical Speciality:

If the patient is in a ward, go to where the patient is being treated and complete the following:

1. Is the patient in**:** (*Circle one option)*

An open ward? A bay on their own? A side room?

ITU/HDU? SCBU? Theatre?

2.	Is patient conscious?	Yes	No
3	a) Is the patient wearing an identification wristband?	Yes	No
	b) if yes, does it contain patient's surname?	Yes	No
	c) if yes, does it contain patient's first name?	Yes	No
	d) if yes, does it contain patient's gender?	Yes	No
	e) if yes, does it contain date of birth?	Yes	No
	f) if yes, does it contain Patient Identification Number?	Yes	No
	If no to any of the above, did the patient come in as an unknown person via A&E?	Yes	No

4. *Concerning the unit actually being transfused at the time of the audit*:

a) Is the compatibility report or the prescription sheet signed by the person administering the blood? Yes No

b) Is the date of transfusion recorded on the Compatibility report or prescription sheet? Yes No

Is the commencement time of the unit recorded on the

c) Compatibility report? Yes No

d) Prescription sheet? Yes No

Is the stop time of the unit recorded on the

e) Compatibility report? Yes No

f) Prescription sheet? Yes No

5. *Considering the unit currently being transfused:*

a) What time did this unit start being transfused? am / pm

b) Was a pre-transfusion BP recorded? Yes No

c) Was a pre-transfusion pulse recorded? Yes No

d) Was a pre-transfusion temperature recorded? Yes No

6. *After the current unit began transfusing:*

Temperature readings

a) When was the first temperature reading recorded?*(hh:mm)* am / pm

b) When was the second temperature reading recorded? *(hh:mm)* am / pm

c) When was the third temperature reading recorded? *(hh:mm)* am / pm

Sitecode	Episode

Pulse readings

d) When was the first pulse reading recorded?*(hh:mm)* am / pm

e) When was the second pulse reading recorded? *(hh:mm)* am / pm

f) When was the third pulse reading recorded? *(hh:mm)* am / pm

7. *After the current unit had finished transfusing:*

a) Was a post-transfusion BP recorded? Yes No

b) Was a post-transfusion temperature recorded? Yes No

c) Was a post-transfusion pulse recorded? Yes No

8. Is there a clear statement in the medical notes giving the reason for the transfusion? Yes No

a) *If yes, record the statement below:*

9. Is there any record of the patient having had an adverse effect due to this transfusion? Yes No

(Symptoms/ signs include: fever>1.5°C above baseline pre-transfusion, rigors, pain in the chest or abdomen, hypotension (↓BP), tachycardia (↑ pulse), rash/ itching, breathlessness, nausea/ vomiting, haemoglobinuria)

a) ***If yes,*** *is it recorded in the*:

Medical notes ☐ Nursing notes ☐ Both ☐

And Finally . . .

Does the identity of the patient match with the compatibility report and the blood being transfused? Yes No

Other notes

Appendix B

+ National Comparative Audit of Blood Transfusion +

Audit of Hospital Policy on Blood Transfusion Practice

Site Code: ☐ **Form Completed by: Name** ☐

Title of post ☐ **Contact Number** ☐

1. Does your hospital have any written policies on blood transfusion practice? Yes ☐ No ☐

If **Yes** please continue below.

If **No** please return this questionnaire to the FREEPOST address provided at the end of the questionnaire.

2. Is there a written policy statement on the labelling of blood samples for blood grouping and crossmatching? Yes ☐ No ☐

3. Is there a written policy statement on which staff can take samples for blood grouping and crossmatching? Yes ☐ No ☐

4. Is there a written policy statement on what training should be given to staff who can take samples for blood grouping and cross-matching? Yes ☐ No ☐

5. Is there a written policy stating that staff who take blood are given a copy of the policy for taking blood? Yes ☐ No ☐

6. Is there a written policy stating that wristbands should be worn during transfusion by:

   a) All patients? Yes ☐ No ☐

   b) All patients unless a specified alternative method is used? (e.g. asking patient to state name and date of birth) Yes ☐ No ☐

7. Is there a policy statement about the administration of blood in your hospital? (Either a central policy or policies in clinical areas) Yes ☐ No ☐

If YES go to Question 8. If NO go to Question 11.

8. Is there a policy statement on how the identity of the patient is verified prior to transfusion? Yes ☐ No ☐

If YES does it contain the following for conscious patients?

   a) Ask the patients to state forename **and** surname **and** DOB Yes ☐ No ☐

   b) Check the patient's wristband? Yes ☐ No ☐

+ If Yes does it contain the following for unconscious patients)? +

c) Check the patients wristband for forename **and** surname Yes ☐ No ☐

d) Check the patient's wristband for DOB and hospital number Yes ☐ No ☐

9a) Is there a policy statement that pre-transfusion observations should be made? Yes ☐ No ☐

If Yes, do these observations include:

i. Pulse? Yes ☐ No ☐

ii. Temperature? Yes ☐ No ☐

iii. BP? Yes ☐ No ☐

9b) Is there a policy statement that pulse and temperature are taken 15 minutes after the start of each unit transfused? Yes ☐ No ☐

9c) Is there a policy statement that specifies what to do in the event of a transfusion reaction? Yes ☐ No ☐

If YES, does it include:

i. Stop transfusion? Yes ☐ No ☐

ii. Contact blood bank? Yes ☐ No ☐

iii. Seek advice from nursing/medical staff? Yes ☐ No ☐

9d) Is there a policy statement that specifies that the compatibility report should be signed? Yes ☐ No ☐

9e) Is there a policy statement that specifies that the date of each unit transfused should be written on the compatibility form? Yes ☐ No ☐

10. Does the written policy state that hospital staff routinely give information to patients about blood transfusions before the blood transfusion? Yes ☐ No ☐

IF Yes, does it advise that they use:

i. NBS Information Leaflet? Yes ☐ No ☐

ii. Local Information Leaflet? Yes ☐ No ☐

iii. Other Yes ☐ No ☐

If OTHER please specify ☐

11. Does the hospital have a Maximum Surgical Blood Order Schedule? Yes ☐ No ☐

+ Thank you for taking the time to complete this questionnaire +

Appendix C

Standards and Criteria

The audit is based on British Committee for Standards in Haematology (BCSH), 'The administration of blood and blood components and the management of transfused patients' (Transfusion medicine, 1999,**9,** 227-238).

Policy Standards

Standard POL 1 - Hospitals have a policy for the administration for blood and blood components. *Measured by Q1*

Standard POL 2 - Hospital policy on sampling complies with BCSH.

Criterion POL 1 - written policy on labelling samples *Measured by Q2*

Criterion POL 2 - policy states which staff can take samples for pre transfusion testing *Measured by Q3*

Standard POL3 - The hospital policy on patient identification complies with BCSH guidelines.

Criterion POL 3 - policy states wristbands worn during transfusion by all patients *Measured by Q6*

Criterion POL 4 - staff ask patient to state first name, surname and date of birth. *Measured by Q8a*

Criterion POL 5 - staff check wristband *Measured by Q8b*

Standard POL4 - Hospital policy on observations during transfusion complies with BCSH guidelines.

Criterion POL 6 - staff observe pulse, BP and temperature before administering blood *Measured by Q9a*

Criterion POL 7- staff observe pulse and temperature 15 minutes after the start of each unit transfused *Measured by Q9b*

Standard POL 5 - Hospital policy on the management of a transfusion reaction complies with BCSH guidelines.

Criterion POL 8- policy states stop transfusion, contact blood bank and seek advice from nursing/medical staff *Measured by Q9c*

Standard POL 6 - Hospital policy on the use of the compatibility report form complies with BCSH guidelines.

Criterion POL 9 - policy states the report form is signed *Measured by Q9d*

Criterion POL 10 - policy states that the date of each unit is written on the report form *Measured by Q9e*

Standard POL 7 - Hospital policy on the provision of information to patients complies with BCSH guidelines.

Criterion POL 11 - policy states patients are given information before blood transfusion. *Measured by Q10*

Practice Standards

Standard PRA1 - Patients undergoing transfusion are identifiable in accordance with BCSH guidelines

Criterion PRA 1 - All patients undergoing transfusion wear a wristband *Measured by Q3a*

Criterion PRA 2 - wristband contains patients surname *Measured by Q3b*

Criterion PRA 3 - wristband contains patient's first name *Measured by Q3c*

Criterion PRA 4 - wristband contains patient's date of birth *Measured by Q3e*

Criterion PRA 5 - wristband contains patients patient identification number *Measured by Q3f*

Standard PRA2 - There is evidence that a compatibility check is performed.

Criterion PRA 6 - compatibility report or prescription sheet signed by person administering the blood *Measured by ToolQ4a*

Standard PRA3 - Dates and times of transfusions are adequately recorded

Criterion PRA 7 - date of transfusion recorded on compatibility report or prescription sheet *Measured by Tool Q4b*

Criterion PRA 8 - start time of unit recorded on compatibility report or the prescription sheet *Measured by Tool Q4c & Q4d*

Criterion PRA 9 - stop time of unit recorded on compatibility report or the prescription sheet *Measured by Tool Q4e*

Standard PRA4 - The patient undergoing a blood transfusion is adequately monitored.

Criterion PRA 10 - pre-transfusion BP recorded *Measured by Tool Q5b*

Criterion PRA 11 - pre-transfusion pulse recorded *Measured by Tool Q 5c*

Criterion PRA 12 – pre-transfusion temperature recorded *Measured by Tool Q5d*

Criterion PRA 13 – Temperature recorded15 minutes after unit start time *Measured by Tool Q6a*

Criterion PRA 14 – pulse recorded 15 minutes after unit start time *Measured by Tool Q6d*

Criterion PRA 15 – Post-transfusion BP recorded *Measured by Tool Q7a*

Criterion PRA 16 – Post transfusion temperature recorded *Measured by Tool Q7b*

Criterion PRA 17 – Post-transfusion pulse recorded *Measured by Tool Q7c*

Standard PRA5 - The rationale for transfusing blood is recorded in medical notes.

Criterion PRA 18 – Clear statement of reason for transfusion recorded
Measured by Tool Q8

Appendix D

Checks on Data Quality

Quota sampling
Quota data for 78% (124) of the 160 NHS hospitals (81% of all episodes) were analysed to see if the cases audited were in accordance with the pre-defined quota. The next table indicates the percentage of episodes expected in total from these 124 hospitals according to where blood had been used in the previous 3 months. Thus according to allocated quotas we would have expected 25% medical episodes and 24% surgical episodes. Overall, the actual breakdown of location was close to expected.

Where transfused	Expected overall for 124 sites according to quota	Actual breakdown of episodes for the 124 sites
Medical	25%	28%
Surgical	24%	20%
Haematology	17%	19%
Orthopaedic	13%	12%
Obs & Gynae	7%	5%
Other	14%	6%

Timing of audit
Auditors were asked to observe during transfusion of the chosen unit, typically 1-2 hours into a 4-hour transfusion. The time the audit began was recorded on the audit tool but was not typed into the database, hence a systematic random sample of 100 audit paper forms were revisited to extract these times. The median time from the start of the transfusion to when the audit began was 60 minutes, with inter-quartile range of 30-110 minutes and 80th centile range of 0-175 minutes. These results confirm the prospective nature of this audit.

External Reliability
Following difficulty in obtaining time from hospital staff to perform reliability checks on data collected, the NBS provided staff to externally verify 10 cases from each of 30 participant hospitals, giving a sample of 300 cases. The intention was to audit 5 of the first 10 cases audited in the chosen hospitals, and 5 at random from the remaining cases. The purpose of this was to collect data from the same case notes as the site auditors, as a means of checking that data were being collected accurately and consistently. At the time of reporting data were available for 139 episodes from 15 hospitals, median 10, range 6-10; and a summary follows here. Final results will be included in any publication(s) in the medical press.

There were a number of problems encountered in collecting data for external auditing. The first was the impossibility in some hospitals of obtaining access to casenotes, since local Data Protection staff considered it inappropriate that non-Trust staff should have access to the patient record. In other cases, notes had become unavailable because the patient had been re-admitted, and so the notes were in use, and not available for audit. In some cases, notes of deceased patients were simply unavailable.

Agreement of the Yes/No questions (Q4-Q9 Appendix A) was generally good with kappa >0.70. The weakest agreement was for start times being recorded on the prescription sheet (kappa = 0.27; McNemar test for bias: P<0.001) – 27 disagreements with 26/27 being times found by the internal but not the external auditor – 24 of these 26 were from 3 sites only.

There was systematic disagreement on whether a clear statement was in the medical notes giving the reason for the transfusion (kappa = 0.67); McNemar test for bias: P=0.001) – there were 22 disagreements with 18/22 being clear statements found by the internal but not the external auditor – these 18 were from 10 sites.

There was 89% agreement for the transfusion start time – 3/15 were discrepancies in that no time was found by the external auditor, whilst 10 of the other 12 were time differences within 15 minutes. Agreement as to when the first temperature observation was made was 88% - 5/17 were discrepancies in that no time was found by one of the auditors (4 external, 1 internal), whilst 4 of the other 12 were time discrepancies within 15 minutes, 6/12 within 30 minutes. Similarly there was 86% agreement for the first pulse observation – 6/20 discrepancies being no time found by one auditor (5 external, 1 internal), whilst 5 of the other 14 were within 15 minutes, 9/14 within 30 minutes.

Double-entry
Data for 501 cases from 14 hospitals were double entered. Data for 10 of these sites were entered by different people whilst 4 sites were entered a second time by the same person (the one who entered most of the original data). From the statement of findings below we can see that error rates were acceptably low.

Sections of the audit tool (Appendix A) to do with specialty, Inpatient or Outpatient, consciousness of patient (Q2), wearing a wristband (Q3a), questions about the compatibility report/prescription sheet (Q4), pre and post transfusion observations (Q5, Q7), adverse reactions (Q9) and ID matching were in complete agreement for the 501 cases.

There were 2 disagreements (in 501 cases) regarding the location of patient (Open ward instead of Side room; Bay on their own instead of A&E Resuscitation), 2 disagreements for Q3a through Q3f relating to details on wristband (Blank instead of No), 1 disagreement about gender on wristband (Q3d), and 1 disagreement about whether the patient came in as an unknown person via A&E (yes instead of No). There were 14 disagreements (Yes instead of No), kappa=0.93, as to whether there was a clear statement in the medical notes giving the reason for the transfusion (Q8).

There were 5 disagreements in the start times of the transfusion and 4 of these were to do with a.m. versus p.m. times. Similar levels of error were found for subsequent observation times of temperature and pulse.

Systematic random sample of 100 episodes
This was done as a check between what was on the paper record and what was shown on the computer at the CEEU in readiness for analysis i.e. a check between start and end points of data collation and cleaning. Error rates were acceptably low. Most sections of the audit tool (Appendix A) were in complete agreement. There were 4 disagreements about whether the patient came in as an unknown person via A&E (Blank Vs No), 1 disagreement of pulse observation times (Q6d-Q6f), and 1 disagreement on ID matching (Blank Vs yes). The detail about the reasons for transfusion (Q8a) varied in 6 cases but only enough in 1 case to influence our later grading of this information. There were open-ended comments written on 30 forms; of these the detail was missing on the computer for 4 cases and there was slight variation in the detail given for 4 cases.