7. INCORRECT BLOOD COMPONENT TRANSFUSED

Definition.
This section describes all reported episodes where a patient was transfused with a blood component which did not meet the appropriate requirements or which was intended for another patient.

This category contained the highest number of reports, (110 of 197 new cases, 55.8%). This chapter analyses 114 questionnaires, consisting of 101 new cases, 11 cases included because of the change in report year, and two outstanding from initial reports received in the previous year.

In the fully reported cases, the majority of incidents involved either administration of a blood component intended for another patient (50 of 114, 44%) or laboratory errors (41 of 114, 36%). These incidents usually involved a series of mistakes and inadequate adherence to prevailing hospital documented policies and guidelines.

The data collated from all 114 questionnaires are presented in Appendix 9.

Sex of recipients	
Males	57
Females	67

Age of recipients	
Age range	2 days - 99 years
Median age	62 years

Components Implicated	Number of Cases
Red cells	98
Platelets	15
Fresh frozen plasma	9
Cryoprecipitate	2
*Anti-D immunoglobulin	3

* Adverse events to this plasma product are reported through the MCA yellow card system, but a decision has been taken to include these cases here, as they fall into the category of administration of a blood derivative to the wrong patient.

Table 6
Outcome of 114 incidents fully reported

Outcome	Number of incidents
Died of sequelae of transfusion	1
Died of sequelae of transfusion & underlying condition	1
Died of underlying condition	4
Recovered from complications of intra-vascular haemolysis	16
Survived with ill effects	4
Survived with no ill effects	88

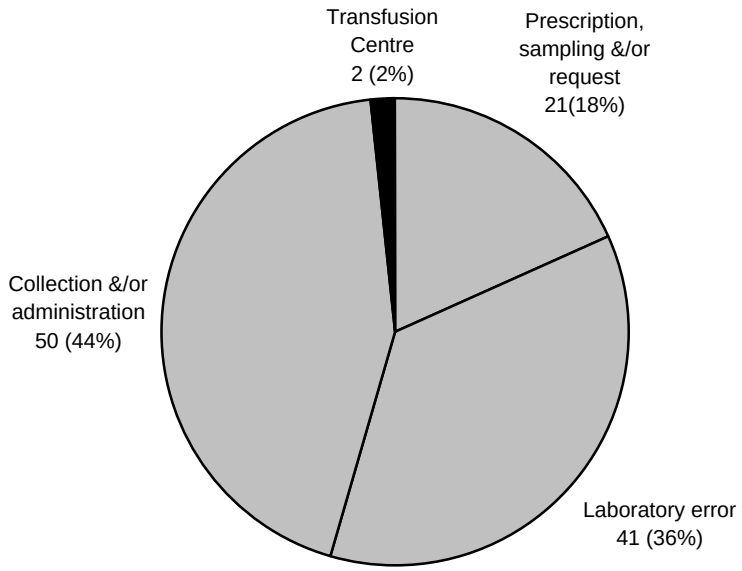
Analysis of reported errors

Where was the error reported to occur?

Errors fell into 4 categories	No. cases 1997-8	No. cases 1996-7
1. Prescription, request of component and/or obtaining the pre-transfusion blood sample	21	18
2. Laboratory errors - grouping, cross-matching or labelling	41	21
3. Collection from storage site and/or administration	50	34
4. Supplying Blood Centre	2	0

Figure 8

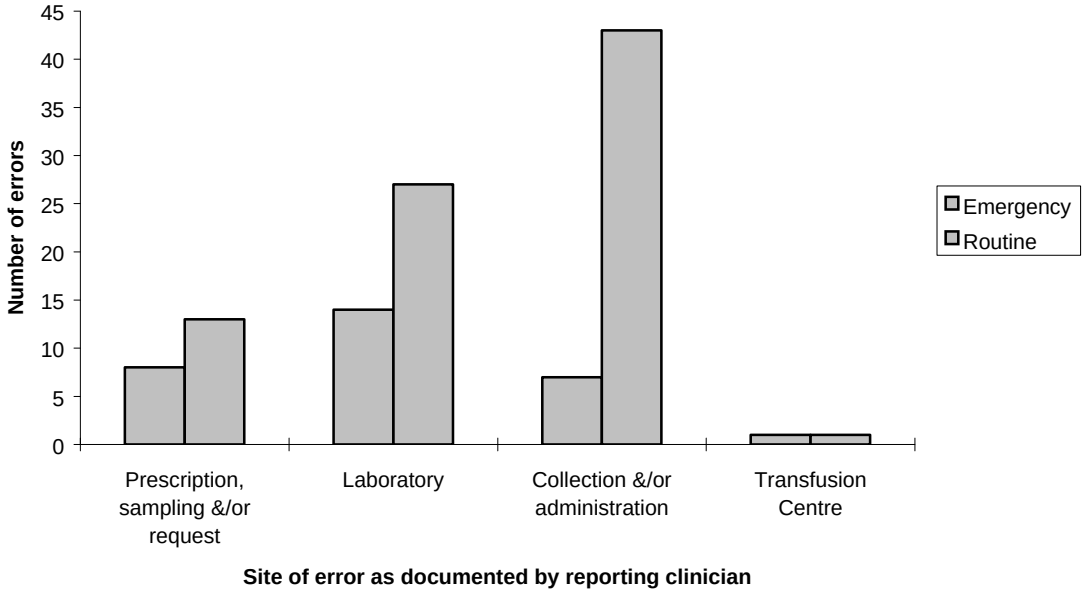
Distribution of errors as stated by the reported clinician



The questionnaire sought further information about the circumstances and the factors that may have contributed to these mistakes and adverse outcomes. The findings are presented in some detail, with the use of case studies where appropriate. The aim is to illustrate weak points in the process which have been identified by the reporting clinicians, in an attempt to help those responsible for training staff, or for the review and implementation of transfusion procedures, in order to identify areas for improvement.

Of the 114 complete reports, 84 errors related to routine non-emergency requests and 30 to emergency requests. Figure 9 shows the distribution of errors in routine and emergency transfusions.

Figure 9
Incidence of errors in the various stages of the process of emergency and routine transfusion.



Multiple errors contribute to many "wrong blood" incidents

Clinicians reported the particular error that had been recognised as the cause of the incorrect transfusion. However, closer analysis of the questionnaires revealed that in 31 (27%) of incidents the mistake had been preceded by other errors, such that in the 114 incidents fully reported a total of 159 procedural failures or omissions were identified.

Figure 10
Total number of errors per case (total cases =114; total errors = 159)

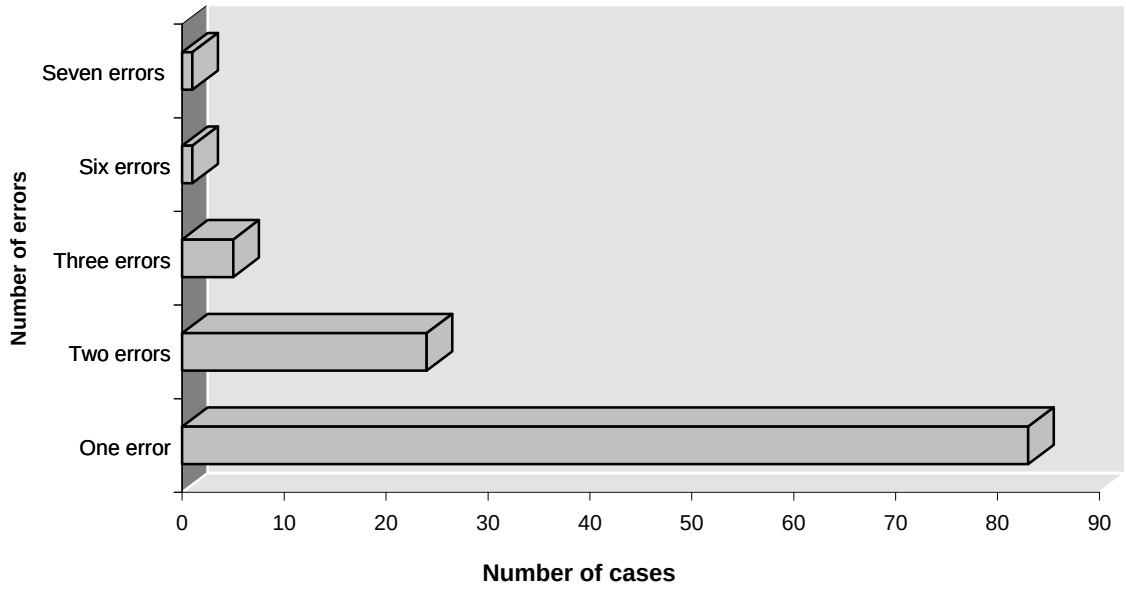


Table 7 illustrates the site of the initial procedural failure that was identified from analysis of the reports (column A), against the documented site of error as reported by the clinician (column B).

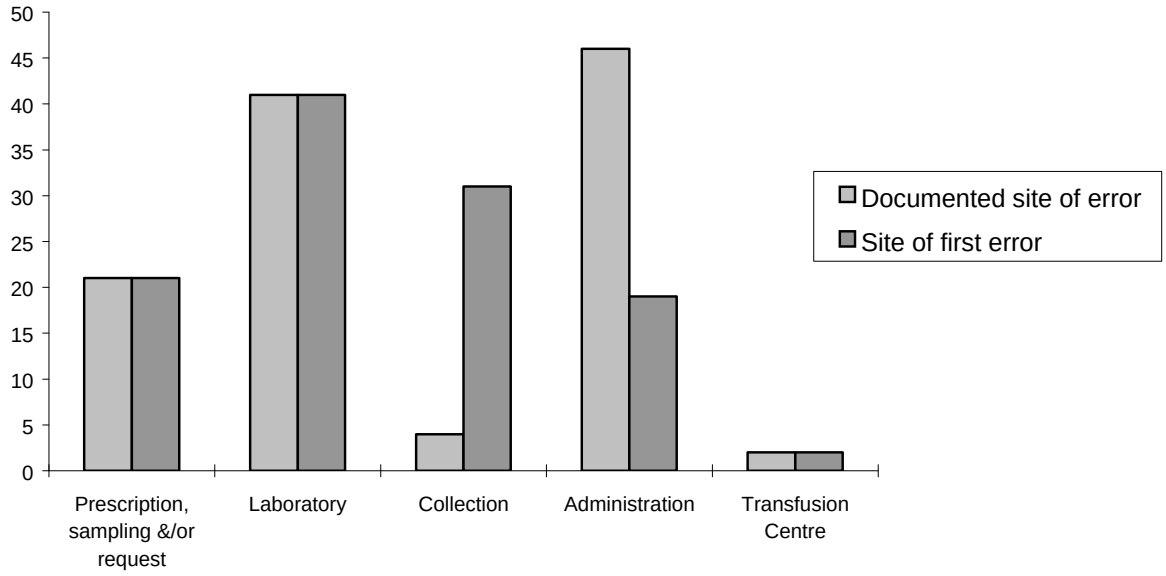
Table 7
Site of first error versus site of reported error (n=114)

Location	A Site of first error	B Documented site of error
Prescription, sampling and request		
1. Prescription of inappropriate &/or incompatible product by medical staff	3	3
2. Details on request form incorrect	7	7
3. Details on sample incorrect	8	8
4. Selection of incompatible products in emergency situations	3	3
Total	**21**	**21**
Blood bank laboratory		
1. Transposition of samples in laboratory	7	7
2. Historical group not checked	2	2
3. Blood incorrectly grouped	16	16
4. Blood incorrectly grouped & crossmatched	1	1
5. Component incorrectly labelled	7	7
6. Inappropriate component selected/issued	7	7
7. Clerical error	1	1
Total	**41**	**41**
Collection of component from hospital blood bank or other storage site		
1. Formal check for identity with patient omitted	15	1
2. Incorrect component collected	16	3
Total	**31**	**4**
Administration of product		
1. Component checked remote from the patient (eg at nurses station)	9	9
2. Misidentity of patient at time of administration	9	36
3. Formal identity check of product against patient omitted	1	1
Total	**19**	**46**
Transfusion Centre		
1. Unit of blood with haematocrit below specification	1	1
2. Unit of red cells wrongly genotyped	1	1
Total	**2**	**2**

In most hospitals the identity check of the component against the patient at the bedside is considered the final point in the checking procedure. Collection of an incorrect component was not identified as the key site of error by most reporting clinicians, as the onus of a correct component being transfused lies with the final bedside checking procedure. The questionnaire has been modified from 1st October 1998 to enable reporters to identify the site of first and subsequent errors.

Figure 11

Site of documented error which was recognised by the clinical team and reported to SHOT compared with site of first error.



The following analysis of 114 reports of wrong transfusions demonstrates a situation common to complex, multi-step processes, which involve many different individuals and which cross professional and managerial boundaries. Delivery of a reliable outcome constitutes a total quality management challenge, with the goal of ensuring that each person involved 'gets it right, first time, every time'.

1. Errors in prescription, requesting of blood, or patient sampling

Prescription errors

There were three cases where a clinician prescribed an inappropriate product. Two cases involved consultant anaesthetists selecting the wrong group of fresh frozen plasma from a theatre freezer due to incorrect serological reasoning (B RhD positive patient given O RhD positive FFP, and A RhD positive patient given O RhD positive FFP). In the third case a doctor knowingly took CMV seropositive platelets issued for one patient to use in an emergency on another patient who required CMV seronegative components. This in itself did not constitute an error, but the platelets were taken without any documentation or explanation to Blood Bank, contrary to the hospital's documented policies.

The request and supply of special components

There were 7 reports in which the correct component was not requested and/or issued. Four incidents involved the transfusion of non-irradiated components where irradiation was required. Two other cases occurred where CMV seronegative components were appropriate but untested components were provided. All of these errors occurred due to inadequate information being put on the request form, or poor communication between different specialities.

One patient was receiving fludarabine and therefore at risk of TA-GVHD. In another case the patient was awaiting autologous peripheral blood stem cell (PBSC) harvest. The PBSC harvest was performed after transfusion of the non-irradiated platelets, and when the error was discovered the procedure had be repeated.

One telephone request error was documented involving a request from theatre. The name and hospital number of the previous patient in theatre was given to the blood bank, resulting in an incorrect unit of FFP being issued and transfused.

Errors in sampling

There were 8 incidents where the sample for crossmatch had been taken from another patient. In 7 of these cases the patient had not been grouped previously, and in 1 case the patient had a previous transfusion history (Case Study 1). In 7 of the incidents it was not documented whether the sample tube had been pre-labelled, although this question was in the questionnaire. In one case pre-labelled tubes were used (Case Study 2).

Case Study 1: a double error which removed a safety net.

Patient A required a routine group and crossmatch for elective surgery. The doctor took a sample from patient A and labelled the sample tube with patient B's details. Patient B had been grouped previously and a historical group was sought in the laboratory using manual records. However, his previous transfusion history was not available in the current file and this was not pursued further. This resulted in a group O RhD positive patient being transfused 50 mls of group A RhD negative red cells before an acute transfusion reaction alerted staff to the error. The patient survived with no ill effects.

Case study 2: Two incompatible transfusions due to multiple errors

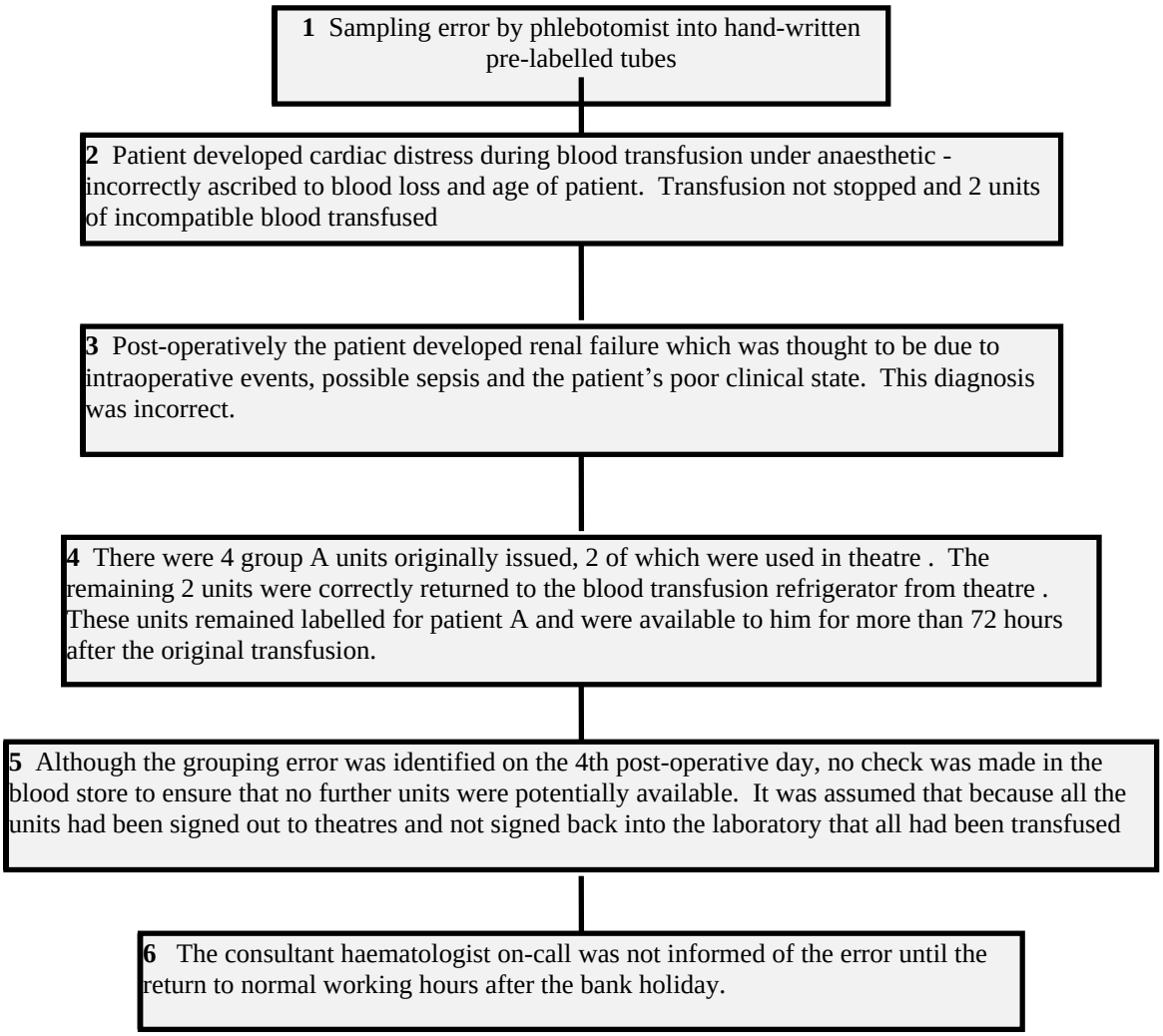
Patient A required routine group and crossmatch for elective surgery. The sample was taken by a phlebotomist into a pre-labelled hand-written tube with details of patient B (error 1). Patient A was bled and the sample put into patient B's tube, and vice versa. Neither patient had been grouped before. Patient A typed as blood group A RhD positive, and 4 units of group A RhD positive blood were crossmatched.

Patient A had his operation the following day. During the operation 2 units of blood were administered to replace intraoperative blood loss, and the patient was noted to have developed tachycardia, atrial fibrillation and moderate hypotension. This was ascribed to his age and relatively poor clinical status (error 2). On days 2, 3 and 4 post-operatively, patient A was unwell because of intermittent atrial fibrillation, the development of renal failure and mild jaundice. These changes were again ascribed to his surgery (error 3). On the 4th day post-operatively it was noted that he was anaemic with a haemoglobin of 7.6g/dL and another blood transfusion was ordered. The house surgeon re-bled the patient and sent a fresh crossmatch sample to the laboratory. The second sample was grouped as group O RhD positive and the transfusion IT system warned laboratory staff of an apparently discrepant result.

The house surgeon was contacted and sent a further sample which once again grouped as O RhD positive. Later that day a blood transfusion was set up. Half an hour into the transfusion the patient had a rigor. The transfusion was stopped and the house surgeon informed. The house surgeon noted that the blood was group A RhD positive, immediately disconnected the transfusion, and informed the transfusion laboratory. It was realised at this point that the previously issued group A RhD positive blood had not been removed from the blood bank (ie had been available to the patient for more than 72 hours after the original transfusion errors 4 & 5) and that this had been administered for a second time to the patient. It was recommended by the laboratory staff that the transfusion was continued with group O RhD positive blood which was administered without further evidence of reaction.

In conclusion, patient A received 3 units of incompatible blood. As a result of intravascular and extravascular haemolysis, he developed acute renal failure and cardiac problems which delayed his post-operative recovery. A further surprising aspect of this case was the delay in informing the responsible consultant haematologist of the error.

Flow chart of errors - Case-Study 2



2. Blood bank laboratory

Laboratory staff

Laboratory errors were not restricted to either inexperienced staff or to on call situations. Of the 41 laboratory errors reported (Figure 12), 25 incidents occurred during routine working hours. Twenty of these involved an experienced blood bank state registered MLSO and 1 an unsupervised MLA. Sixteen incidents occurred on-call, of which 7 involved regular blood bank staff, with the remaining 9 staff not regularly working in the blood bank.

Figure 12

Circumstances under which laboratory errors occur

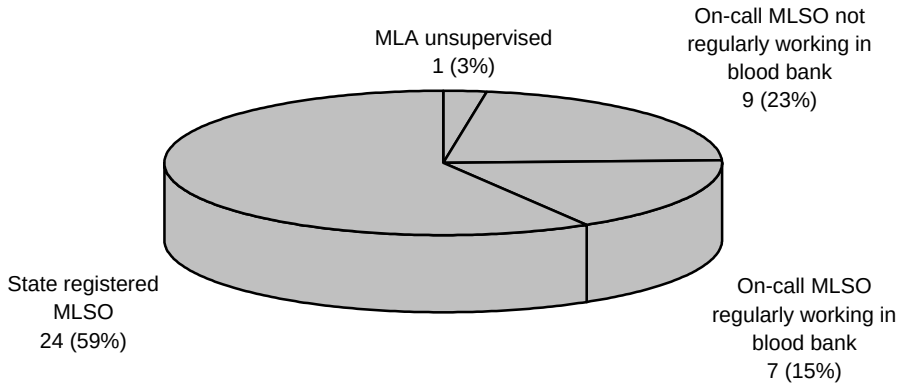


Table 8 details the grade of staff, type of error and whether the incident occurred during routine or on-call hours.

Table 8

Documented laboratory errors (n= 41)

Error	Total number of errors	State Registered MLSO routine hours regularly working in blood bank	State Registered MLSO on-call regularly working in blood bank	State Registered MLSO on-call not regularly working in blood bank	MLA unsupervised routine hours
A. Blood incorrectly grouped	**25**	14	5	6	
B. Blood incorrectly crossmatched	**1**		1		
C. Component incorrectly labelled	**7**	6	1		
D. Clerical error	**1**				1
E. Inappropriate component selected	**7**	4		3	
Totals	**41**	**24**	**7**	**9**	**1**

NOTES

A&B. Group and crossmatch errors (n=26)

- 7 errors were due to transposition of samples in the laboratory, 1 case resulting in the patients death.
- 16 errors in the performance of serological procedures, of which 1 was stated to be due to an exhausted MLSO at the end of a 24 hour on-call period.
- 1 instance of cross-matching error.
- In 2 cases the historical grouping record was not checked, which would have alerted the laboratory staff to the patient's antibody status.

Case study 3: errors in grouping and cross-matching

This was an obstetric emergency. The patient had been previously grouped as O RhD positive, the computer was in down time and therefore the historical group could not be checked (error 1). The patient was regrouped incorrectly as A RhD positive (error 2) and an immediate spin crossmatch failed to detect any incompatibility (error 3). Group A RhD positive units were issued and the Medical Laboratory Scientific Officer (MLSO) proceeded with a full crossmatch which revealed that the units issued were incompatible.

The labour ward was informed, by phone, to stop the transfusion immediately as the units issued were A RhD positive and the patient O RhD positive. There was a delay in the labour ward implementing the urgent message from the MLSO (error 4), by which time over 2 units had been transfused.

The patient was bleeding profusely, shocked and with disseminated intravascular coagulation. She required an emergency hysterectomy and 2 further laparotomies for control of bleeding. Under the circumstances the reporting clinician was unable to determine the contribution of the incompatible transfusion to the clinical picture.

C. Component incorrectly labelled (n=7)

- 2 errors - Red cells should have been irradiated, but although this was not performed, the laboratory paperwork indicated that it had been
- 1 error - label did not correspond with the unit number or the compatibility form
- 1 error - incompatible unit labelled and issued as compatible
- 1 error - laboratory label wrong with respect to donation number
- 1 error - 2 sample labels transposed in the laboratory, resulting in an RhD positive woman receiving anti- D immunoglobulin.
- 1 error- transposition of patient-specific compatibility labels

D. Clerical error (n=1)

- This related to a telephone request for FFP on a known patient who had been previously grouped and crossmatched (B RhD positive). The patient's historical record was checked, but the patient was misidentified as another due to the entry of an incorrect date of birth onto the computer. This culminated in the patient receiving a unit of A RhD positive FFP. The patient survived with no ill effects.

E. Inappropriate component selected/ issued (n=7)

- 1 error - inappropriate selection of component for patient with known antibodies
- 1 error - patient should have received leucocyte depleted blood, which was not issued
- 2 errors - where patients should have received irradiated products; in one case this was not communicated by the referring hospital
- 1 error - higher dose than required of anti D immunoglobulin was issued and given (2,500iu instead of 500iu)

- 1 error - Rh D positive platelets issued in error to an Rh D negative patient.

- 1 error - Patient grouped as B RhD negative. This group was not available and as red cells were required urgently, group O RhD negative red cells were issued. These stocks were then depleted so group O RhD positive red cells were issued. Then group O RhD positive fresh frozen plasma was issued and given in error.

3. Errors in withdrawal of blood components from storage location immediately prior to transfusion

As in the first report, withdrawal of an incorrect component from the storage location continues to be a substantial source of primary error, with 31 reported incidents.

In 2 cases the wrong component was handed over personally from blood bank staff to a porter, in 14 cases the wrong component was collected from a blood bank refrigerator and in 15 cases from a satellite refrigerator.

In 14 of these incidents the component was not checked for identity with the patient when it was taken from the refrigerator, and on 6 occasions a formal check had been performed but an incorrect component was still taken. In 11 cases, the collection details were not given.

In all these cases it appeared that the grade of staff checking the component did not influence whether a formal check was performed, nor whether the correct component was collected (Table 9). In 21 cases the component collected was incorrect with respect to name, date of birth and hospital number; in 5 cases it was incorrect with respect to date of birth and hospital number; in 1 case incorrect with respect to name and hospital number and in 1 case incorrect with respect to date of birth only. In 2 cases the completely incorrect type of component was collected.

Table 9
Formal check of component at the time of collection versus correct component collected: grades of staff involved (n=114)

Grade of staff	Formal identity check			Correct pack for patient		
	Yes	**No**	**Unknown**	**Yes**	**No**	**Unknown**
Qualified Nurse	19	5	17	33	8	
Unqualified Nurse	2	1	3	5	1	
Porter	19	11	13	30	13	
Theatre Staff	2		5	2	5	
*Other	3	2	1	3	3	
Unknown	2	1	8	9	1	1
Totals	**47**	**20**	**47**	**82**	**31**	**1**

* Other	Health care assistant	3
	Support worker	1
	Sent in taxi to SCBU	1
	Hospice driver	1

4. Administration of blood components - 'bedside' procedures

There were 50 reported cases where the final bedside check did not detect non-identity of the unit and patient. In most of these cases, two people were reported to have been involved in setting up and checking the transfusion. Table 10 shows the grade of staff setting up the transfusion in these cases.

Table 10
Grades of staff involved in setting up transfusions in which the bedside check was incomplete (n=50)*

Grade of staff	Number of cases
2 Doctors	2
Doctor & qualified nurse	2
Midwife only	1
Qualified nurse & qualified nurse	34
Qualified nurse & unqualified nurse	3
Qualified nurse & unknown	4
Doctor & unknown	2

*excludes 2 cases where the grade of staff was not reported

One explanation regularly stated for 'misidentity of patient at time of administration' (10 cases) was the practice of checking one or more component(s) remote from the patient, leading to transposition of components and compounded by omission of a final identity check at the bedside.

Case study 4 – the dangers of checking units away from the bedside

This incident occurred during a period of nursing night duty. Three patients were having blood transfusions on the same ward. One was in progress, while the other 2 patients were waiting for red blood cells to arrive from the blood bank. The red cells arrived for patient A. The senior state registered enrolled nurse (SREN) checked the component against patient A's notes, with the night sister at the nurses' station (error 1).

The night sister was bleeped by another ward and left the SREN to put up the transfusion (error 2, this hospital's nursing policy states 2 qualified nurses are required to put up and check a transfusion). The final patient identity check was not performed at the bedside resulting in patient A, (blood group O RhD positive), receiving group A RhD positive red blood cells (error 3).

When the SREN realised her error, she contacted the on-call locum and bleeped the night sister. When the locum arrived on the ward, he advised the nursing staff not to notify the on-call haematologist (error 4). Patient A received no investigations appropriate to an ABO incompatible transfusion (error 5). The on-call locum explained that '50mls of blood would not do any harm'(error 6). He then spigoted off the unit that had been partially given in error to patient A and reconnected it to patient B, the intended patient (error 7). Both patients survived with no ill effects.

Case Study 5 – fatal case of non-identity missed by bedside checking

In one case a health care assistant collected an incorrect component with respect to name, date of birth and hospital number, from a satellite refrigerator. The formal identity check at the bedside was not adequately performed resulting in a group O RhD positive patient receiving 2 units of group A RhD negative red cells.

The patient developed a fever, haemoglobinuria hypotension and cardiac problems which culminated in his admission to the intensive care unit. The patient died as a result of this incompatible transfusion.

Use of identity wristbands

In 12 incidents where an incorrect component was transfused, the patient had no identity wristband. Five cases occurred on the ward, 1 in theatre, 4 in out-patients and 2 in the accident and emergency department. In 2 cases group O Rh D positive patients received group A Rh D positive red cells and suffered the complications of intravascular haemolysis.

5. Transfusion centre errors

There were 2 documented transfusion centre errors.

- One was where a red cell unit was typed as Ss retrospectively, having been issued as homozygous. The transfusion centre notified the hospital blood bank by phone, by which time the unit had been transfused. The patient survived with no ill effects.

- The second case involved an exchange transfusion for neonatal jaundice. The laboratory staff noticed a falling MCV from 86 to 66 post exchange. This led to a discussion with the transfusion centre. The donor was recalled and found to have severe iron deficiency anaemia, with a haemoglobin of 7g/dL 1 week post donation. This donor should not have passed the copper sulphate donor screening test for anaemia. There were no adverse sequelae in the patient.

How was the error first recognised?

Of the 114 cases of an incorrect component transfused

- 11 were identified due to an acute transfusion reaction. Five of these were ABO incompatible transfusions (red cells); 3 ABO and RhD incompatible (red cells); in 2 cases the units were incompatible due to patient antibodies:- an O RhD positive Jk (a-b+) patient transfused O RhD positive Jka positive red cells, and an A RhD positive patient with anti-E transfused A RhD positive E positive red cells. In 1 case the blood groups were not stated.
- 38 incidents were detected by the ward staff.
- 51 incidents were detected by laboratory staff. One of these involved failure to detect anti Fy^a in a previously transfused patient admitted as an emergency with haematemesis. A Fy^a positive, and therefore incompatible, unit was supplied. Despite an acute reaction (hypotension and fever) the transfusion was continued and the patient went on to develop evidence of delayed haemolysis. Retrospective crossmatch easily detected the anti Fy^a and hence the cause of the delayed reaction.
- 7 errors were detected by theatre staff.
- 6 errors were identified by the patient or the patient's relative.
- 1 error was noted by the Transfusion Centre.

Where transfusion of the incorrect component was not associated with a reaction the error was detected in a variety of ways, for example:

- A patient, who had regular transfusions for a non-malignant haematological disorder as an out-patient, stated in clinic 2 months post transfusion, that he had been given a unit of group A RhD positive blood and that he felt this may have accounted for his symptoms, and for his admission to the Intensive Therapy Unit (Table 12, Case 52). The patient was group O RhD positive and in retrospect had probably suffered the complications of intravascular haemolysis due to this error.

- Two units of red cells were checked remotely from each of two patients and then transposed. An acute reaction in one of the patients alerted ward staff to their error and the transfusion was stopped on the second patient. The red cells and patients implicated were group O RhD positive and group B RhD negative; this error therefore exposed 1 patient to the risks of an ABO incompatible transfusion and the other to the risks of RhD sensitisation.
- In 1 case, when the patient required a second transfusion 4 days post-operatively the second grouping was different from the original group (Case Study 2).

Outcome

Of the 114 cases fully investigated, there were 41 ABO incompatible transfusions, 16 Rh incompatible transfusions, 5 ABO + Rh incompatible transfusions and 1 incompatible transfusion due to a missed anti Fya antibody (Tables 11 and 12) plus 6 instances where the blood groups of patient and/or unit was not stated.

- 1 patient died as a result of the transfusion. This was an O RhD positive patient who received 2 units of A positive red cells and required intensive care admission with cardiac problems (Case Study 5).

- 1 patient died as a result of an ABO incompatible transfusion combined with his underlying condition. The patient was group O RhD positive and received 4 units of A RhD positive red cells. The patient was admitted as an emergency with gastro-intestinal bleeding. He developed rigors, hypotension, renal failure and coagulopathy which combined with his underlying condition necessitated admission to the intensive care unit.

- 16 patients recovered fully or partially from the effects of intravascular haemolysis. Fourteen of these were ABO incompatible transfusions, 1 was due to an undetected Fy^a antibody at crossmatch, and 1 to an ABO and Rh incompatible transfusion.
  One of these patients, who recovered from intravascular haemolysis, required both ITU admission and dialysis and was discharged with renal failure. This was an 95-year old lady who had been admitted for a total hip replacement. The incorrect transfusion resulted in her no longer being able to live independently.
  Another patient who suffered the complications of intravascular haemolysis, had not been prescribed a transfusion. This patient was confused with a reduced conscious level at the time of the unintended and mismatched transfusion (O RhD positive patient given group A RhD negative red cells).

- Of the 16 patients receiving RhD incompatible transfusions, 3 were females aged 27 years, 5 years and 10 months respectively. It was not known at the time of reporting if these females had developed anti-D.

- There were 6 reports where the blood group was stated as unknown. In 1 of these the patient suffered from rigors and haemoglobinuria after only 50-100mls of red cells, and it is assumed that this transfusion was ABO incompatible. It is noteworthy that no investigations appear to have been performed on this case.

- Four patients were recorded as having died of their underlying condition. In one of these neither the blood group of the patient nor the incorrect component were stated. In another, the patient was paralysed and ventilated in the intensive care unit at the time of the incorrect transfusion (an ABO incompatible transfusion of 2 units of red cells due to laboratory grouping error).

Table 11

Sequelae of incorrect component transfused according to whether there was ABO and/or Rhesus incompatibility (n=108)* For further details please refer to Table 12.

Sequelae	Asymptomatic	Minor reaction	Major morbidity	Death
ABO incompatible	22	2	15	2
Rh incompatible	13	0	3	0
ABO + Rh incompatible	3	1	1	0
ABO + Rh compatible	45	0	1**	0
Totals	**83**	**3**	**20**	**2**

- excludes 6 cases where the blood group was not stated
- ** Fy^a incompatible

Major morbidity was classified as the presence of one or more of the following, attributed to the transfusion:

- Intensive care admission and/or ventilation
- Dialysis and/or renal dysfunction
- Major haemorrhage
- Jaundice including intravascular haemolysis
- Potential risk of RhD sensitisation in a female of child-bearing age (or child)

Minor reaction: The patient suffered symptoms/complications attributed to the transfusion but these did not require ITU admission or dialysis and the patient recovered rapidly.

Asymptomatic: No symptoms were directly attributed to the transfusion. Death due to the underlying condition or from other causes are included in this category (n=5)

Table 12
Sequelae of ABO and/or Rhesus incompatible transfusions, and an incompatible transfusion due to undetected Fy[a] antibody (n=63)

Patient ABO & Rh group	IBCT ABO & Rh group	Blood component	Volume IBT transfused	Symptoms/ complications	ITU ventilation &/or dialysis	Outcome
1. A neg	A pos	platelets - apheresis	1unit	potential Rh sensitisation female 27 years	none	survived with potential long term effects
2. B pos	A pos	FFP	1 unit	none	none	no ill effects
3. O pos	B pos	red cells	<50mls	none	none	no ill effects
4. A neg	O pos	red cells	3 units	none	none	no ill effects
5. A pos	AB pos	red cells	3 units	none	none	no ill effects
6. B pos	O pos	FFP	2 units	none	none	no ill effects
7. A pos	O pos	FFP	>100mls	haematological changes/ coagulopathy	already on ITU	no ill effects
8. O pos	A pos	red cells	50-100mls	loin pain hypotension haematological changes/ coagulopathy	none	intravascular haemolysis; recovered
9. O neg	O pos	red cells	1 unit	possible Rh sensitisation female child 5 years	none	survived with potential long term effects
10. A neg	A pos	red cells	50-100mls	none	none	no ill effects
11. O neg	AB pos	red cells	<50mls	fever	none	no ill effects
12. O neg	O pos	red cells	9 units	developed anti D male, 71 years	none	no ill effects
13. A pos	B neg	red cells	50-100mls	none	none	no ill effects
14. O neg	O pos	red cells	1 unit	none	none	no ill effects
15. O neg	A pos	red cells	2units	none	none	no ill effects
16. O pos	A pos	red cells	3 units	difficult to ascertain if any of the complications were due to the incorrect transfusion - patient shocked and bleeding profusely (case study 3)	ITU admission	intravascular haemolysis; recovered
17. O pos	A pos	red cells	<50 mls	none	none	no ill effects
18. AB pos	O pos	FFP	2 units	none	none	no ill effects
19. A pos	B pos	red cells	<50mls	fever hypotension	none	intravascular haemolysis; recovered
20. A pos strong Fya antibody	A pos	red cells unselected	2 units	fever hypotension post transfusion fall in Hb jaundice	already on ITU	intravascular haemolysis; recovered

Patient ABO & Rh group	IBCT ABO & Rh group	Blood component	Volume IBT transfused	Symptoms/ complications	ITU ventilation &/or dialysis	Outcome
21. O pos	A pos	red cells	<50mls	bronchospasm hypotension rigors fever	none	intravascular haemolysis; recovered
22. B pos	A pos	red cells	3 units	none	none	no ill effects
23. O neg	O pos	red cells	<50mls	none	none	died of underlying condition
24. A pos	B pos	red cells	2 units	difficult to ascertain if any of the complications were due to the incorrect transfusion - patient shocked and bleeding profusely	already on ITU	died of underlying condition
25. B neg	O pos	FFP	4 units	unknown	unknown	no ill effects
26. A neg	O pos	platelets - apheresis red cell pedipack	2 units 1 unit	possible Rh sensitisation female infant 10 months	unknown	survived with potential long term effects
27. O pos	A pos	red cells	1 unit	haemoglobinuria haematological changes/ coagulopathy	none	intravascular haemolysis; recovered
28. O pos	A pos	red cells	4 units	rigors hypotension haemoglobinuria haematological changes renal failure	ITU admission	died due to incompatible transfusion and underlying condition
29. O pos	A pos	red cells	<50mls	none	none	no ill effects
30. A neg	A pos	red cells	1 unit	none	none	no ill effects
31. O neg	O pos	red cells	2 units	none	already on ITU	no ill effects
32. O pos	B pos	red cells	<50mls	none	none	no ill effects
33. O pos	B pos	red cells	1 unit	none	none	no ill effects
34. O pos	A pos	red cells	<50mls	none	none	no ill effects
35. O pos	A neg	red cells	>100mls	hypotension haemoglobinuria haematological changes/ coagulopathy renal failure	none	intravascular haemolysis; recovered
36. O pos	A pos	red cells	2 units	haemoglobinuria	already on ITU	intravascular haemolysis; recovered
37. O pos	A pos	red cells	<50mls	none	none	no ill effects

Patient ABO & Rh group	IBCT ABO & Rh group	Blood component	Volume IBT transfused	Symptoms/ complications	ITU ventilation &/or dialysis	Outcome
38. O pos	A pos	red cells	>100mls	haemoglobinuria hypotension loin pain rigors fever haematological changes/ coagulopathy	none	intravascular haemolysis; recovered
39. O pos	A pos	red cells	2 units	hypotension atrial fibrillation cardiac problems renal failure electrolyte imbalance	none	intravascular haemolysis; recovered
40. B pos	O pos	FFP	>100mls	none	already on ITU	no ill effects
41. B pos	O pos	FFP	1 unit	none	none	no ill effects
42. A neg	A pos	red cells	1 unit	none	none	no ill effects
43. O pos	A pos	red cells	1unit	haemoglobinuria electrolyte imbalance fever haemoglobin-aemia hyper-bilirubinaemia	none	intravascular haemolysis; recovered
44. O pos	A pos	red cells	2 units	none	none	no ill effects
45. B neg	O pos	red cells	<50mls	none	none	no ill effects
46. O pos	B neg	red cells	<50mls	rigors fever	none	no ill effects
47. B neg	A pos	red cells	<50mls	fever rigors loin pain	none	intravascular haemolysis; recovered
48. O pos	A pos	red cells	1 unit	dark urine rigors haemoglobinuria ventilatory problems	none	intravascular haemolysis; recovered
49. O neg	O pos	red cells	2 units	none	none	no ill effects
50. A neg	A pos	red cells	2 units	none	none	no ill effects
51. O pos	A pos	red cells	3 units	poor increment in Hb post transfusion hyper-bilirubinaemia	none	no ill effects

Patient ABO & Rh group	IBCT ABO & Rh group	Blood component	Volume IBT transfused	Symptoms/ complications	ITU ventilation &/or dialysis	Outcome
52. O pos	A pos	red cells	1 unit	hypotension bronchospasm haemoglobin-uria fever, rigors, cardiac & ventilatory problems	ITU admission	intravascular haemolysis; recovered
53. O pos	A pos	red cells	2 units	fever haemoglobinuria hypotension cardiac problems	ITU admission	died of sequelae of transfusion
54. A neg	A pos	red cells	<50mls	none	none	no ill effects
55. A pos	O neg	FFP	1 unit	none	none	no ill effects
56. O pos	A neg	red cells	<50mls	none	none	no ill effects
57. O pos	A neg	red cells	>50mls	none	none	no ill effects
58. A neg	O pos	red cells	1 unit	none	none	no ill effects
59. AB neg	B pos	red cells	2 units	none	none	no ill effects
60. O pos	A pos	red cells	2 units	rigors fever	none	intravascular haemolysis, recovered
61. B neg	A neg	red cells	2 units	hypotension fever cardiac problems renal failure	ITU admission dialysis	intravascular haemolysis; recovered
62. A pos	B pos	red cells	1 unit	none	none	no ill effects
63. A pos	B pos	platelets, pooled	<50mls	none	none	no ill effects

PROCEDURAL REVIEW

Because of the anonymous nature of reporting, it has not been possible to analyse this data by number of hospitals. However, of 114 incidents analysed, 50 questionnaires stated that as a result of review of the incident locally, changes had been made. The commonest (30 cases) was review of or modification to existing procedures, with, in some cases, changes to written guidelines, protocols or standard operating procedures. Ten reports stated that there would be additional training for staff, and 7 said that entirely new systems (both manual and computerised) had been or would be introduced. Two incidents gave rise to a request for more staff, and one incident resulted in the suspension of a staff member.

Twenty nine incidents had been reviewed by the Hospital Transfusion Committee, and a further 56 such reviews were pending. For the remaining 29 hospitals, no local transfusion committee existed.

SUMMARY OF FINDINGS

1. Three prescription errors were reported, 2 of which were due to incorrect serological reasoning by consultant anaesthetists.

2. Seven request errors were noted, 6 involved the request and supply of 'special components', 1 involved a telephone request where incorrect information was given.

3. There were 8 cases where the crossmatch sample was taken from the wrong patient resulting in major morbidity in 1 patient. This incident involved the use of hand-written pre-labelled sample tubes (Case Study 2).

4. The historical transfusion record was not always checked prior to component issue (Case Study 1).

5. Errors in grouping, crossmatching, labelling and selection of a component were reported. Seven of the grouping errors were due to transposition of samples in the laboratory; one incident resulted in the patient's death.

6. The withdrawal of the wrong pack from its storage location, usually the hospital blood bank, continues to be an important source of primary error, with 31 such incidents reported. The grade of staff collecting a component ranged from qualified nurses to a support worker. In one incident the collection of an incorrect component culminated in the patients death (Case Study 5)

7. **The most important single cause contributing to incorrect transfusions was the lack of a formal identity check of the component with the patient at the bedside. There were 50 such cases, 1 incident resulting in the patient's death. One common explanation stated was the practice of checking one or more component(s) against the paperwork only, remote from the patient, eg at the nurse's station.**

8. Lack of patient hospital identity wristbands or other formal means of identification led to an incorrect component being transfused on 12 occasions. Two of these cases lead to complications of intravascular haemolysis.

9. In 1 reported case a component was given to a patient for whom blood transfusion had not been prescribed at all. The patient was confused with a reduced conscious level at the time of the unscheduled transfusion and suffered complications of intravascular haemolysis.

RECOMMENDATIONS

This year's recommendations are essentially the same as those in the SHOT 1996/97 report.

1. Selection and issue of components for transfusion should only be performed by staff specifically trained in serology.

2. Request systems for blood and components should ensure prescription, issue and administration of the correct component. These should cover 'special requirements' and telephone requests, and should clarify the respective responsibilities of medical and blood bank staff.

3. Pre-labelled sampling tubes should not be used.

4. Access to previous transfusion records in the laboratory containing grouping information should be available at all times and used as appropriate .

5. Blood banks should review procedures and systems including enforcement of the current guidelines and standards available, in addition to training to prevent errors of sample handling and technical errors.

6. Hospitals should review their current system to ensure that errors in the collection of blood from the blood bank can be prevented. Standards should be set for a minimal formal identification requirement when a component is collected. Novel identification systems are available, but have resource implications. However, these systems merit evaluation and development.

7. The bedside check is a vital step in preventing mis-transfusion. Staff should be vigilant in checking identification details of the component against those of the patient. Every hospital should have a policy for formally checking the blood component at the bedside. This is already stated in the Handbook of Transfusion Medicine[9], and is currently being addressed by the British Committee for Standards in Haematology (for the key points of the forthcoming BCSH Guideline on blood handling, see Appendix 8).

8. Hospital systems should ensure that in-patients and out-patients can be identified at the time of both sampling and transfusion, especially in out-patient departments where specific patient identification documents may not be available.

9. Blood components should always be administered against a written prescription.