IBCT EVENTS ORIGINATING IN THE HOSPITAL TRANSFUSION LABORATORY *n* = 149

2009 has seen a total of 149 IBCT cases in which the primary error occurred in the laboratory, which represents 53% of the total 282 IBCT cases. All IBCT cases have been summarised in Table 12 (page 29) and are discussed in more detail below. Laboratory errors resulting in special requirements not met (SRNM, 67 cases) are discussed towards the end of this chapter.

Overall laboratory errors account for 230 of the total 1279 cases included in the 2009 SHOT Report (18% of all reports). This consists of 149 IBCT events, including 67 cases of special requirements not met (see Table 17, below), 38 anti-D related events (see page 81) and 43 handling and storage errors (see page 75).

In 2008 there were 200 cases involving laboratory errors consisting of 132 IBCT events, including 41 cases of special requirements not met, 47 anti-D related events and 21 handling and storage errors. This represented 19% of the total 1040 SHOT reports in 2008.

However, the increase in the overall reporting to SHOT this year (from 1040 to 1279 reports) stands at 23% while the absolute increase in laboratory-based reports, from 200 to 230, is 15%.

Table 17
Summary of Laboratory-related errors *n* = 230

Type of error	Number of cases from this chapter
Wrong blood	**21**
Wrong sample selected	2
ABO grouping error	5
D grouping error	4
Incorrect component selected	9
Incorrect labelling	1
Wrong group selected for SCT patient	**13**
Wrong ABO group selected	7
Wrong D Group selected	2
Procedural errors	4
Other pre-transfusion testing errors	**48**
Testing errors	9
Procedural errors	39
Special requirements not met	**67**
Due to poor serological knowledge/ failure to recognise the special needs of a specific patient group	27
Owing to failure to consult patient records thoroughly	40
SUBTOTAL	**149**
Anti-D related laboratory errors	**38**
Handling and storage related laboratory errors	**43**
TOTAL LABORATORY ERRORS	**230**

Mortality

There were no cases of mortality definitely related to laboratory IBCT events, nor any in which a lab IBCT event probably or possibly contributed to a patient's death.

Morbidity

One patient showed symptoms (severe pain in the back, abdomen, pelvis and legs, nausea, and tingling in the hands and feet) of an ATR during an ABO-incompatible transfusion of group A D negative blood to a group O D positive patient. There were 3 cases of minor morbidity which occurred as a consequence of errors; these are highlighted in the text. Three other minor acute transfusion reactions were reported but were not a consequence of the error that was made.

ABO and D incompatibility

Errors have resulted in 2 ABO-incompatible red cell transfusions: the case highlighted above which gave rise to an AHTR and a second case where group A D negative blood was transfused to a group B D positive patient. There were a further 5 cases where group A red cells were transfused to group A patients who were recipients of group O BMT/SCT and therefore should have received group O red cells. RhD positive red cells have been given to RhD negative individuals in 6 cases: once because RhD positive red cells were selected in error, twice due to D typing errors, and on three occasions D positive components were selected when the BMT/SCT transplant protocol demanded selection of RhD negative components. No adverse sequelae were reported as a result of these ABO and D typing errors other than the acute haemolytic transfusion reaction described.

Wrong Blood Incidents *n* = 21

This year 21 out of the 230 cases (9.1%) of laboratory errors accounted for 'wrong blood' incidents. This is in comparison with 39 out of 200 cases (19.5%) last year.

Four cases involved paediatric patients – a neonate, a 1-month-old baby, a 15-month-old baby and a 17-year-old. In 2 cases the age was not given. All other cases were in adults over 18 years old. Table 18 illustrates the time and circumstances under which these wrong blood incidents took place.

Table 18
Summary representing when incidents occurred

	Out of hours	In core hours	Unknown
Emergency	7	1	0
Routine	5	3	2
Unknown	0	1	2

As reported in previous years, more errors occurred out of hours. The staff involved out of hours included 8 BMSs who normally work in transfusion and 4 who do not.

The 21 errors were:

- Two cases in which blood was grouped and crossmatched for a patient using the wrong sample. In the first case this resulted in group A D negative blood being transfused to an O D positive individual; and in the second case group A D negative blood was transfused to a group B D positive patient. The transfusion was stopped after only 30 mL had been transfused and the patient experienced no adverse reaction.

Case 1

A malfunctioning analyser forced a manual group and crossmatch – and human error

A crossmatch sample was run on the grouping analyser, but the results failed to transmit to the LIMS due to non-identification of the results by the analyser. A manual group and crossmatch was started but the BMS was interrupted and on return to blood transfusion picked up the wrong sample and tested it.

- There were 5 ABO grouping errors, all of which occurred during emergencies. Three cases involved errors in manual, tube groups resulting in 1 group A D positive patient being grouped as O D positive and receiving

multiple group O components; 1 group B D positive patient being grouped as O D positive and receiving group O red cells and FFP; and 1 group O D positive patient being grouped as A D positive but fortuitously only requiring FFP. A further case involved a neonate being grouped manually as O D positive, and subsequently transfused group O D positive components. However, during a validation process the sample was selected at random and analysed using an automated system, and was grouped as AB D positive. This was later confirmed to be correct. The final case involved a 1-month-old baby that was transferred between 2 hospitals. This case is given below because it highlights the importance of good communication both in shared care situations and between 'shifts' in laboratories.

- There were 4 errors in D-typing that resulted in IBCT cases, all occurring during on-call emergency situations and using manual techniques. In no case was the reporter able fully to ascertain what had gone wrong. All the errors were detected during subsequent routine testing. There were 3 female patients (2 > 60 years old, 1 age unknown) and 1 male patient. The errors resulted in RhD negative blood being given to an RhD positive individual in 1 case and RhD positive blood being given to RhD negative patients in 2 cases. In the final case, despite being mistyped as RhD positive, RhD negative blood was selected and transfused to the patient. There were no cases of anti-D being formed at the time of reporting.

  A further 5 D typing errors resulted in anti-D being given unnecessarily; these are reported in the anti-D chapter, see page 81.

- In 9 cases the incorrect component was selected.
  - Two cases involved red cells. One of these cases occurred when 2 units of red cells, received from a reference laboratory for a named patient, were incorrectly issued to another patient of the same blood group. The error was detected by the BMS and the second unit was withdrawn. The patient experienced pyrexia and rigors 12 hours post transfusion but these symptoms were attributed to a septic episode. The other case involved a male patient whose blood group was O D negative being issued 1 unit of group O D Positive red cells in error. The patient had not produced anti-D at the time of reporting.

  - In 4 cases cryoprecipitate was issued when FFP was requested.

  - Three cases involved platelets. In 1 case RhD positive platelets were issued to an RhD negative patient with anti-D. In another case RhD positive platelets were issued to a female of childbearing potential necessitating the issue of anti-D immunoglobulin. In the final case a group A D positive unit was issued to a group O D positive patient; it appears that the wrong group was sent by the BTS and issued by the laboratory. The ward queried the different blood groups and the decision was made, not unreasonably, to transfuse the platelets.

- Only 1 case was reported as a result of incorrect labelling. A laboratory staff member was partway through the labelling procedure when they were called away: on returning they attached the label to the wrong pack. A patient was subsequently transfused platelets which were not HLA matched. Although the error originated in the laboratory, the discrepancy between the laboratory label and the donor number on the pack was not detected by the nurses collecting and transfusing the unit.

Case 2

Effective transfer of data is essential

A baby was transferred to another hospital and subsequently grouped as O D negative. The BMS contacted the first clinical team and was informed that the baby had recently been transfused. However, the second team were desperate for blood and 8 group O D negative paedipaks were issued. There was concern over the blood group so the case was handed over to the morning staff. The transfusion laboratory tried but failed to contact the referring hospital. The problem was not passed on the next day and group O D negative MB-FFP was issued. The patient was later found to be group A D positive, having been transfused with group O D negative blood at the first hospital.

COMMENTARY on wrong blood incidents

The number of laboratory errors contributing to 'wrong blood' events has decreased this year. This number is small, but ABO and D typing errors continue to be a problem when using manual techniques, generally in urgent situations. Consideration should be given to adding a second check if manual groups are to be performed.

Table 19
Trends in laboratory-based ABO grouping errors, with causes

Year	ABO errors	Wrong sample tested	Interpretation/ transcription errors	Other	ABO-incompatible transfusion (all components)	Sequelae
2009	6	2	5	0	4	1 AHTR
2008	8	3	5	0	4	1 AHTR
2007	7	3	4	0	2	No morbidity
2006	6	2	3	1	0	No morbidity
2005	22	9	12	1	9	1 AHTR
2004	18	5	12	1	6	1 death 1 major morbidity
2003	17	8	9	0	7	2 major morbidity

The trend shows a decrease in the number of reports over time, despite an overall increase in reporting to SHOT – this is a positive finding, and may be seen as a sign of improvement.

Table 20
Trends in laboratory-based D grouping errors, resulting in IBCT, with causes

Year	D errors	Wrong sample tested	Interpretation/ transcription errors	Tx of D+ to D- individual	Other	Sequelae
2009	5	1	4	2	0	No morbidity
2008	11	0	11	10	0	3 patients formed anti-D but none were of childbearing potential
2007	4	1	3	3 (I x 33-yr-old female)	0	No morbidity

Errors in component selection continue to occur, with 4 more cases of cryoprecipitate being issued when FFP was required. Laboratories should ensure clear separation of components which look similar and the LIMS should support prevention of this type of error.

In 8 cases it was believed that the final bedside check could have picked up these primary laboratory errors and prevented mistransfusion.

Learning points

- Where feasible all samples tested by manual methods should be tested using an automated system as soon as possible. Consideration should be given to:
    - adding a second check if manual groups are performed;
    - reassessing the use/availability of automation/IT to add security to manual methods, e.g. automated readers.
- A full RCA should be performed on all errors that led to a SHOT reportable incident and appropriate CAPA instigated.

The following learning points from previous SHOT reports remain pertinent:

- Training and competency-assessment in the laboratory must cover basic manual checking procedures to ensure that these are second nature at a time when automation and computerisation will have lessened experience and practice in these basic skills.
- When new components are introduced, training must be given to all staff to allow thorough familiarisation with the component appearance, label and specification.
- NHSBT should review the packaging of components that look similar, to assess whether they could be more easily identified, particularly when those components are often used in emergency situations.
- The IT system should be configured to flag a component discrepancy between that ordered and that issued, and this should be fully validated. If this is not possible locally then these development requirements must be raised with LIMS suppliers.

Wrong ABO or D type blood components issued for SCT/BMT recipients *n* = 13

All cases were routine transfusions: 1 case was in a 13-year-old patient and all the rest were in adults. Eleven of the cases occurred during normal working hours and 2 were outside normal working hours.

In previous years only errors in selection of ABO and RhD type have been seen for this group of patients. However, this year other errors have occurred necessitating a new subcategory, 'procedural errors'. Five procedural errors occurred this year: 2 cases in which BMSs failed to perform antibody screening prior to transfusion and 3 cases where information regarding the transplant had not been entered clearly or completely into the LIMS. The latter 3 errors resulted in 1 case in which a patient who had an ABO mismatched BMT had blood issued using electronic issue rather than a serological crossmatch, 1 case where red cells of the incorrect RhD group were selected and 1 case where blood of the wrong ABO group was selected.

In total, 7 out of the 13 cases resulted in the issue of components (5 red cells and 2 platelets) of the wrong ABO group. Six of these cases were a result of the BMS's failure to notice or heed warning flags or to read notes belonging to the patient.

In the final 2 cases RhD positive components were selected when the transplant protocol demanded selection of RhD negative components. Both patients were male and anti-D had not formed in either case at the time of reporting.

Learning points

The following learning points from previous reports remain pertinent:

- Simple yet robust procedures must be in place for recording transplant details. Use of a 'shared care' document is helpful but the information from this document must be clearly recorded in the LIMS.
- Selection of blood and blood components post transplant, including thorough consultation of the patient's history/warning flags/notepad entries, must be included in competency-assessments.
- New BCSH guidelines on compatibility procedures in blood transfusion laboratories are in progress. These guidelines will simplify blood group requirements post PBSCT/BMT in line with EMBT (European Group for Blood and Marrow Transplantation) guidelines.[21]

Other pre-transfusion errors *n* = 48

The number of cases in this category is the same as last year. Two of the cases involved babies under 4 months old. In 1 case the age was not stated and the remainder occurred in adults. Table 21 illustrates the time and circumstances under which these pre-transfusion errors took place.

Table 21
Summary representing when incidents occurred

	Out of hours	In core hours	Unknown
Emergency	10	5	0
Routine	12	16	1
Unknown	1	2	1

The staff involved out of hours included 10 BMSs who normally work in transfusion, 9 who do not routinely work in transfusion and 4 cases where the status of the BMS was not known.

The 48 errors have been divided into:

- Testing errors, i.e. the correct tests were performed but incorrect results obtained owing to poor performance of the test, transcription error, or incorrect interpretation.
- Procedural errors, e.g. incorrect test selection, failure to follow procedure.

Testing errors *n* = 9

Two transcription errors resulted in patients receiving antigen positive blood. In one case 2 days after a transfusion, bilirubin results were mildly elevated and the DAT weakly positive. The patient died but this was not related to the transfusion.

Case 3

Confusion during an emergency situation

A sample for a patient in critical care was placed on the transfusion analyser for processing. Two units of uncrossmatched blood were issued as soon as the blood group was known. A manual group and antibody screen was requested but not performed, and then the positive antibody screen results produced by the analyser were 'missed' and recorded as negative. A positive antibody screen was discovered 2 days later, and an anti-E identified. On look back it was ascertained that of 16 units transfused, 1 of the uncrossmatched units and 3 of the other units had been E positive.

Three interpretation errors occurred: in 1 case antibody identification was misinterpreted as anti-Kp^a. The procedure for a 2-person check on all samples where antibodies were detected failed. In a second case the presence of anti-Kp^a was overlooked in a patient with autoantibodies. In the final case a laboratory interpreted the antibody as 'non-specific' but when sent to NHSBT was found to be anti-Jk^a.

One case involved an error during a 6-unit crossmatch where the BMS typed the units for Lu^a at the same time as crossmatching, found 1 unit Lu^a positive, but issued that unit in error.

One case involved a patient with known cold agglutinins. Laboratory staff were aware of this and should have put a note on the paperwork to indicate that a blood warmer was required. They failed to do this. Nursing staff were not aware of the cold agglutinins so the patient was transfused with cold blood and had a minor reaction.

It is debatable whether to call the final 2 cases errors as both involved very weak antibodies (an anti-Fy^a and an anti-Jk^b) at the limit of detection, that gave negative results when tested manually but reacted weakly when tested the next day using automation. Neither patient suffered any adverse reaction.

Procedural errors *n* = 39

There were many different types of procedural errors:

Testing unsuitable samples n = 12

There were 12 cases where the sample was too old. Some errors were due to the BMS failing to check previous transfusion history whereas others were felt to be failures to follow protocol, knowing the transfusion history.

Failure to find historic records n = 10

Two of these cases involved neonates: in one case the mother had two records as her details had not been successfully merged. One record showed anti-D and the other no antibodies. Blood was issued by electronic issue due to the second record being accessed. In the other case a neonate grouped as A D negative and was issued with 2 group A D negative paediatric packs without consulting the maternal record which would have indicated transfusion of group O D negative units.

Of the remaining cases, historic records were not found by the laboratory owing to the following factors:

- an ED number used rather than a hospital number
- a surname change since the last record
- 6 cases where 2 separate databases were held in the laboratory – either current and legacy systems or 2 current systems (1 of these cases is also referred to in the testing section).

Case 4

The importance of accessing all available information when interpreting results

A BMS on duty was unable to identify an antibody specificity and issued crossmatch compatible blood. A senior BMS reviewed the antibody identification results prior to authorisation of the antibody report. The BMS thought that the results were indicative of anti-Fy^a and performed additional testing with Fy^a homozygous cells. Results indicated likelihood of anti-Fy^a. The BMS then looked back at historical data for the patient on a separate database. The patient had a previously detected anti-Fy^a but this data was not available on the current computer system.

Blood issued with incomplete pre-transfusion testing or without following the correct procedure n = 14

- One case in which the BMS failed to read the crossmatch before the results were entered on the IT system. The gel card was found in the centrifuge.
- One case where blood was issued, without investigation, despite the presence of a pan-reacting autoantibody.
- Two cases of failure to look up antibody screen results, therefore missing a positive antibody screen, and issuing blood by electronic issue.
- Blood crossmatched and issued without the antibody screen results being recorded.
- Blood issued despite an incomplete antibody screen and crossmatch.

- Failure to follow protocol resulted in the issue of incompatible blood, resulting in a mild reaction: rigors and pyrexia. This error could have been prevented if the clinician had passed on to the laboratory the vital antibody information given by the patient.
- One case involved an interruption during crossmatching, which contributed to blood being electronically issued rather than issued following an immediate spin technique.
- Two cases involved NHSBT. In 1 case the BMS assumed NHSBT had completed all pre-transfusion testing, and issued the units, when they had not. In a second case NHSBT sent phenotyped units rather than crossmatched units and the BMS assumed they had been crossmatched and issued them.
- One case where an MLA failed to obtain full patient identification when taking a telephone request.
- One case in which a unit of FFP was incorrectly put into the laboratory database as group O D negative when it was group O D positive. It was then transfused to a group O D positive patient. Although the sequelae in this case was of no clinical significance the use of 'copy' facilities on LIMS when inputting critical component information must be disabled.
- One case in which a BMS edited the results to negative, twice; when warning messages of 'wrong liquid level', which invalidates the test, were clearly displayed on an automated analyser.
- One case where a DTR was caused by a missed anti-Jk^b; laboratory protocol did not follow BCSH guidelines on pre-transfusion testing.[22] (See Case 5, below.)

Case 5

Different procedures might have prevented reaction

A pre-transfusion sample from a patient with known anti-K gave weak reactions with the K negative screening cells by an automated technique. The screen was repeated on the second analyser, which gave negative results, and testing against a panel of red cells was not undertaken. Four days later the patient showed signs of a severe DHTR including deteriorating renal function, and anti-Jk^b was detected in the post-transfusion sample. Retrospective testing on the pre-transfusion sample did not reveal anti-Jk^b; however, no different or additional techniques were used, and the sample was not referred for confirmation. The laboratory has since changed its policy, and a full antibody identification panel is undertaken on patients with known antibodies.

Errors during crossmatching n = 3

- 1 case where an incompatible unit was issued to a patient.
- 2 cases in which units were issued that expired before the day they were required.

There were a number of cases of inappropriate electronic issue this year: 1 due to the patient's historic record not being found, and 1 due to 'interruption' during crossmatch. There may have been others due to errors earlier in the pre-transfusion testing process, e.g. sample age, but these have been reported under the appropriate sections and whether they then led to inappropriate EI is unclear.

Case 6

Overriding warning signals

A request was received for 6 units of blood for a patient with anti-D+C. Antigen negative blood was selected and an IAT crossmatch set up. On reading the crossmatch 1 unit was weakly incompatible (+) by IAT. This result was correctly entered into the LIMS but the unit was not physically quarantined from the compatible units. The units were then issued to the patient: a warning message was displayed for the incompatible unit but this was overridden and the emergency issue option used. The unit was transfused before the error was identified.

COMMENTARY on pre-transfusion testing

Numbers of procedural errors remain constant with 40 in 2008 and 38 this year. Although not as marked as in the 'wrong blood incident' section, it appears that there are a disproportionately high number of errors occurring out of hours, even after taking workload into consideration. Local investigation into these errors must be carried out and a full RCA performed to ascertain why they occurred. SHOT endorses the recommendations of the UK Transfusion Laboratory Collaborative with regard to staffing levels, technology, training and competencies both in and outside core working hours.[10,11]

IT must be used to its full potential. It is difficult to understand why the following are not set up on LIMS:

- Preventing the issue of units that expire before the 'time required'.
- Reflex requesting of an antibody identification based on a positive result in the antibody screen so that there is clear, outstanding work still to perform before a crossmatch.

These points are also highlighted in the IT chapter.

Learning point

- Use of automation and IT can increase the security of testing but only if the messages/flags given are heeded and acted on appropriately. It is disappointing to report a number of examples this year that involve qualified staff overriding information, leading to the transfusion of what could be unsuitable units of blood. It is important that staff understand all warning messages and the necessary, appropriate actions to take following warnings.

The following learning points from previous reports remain pertinent:

- Errors are still being made in using inappropriate samples. Computer warning flags are a useful tool but must be backed up with strong theoretical knowledge. New BCSH Guidelines on compatibility procedures in blood transfusion laboratories are in progress. These guidelines will simplify sample age requirements.
- Competency-assessment must comprehensively cover the areas of phenotype selection, antibody history and appropriate use of EI.
- Competency-assessment must comprehensively cover all warning messages from analysers and the LIMS and staff must be able to demonstrate appropriate actions.
- Transfusion laboratories must have thorough search strategies when looking for patient histories in order to find and reconcile multiple entries for a patient.[23]

Laboratory-based cases of SRNM *n = 67*

The 67 SRNM errors have been divided into SRNM based on the following:

- poor serological knowledge/failure to recognise the special needs of a specific patient group
- failure to consult patient records thoroughly.

This section mirrors that of previous years in which the majority of errors were associated with either failing to notice/heed warning flags or absence of warning flags, either because they have not been added or because they have been incorrectly deleted.

SRNM due to poor serological knowledge/failure to recognise the need for special requirements *n* = 27

Failure due to poor serological knowledge/carelessness in selection n = 11

- An incorrect order for blood was made for a neonate. Anti-D+Fy^a+Jk^b antibodies were identified in the mother, who initially refused to have a sample taken, so blood was crossmatched against the baby's sample in which only anti-D was detectable. The first BMS failed to order Jk^b negative units and the second BMS did not pick up on the error when crossmatching the blood.

- One case which resulted in failure to provide antigen negative units for a patient with anti-Jk^{a} plus anti-C^{w}.
- Failure to select a CDE negative unit for the 'flying squad' blood: 1 unit was C positive and was transfused to a patient with anti-C+D.
- A second case where the emergency group O D negative 'flying squad' blood that should have been CDE negative was found to be C positive, after an anti-C was found in a patient who had received the 'flying squad' blood.
- Four cases in which blood that was crossmatch compatible, but not Jk^{a} typed, was transfused to patients with known anti-Jk^{a}.
- Failure to issue appropriately phenotyped units to a patient with thalassaemia due to misinterpretation of nomenclature: i.e. the BMS had written 'R1R1 required', which was correct for the patient, followed by, 'i.e. e neg, K neg', which was wrong: the patient received R2R2 K neg blood instead of R1R1 K neg.
- e negative units were not selected for a patient with anti-C+e. The crossmatch was then performed incorrectly (Case 7).
- Failure to provide blood of the correct age, following a request to ensure that all units were < 7 days old. NHSBT only sent 4 units that met this requirement; the other 4 were older units and the laboratory did not notice the error.

Case 7

BMS staff must understand the clinical significance of warning flags on analysers

The patient was known to have an IAT reacting anti-C and enzyme only anti-e. As there was no R2R2 blood in stock the BMS selecting the blood decided that, as the anti-e was only reacting with enzyme treated cells, e positive blood could be selected. On the automated crossmatch 'too few cells' were indicated on the analyser. The BMS edited these results to compatible as she thought that this warning had occurred because the patient was anaemic. It was pointed out that the cells were from the donors, not the patient.

Failure to recognise the needs of specific patient groups n = 16

- Giving a female of childbearing age, who was phenotyped as c negative, c positive blood, against local protocol
- Five cases in which K positive units were issued to female patients under the age of 60
- Three cases of failure to provide apheresis platelets to children under 16 years of age
- Seven cases of failure to supply MB-FFP to children under 16 years of age.

SRNM due to failure to consult the patient records thoroughly *n* = 40

Table 22
SRNM due to failure to consult patient records thoroughly *n* = 40

Failure to	No. of cases
Failure to provide irradiated components	22
Failure to provide CMV negative components	10
Failure to provide CMV negative and irradiated components	4
Failure to provide HLA matched platelets	4

The next two cases have been selected to highlight that SHOT reportable incidents often occur because of a number of errors in the transfusion process.

Case 8

When the laboratory knows of a special requirement it should not have to be reiterated on request

A request was made for platelets. The BMS noted the requirement for HLA matched platelets and ordered them to arrive to cover overnight and for use the next day. The on-call BMS booked in and issued the HLA matched platelets. The platelets were not used overnight and the pack was returned to stock the following morning. A different BMS on specimen reception received a request for a unit of platelets for the patient. The need for HLA matched platelets was not mentioned. The BMS failed to notice the comment regarding the need for HLA matched platelets, entered on the laboratory system and on the laboratory whiteboard, and a pool of non-HLA matched platelets was issued and transfused. On discovering the error the ward was contacted and reminded that the patient needed HLA matched platelets and that this needed to be stated on the request. The HLA matched platelet was then reissued to the patient and transfused.

Case 9

Checking the need for a special requirement is the responsibility of all staff groups

A patient had received fludarabine and required irradiated components. While being transfused irradiated components, the patient stated that the blood he had received on a previous occasion had not been irradiated. An investigation ensued.

In the clinical area:

- *the patient's notes did not have an 'irradiated blood' alert sticker on them*
- *the prescription did not state irradiated blood – the relevant field on the prescription was blank.*

In the laboratory:

- *the patient's notes on LIMS contained a large amount of information including that irradiated blood components were required.*

Clearly a number of problems led to this error: omissions at ward level and an error on the part of the BMS. Was this simply a lapse by the BMS or could the notes on the LIMS have been clearer?

COMMENTARY on SRNM laboratory cases

This year has seen an increase in the number of paediatric cases: 7 cases where MB-treated FFP should have been issued to patients under 16 years of age and 3 cases where apheresis platelets should have been issued to the same patient group.[24] Two cases resulted from patients having more than 1 record in which data was not successfully merged or reconciled and as a result warning flags were deleted/missed during the transfer process.

Failure to provide irradiated components when required was the biggest group (22/67 cases). Some hospitals are relying on a ticked box on a request form to highlight the need for irradiation. This can be missed in the laboratory. As recommended in 2008, a more robust mechanism should be in place for informing the laboratory that irradiated components are required. The laboratory must then ensure that these requirements are consistently met without the need for further prompts.

Once again the failure of laboratory staff to select appropriate components when warnings flags are present is hard to understand, especially as the majority of the cases reported were during normal working hours. There does seem to be a particular problem when there are multiple special requirements. IT should be used to its full potential to prompt staff about special requirements either through algorithms based on date of birth and/or gender, or via warning flags. Warnings need to be clear and unambiguous and must be linked to the patient record, not one sample. Staff must then be competency-assessed to ensure that they fully understand all prompts/warnings/flags.

Case 8 above shows, again, that multiple errors, both clinical and laboratory, often contribute to cases of mistransfusion.

Learning points

- Simple yet robust procedures must be in place for recording special requirements. Use of a 'shared care' document is helpful but the information from this document must be clearly recorded in the LIMS.
- Once informed of the need for a special requirement the laboratory must ensure that the requirement is consistently met without the need for further prompts.
- Mistransfusion is often a result of multiple errors. It is important to investigate these incidents thoroughly by performing a full RCA so that all appropriate CAPA can be instigated.

The following learning points from previous reports remain pertinent:

- Assessment of staff working in the transfusion department must cover competency in the provision of blood components for specific groups of patients, and understanding the importance and use of 'special requirements' flags.
- Laboratories must give thought to the nomenclature used to describe phenotype requirements. It may be prudent to simply state the antigens that the red cells should lack, rather than use Weiner terminology, for example, which requires interpretation.

Errors involving NHSBT

These are discussed in the text but grouped here for clarity. There were 2 cases where the primary error was made by NHSBT and then not noticed by the hospital laboratory:

- platelets of the wrong ABO group were sent
- blood that was older than requested was sent.

There were 2 further errors where it is unclear whether there were mistakes or simply miscommunication between the hospital laboratories and NHSBT:

- In 1 case the BMS assumed NHSBT had completed all pre-transfusion testing, and issued the units, when they had not. In a second case NHSBT sent phenotyped units rather than crossmatched units. The BMS assumed they had been crossmatched and issued them.

RECOMMENDATIONS

RECOMMENDATIONS for clinical IBCT cases

- A transfusion checklist should be developed, ideally with an accompanying transfusion record section, in a similar style to the WHO surgical checklist (http://whqlibdoc.who.int/publications/2009/9789241598590_eng_checklist.pdf). This approach is a proven aid to patient safety and could prevent omission of critical steps in the process.

  Action: NBTC and counterparts in Scotland, Wales and Northern Ireland

- All point of care testing devices for Hb estimation must be fully validated and internal quality control and participation in external quality assurance schemes must be ensured. (See also recommendation on page 74.) Currently this is not the case for calculated Hb estimates from blood gas analysers. A study to evaluate the utility of these devices for Hb measurement should be undertaken and guidance and recommendations issued.

  Action: NBTCs, NEQAS, SHOT

- All staff must take full professional responsibility for their part in the transfusion process. Personnel involved at the point of component administration must understand that this is the final opportunity to check for errors earlier in the chain, and the sole remaining opportunity to be certain of the recipient's identity.

  Action: CEOs of Trusts/hospitals, HTCs and HTTs

- The existence, and the importance, of special transfusion requirements must be taught to junior doctors in all hospital specialities. Local mechanisms for ordering and prescribing components need to facilitate correct ordering, and remind clinical and laboratory personnel where possible.

  Action: CEOs of Trusts/hospitals, HTCs

- Hospitals must ensure that they have protocols and documentation systems for:
  - transportation of blood components accompanying patients transferring to other sites
  - administration to patients who may be permitted to receive blood components at home
  - ongoing information transfer between hospitals when patients have shared care at 2 or more sites.

  Action: HTCs, HTTs

RECOMMENDATIONS for laboratory IBCT cases

- Many hopes of error reduction have been pinned on extending automation and IT. An emerging theme from this year's report is that frequently it is still up to well trained staff, with underpinning knowledge, to interpret and heed warnings and flags and, unless appropriate actions are taken, errors will continue to occur.

  Action: Lead BMS for hospital transfusion laboratories, transfusion laboratory managers

- There is a requirement for manufacturers to provide affordable, secure automation for smaller laboratories that bridges the gap between manual methods and large 'walk away' analysers.

  Action: Manufacturers of blood grouping equipment, IT working group of the NBTC

- The number of errors in the SRNM category has remained high for a number of years. Laboratories must make a concerted effort to tackle this problem. This should be done at a local level as there will be different root causes in different Trusts.

  Action: HTTs

- Blood services should review the packaging of components that look similar, to assess whether they could be more easily identified, particularly when those components are often used in emergency situations.

  Action: UK Blood services

- The IT system should be configured to flag a component discrepancy between that ordered and that issued, and this should be fully validated. If this is not possible locally then these development requirements must be raised with LIMS suppliers.

  Action: HTTs, manufacturers of blood grouping equipment, IT working group of the NBTC

IBCT RECOMMENDATIONS FROM PREVIOUS YEARS (ALL SECTIONS)

Year first made	Recommendation	Target	Progress
2008	Competency-assessment of staff involved in the transfusion process must be relevant to the person's core role and knowledge requirements. This must be carried out in accordance with NPSA SPN 14.	**Clinical risk managers, HTTs**	MHRA annual compliance reports ask whether competency-assessment is carried out. MHRA and CPA (UK) Ltd inspectors will look for evidence of competency-assessment.
2008	All staff must be trained (and competency-assessed) in recognising the different blood components and their labels.	**Clinical risk managers, HTTs**	NPSA has issued new guidance and deadlines for completion.
2008	Laboratory procedures should be validated in line with the BSQR and should be revisited following an error as part of Corrective and Preventative Actions.	**Transfusion laboratory managers**	
2008	Competency-assessment in laboratories must be linked to process. BMS staff must be competent in performing the test but must also have a thorough understanding of the context in which the test is being performed, i.e. the test in relation to a specific patient and the clinical information. Basing competency-assessment on National Occupational Standards (NOSs) will enable this, as NOSs have both 'Performance' criteria and 'Knowledge and Understanding' criteria.	**Transfusion laboratory managers**	
2008	The UK Transfusion Laboratory Collaborative has recommended minimum standards for hospital transfusion laboratories in terms of staffing, technology, training and competence. This document has been widely disseminated and should form the basis for future laboratory planning.	**CEOs, Pathology managers**	Report published in *Transfusion Medicine* and *The Biomedical Scientist*, September 2009.[10,11] Report circulated to all CEOs in England, Wales and Northern Ireland. SCTAC considering.
2008	Shared care discharge notification, giving tick-box options for special requirements, with reasons, should be completed by the referring clinicians and forwarded to the receiving hospital through the laboratory network.	**NBTC, RTCs**	
2007	Education of doctors and nurses involved in transfusion must continue beyond basic competency to a level where the rationale behind protocols and practices is understood. Transfusion medicine needs to be a core part of the curriculum.	**NBTC, Royal Colleges, GMC**	Royal Colleges and Specialist Societies Committee working with NBTC.
2007	Staff involved in blood component transfusion must be aware of their professional accountability and responsibility.	**GMC, NMC, IBMS, professional insurance schemes**	