COMMENTARY on SRNM clinical cases

The request for irradiated components continues to be the single most commonly omitted special requirement. With few exceptions in 2010, the patients who required irradiated components but did not receive them either have been or continue to be under the care of a haematologist, and yet the reports this year demonstrate a lack of knowledge among all grades of members of haematology staff either of the indications for irradiated components or the means of reliably informing the laboratory of this requirement. Consequently it is essential that all members of a haematology clinical team are fully aware of the indications for prescribing these components.[3] Furthermore there is a need for a robust procedure that is owned by both the laboratory and the haematology clinical team, and that specifies the process for requesting such components. This document should clearly indicate the responsibilities of both parties. Although it may be prudent in transplant units for a given individual or coordinator to specifically undertake this role, the process should still be documented and alternative staff members trained for the role.

In a number of cases this year the failure to prescribe blood components with special requirements was identified by the nursing staff during the administration of the blood, which in some cases revealed that patients had previously received components of the incorrect specification over a protracted period of time.

Learning points

- All haematology units must devise specific educational programmes for all their staff members providing the rationale and indications for specialist components and this information should be accessible at the time of making the requests for blood components.
- All haematology units must possess a documented procedure for communicating the need for specialist components to the laboratory, including the responsibilities of both parties.
- With respect to purine analogues, systems can be developed with the pharmacy to alert either the prescriber or the transfusion laboratory of the need for irradiated components. Nevertheless, the primary responsibility for prescribing specialist components rests with the clinician and the responsibility for informing the transfusion laboratory rests with the clinical team.
- All members of the clinical haematology team should be empowered to challenge an inappropriate prescription.
- All transfusion request forms should be fully completed with as much information as possible, including relevant medical history, any known special requirements, antibodies, pregnancy, IUT and exchange transfusion (ET).

IBCT EVENTS ORIGINATING IN THE HOSPITAL TRANSFUSION LABORATORY *n* = 107

2010 has seen a total of 107 IBCT cases in which the primary error occurred in the laboratory, which represents 54% of the total 200 IBCT cases. This constitutes a 28% (*n* = 107) decrease in laboratory-related errors in 2010 compared with 2009. This decrease in the number of errors reported could be due to a number of factors: following the BSQR 2005,[4] many laboratories probably have a much more robust quality management system and are better at identifying the root cause of errors and are therefore determining more appropriate corrective and preventative action (CAPA). Feedback from inspections, from SHOT reports and other routes of sharing good practice, for example via RTCs, is probably also helping towards error reduction. Recommendations from the UKTLC[5,6] in the areas of staffing, technology and training and competence may be starting to have an impact on transfusion laboratories.

All IBCT cases are summarised in Table 10 on page 20. However, the cases whereby the primary error occurred in the laboratory are discussed in more detail below. Laboratory errors resulting in SRNM (37 cases) are discussed towards the end of this chapter.

Table 17
Summary of laboratory-related errors *n* = 107

Type of error	No. of cases in 2009	No. of cases in 2010
Wrong blood	**21**	**21**
Wrong sample selected	2	2
ABO grouping error	5	2
D grouping error	4	4
Incorrect component selected	9	11
Incorrect labelling	1	2
Wrong group selected for SCT patient	**13**	**15**
Wrong ABO group selected	7	9
Wrong D group selected	2	2
Procedural errors	4	4
Other pre-transfusion testing errors	**48**	**34**
Testing errors	9	8
Procedural errors	39	26
SRNM	**67**	**37**
Due to failure to consult patient records thoroughly	40	18
Due to poor serological knowledge/failure to recognise the special needs of a specific patient group	27	19
Total	**149**	**107**
Anti-D-related laboratory errors	**38**	**45**
Handling- and storage-related laboratory errors	**43**	**53**
Grand total laboratory errors	**230**	**205**

Mortality
There were no transfusion-related cases of mortality reported.

Morbidity
There were 5 women of childbearing potential transfused with K positive red cells this year and 1 of these had produced anti-K at the time the cases were reported. In view of the unknown K status of the remaining cases the potential for major morbidity is unknown.

In another case an 85-year-old patient experienced a DHTR as blood was electronically issued without an antibody panel, following a positive antibody screen. An anti-Jka was identified. The patient recovered.

ABO- and D-incompatibility
There was 1 ABO-incompatible red cell transfusion reported this year, following an ABO grouping error. Group AB red cells were transfused to a group A patient (see Case 10 below). In 2 cases RhD positive red cells were transfused incorrectly following D typing errors.

Wrong blood incidents originating in the laboratory *n* = 21

This year 19% (21/107) of laboratory errors accounted for wrong blood incidents. This compares to 14% (21/149) last year.

Seven cases involved paediatric patients: 3 neonates, a 3-month-old and 3 aged 2–8 years. All other cases were in adults over 18 years of age. Table 18 illustrates the time and circumstances under which these wrong blood incidents took place.

Table 18
Summary representing when wrong blood incidents occurred and their urgency

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

Unfortunately, there are a number of unknowns in the above table. From the information given, approximately equal numbers of errors occurred in and out of core hours. This suggests that the error rate out of hours is greater than that in core hours, as less work is performed out of hours. However, the difference is less marked than in previous years.

The 21 errors fell into the following five categories.

Wrong sample selected

There were 2 cases where the wrong sample was used. In 1 case the incorrect sample was retrieved from a storage rack and used to crossmatch 2 units, out of routine hours. Both patients happened to be group A with no antibodies. In the second case a BMS aborted a run on the analyser due to an emergency situation but took the incorrect sample off the analyser to group manually. The sample grouped was A and the patient B but, fortunately, only FFP was required and the group B patient received group A high-titre negative FFP.

ABO grouping errors

There were 2 ABO grouping errors. One case occurred during core hours while performing routine manual grouping. Manual results were written on a worksheet and the conclusion documented. One BMS documented the group incorrectly, a second BMS failed to notice the error and a third BMS who entered the result onto the computer also failed to notice the error. The O RhD positive 21-year-old male was assigned the group A RhD positive. Fortuitously only platelets were required and group A platelets were transfused. The reporter stated that automation was to be purchased for the laboratory in the next couple of months. The error was discovered on receipt of a subsequent sample. The second case is Case 10 below.

A further ABO grouping error is noted in Chapter 10 (page 63). An AB RhD negative cord group was misinterpreted as A RhD positive and manually entered on to the LIMS, resulting in an unnecessary 1500 iu dose of anti-D Ig being given to the mother. It is interesting that this case was reported as an anti-D error rather than an ABO typing error.

A further 9 grouping errors are reported in Chapter 21 on near misses (page 128). All of these occurred while using manual grouping techniques.

Case 10

Manual grouping error

A sample was grouped as AB RhD positive using a manual technique. Two units were requested and 2 units of AB RhD positive red cells crossmatched. One of the units was incompatible. A third unit was crossmatched and found compatible and the 2 compatible units were issued and transfused uneventfully. The sample was put on the laboratory analyser for confirmatory testing but a grouping interpretation could not be made. A sample was sent to NHS Blood and Transplant (NHSBT) to investigate the reason for the positive reaction with the incompatible unit. NHSBT found that the patient was A RhD positive but had a very weak anti-B. The reporting hospital thought there must have been 'splash' between reagents in the manual group to have given the erroneous result with the reagent anti-B in the original forward group.

D grouping errors

There were 4 errors in D typing. Three of the errors appear to have been misreading/transcription errors when performing manual groups, while the fourth case involved an inappropriate action by a BMS following an unspecified warning on a blood grouping analyser. Two cases, neither of which involved women of childbearing potential, resulted in RhD positive blood being given to RhD negative patients, 1 of which resulted in the patient developing anti-D. In the other 2 cases, despite being mistyped as RhD positive, RhD negative units of blood were selected and transfused.

Further D typing errors have been identified from the chapter on anti-D errors (Chapter 10, page 63):

- A cord group was manually transcribed incorrectly on to the LIMS as RhD positive, leading to an unnecessary 1500 iu dose of anti-D Ig being given.
- A grouping result of A RhD positive was manually entered onto the LIMS incorrectly as A RhD negative and the woman was then given 1250 iu of anti-D Ig unnecessarily.
- A maternal group was incorrectly transcribed and authorised on the LIMS as RhD positive so anti-D Ig was not given.
- A cord D type of RhD positive was uploaded to the maternal record on the LIMS. The mother was RhD negative but did not receive anti-D Ig.

There were 3 further cases involving weak RhD types, which show poor practice. In 1 case a 10-year-old historic group, confirmed by a manual tube group, was used to issue anti-D Ig when the routine group indicated a weak D positive result. In the second case the patient was known to have a weak D antigen but a manual tube group gave a result of RhD negative and anti-D Ig was issued on the basis of this result. In the final case two technologies gave different results, 1 D negative and 1 D positive (weak). Anti-D Ig was issued but the reference laboratory later confirmed that the patient was weak D positive (see Chapter 10, page 63). However, where there is doubt about the D type of the mother, the safest policy is to issue anti-D Ig.

Learning point

- Variations in D typing of patients with a weak D antigen may be unavoidable as technologies differ in their sensitivity but it is important that the D type is determined by the most robust routine method available.

Incorrect component selected

In 11 cases an incorrect component was selected. Five of these involved platelets. Four cases resulted in RhD positive platelets being given to RhD negative patients, 3 of whom were paediatric patients (1, 2 and 7 years of age; 1 male, 2 females) and the fourth was a 47-year-old female patient. In the fifth case a porter requested the collection of platelets for a specific patient, but the BMS handed over platelets that were intended for another patient.

Four cases involved red blood cells (RBCs). In 2 cases RhD positive red cells were issued when RhD negative red cells were required; both patients were male. In 1 neonatal transfusion, group A red cells were selected, matching the baby's group, when, according to local policy, group O red cells should have been used as the mother was group O. This was a deviation from local policy and it was not stated whether an indirect antiglobulin test (IAT) crossmatch was performed. In another neonatal transfusion the BMS requested six paedipaks for an ET, not knowing that a single unit of the

specialist component red cells for ET should have been requested and not understanding the difference in specification of these two different red cell components.

Two cases involved plasma components, 1 in which a B RhD negative patient was transfused with group O cryoprecipitate when group A was available, and a second involving the transfusion of cryoprecipitate when FFP was requested.

Incorrect labelling

Only 2 cases were received as a result of incorrect labelling, both of which involved labels being transposed. One case resulted in an incompatible unit being labelled compatible and subsequently transfused. The other resulted in a patient receiving blood that was not crossmatched for them. No adverse reactions were reported. It is significant that a further 34 cases involving mislabelling components were reported as near misses and a further 27 cases as RBRP (see Chapter 7.2, page 46).

COMMENTARY on laboratory wrong blood incidents

The number of laboratory errors contributing to wrong blood events has remained constant. This year errors in component selection mainly involved mis-selection of RhD positive components for RhD negative individuals, against local policies.

It is interesting this year that an ABO error and a number of D typing errors have been reported through the adverse events relating to the anti-D Ig route when the root cause of the anti-D error has been a grouping error. This means that the detail of the grouping error is not available for analysis.

It appears that a number of manual groups are performed on maternal samples in order to issue anti-D Ig, which is hard to understand given that there is a 72-hour window from the time of the sensitising event for anti-D Ig to be issued and transfused. Routine grouping methods would appear to be more appropriate.

Another interesting issue that has come to light this year, following the complete analysis of the near miss data, is that looking at the number of actual SHOT cases in a category does not always reveal the extent of a particular problem. Although there are only 2 cases of incorrect labelling of components that have resulted in IBCT cases, there have been 61 cases of incorrect labelling reported to SHOT. This is an area of laboratory practice that should be looked into.

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

Year	ABO errors	Wrong sample tested	Interpretation/ transcription errors	Other	ABO-incompatible red cell transfusions	Sequelae
2010	3	1	1	1	1	No morbidity
2009	7	2	5	0	2	1 AHTR
2008	8	3	5	0	4	1 AHTR
2007	7	3	4	0	1	No morbidity
2006	6	2	3	1	0	No morbidity
2005	22	9	12	1	3	1 AHTR
2004	18	5	12	1	6	1 death 1 major morbidity
2003	17	8	9	0	6	2 major morbidity

AHTR, acute haemolytic transfusion reaction.

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, with causes

Year	D errors	D errors from anti-D chapter	Wrong sample tested	Interpretation/ transcription errors	Tx of D+ to D- individual	Other	Sequelae
2010	4	7 (3 weak D)	0	4	2	0	1 patient produced anti-D but was not of childbearing potential
2009	5	NK (7 weak D)	1	4	2	0	No morbidity
2008	11	NK	0	11	10	0	3 patients produced anti-D but none was of childbearing potential
2007	4	NK	1	3	3 (I x 33-year-old female)	0	No morbidity

Tx, transfusion; NK, not known.

In 9 cases it was believed that the final bedside check could/should have picked up these primary laboratory errors and prevented mistransfusion.

Learning points

- 5/6 grouping errors reported in this chapter and all grouping errors in the near miss chapter (Chapter 21) were made using manual procedures. The UKTLC recommends the use of 24/7 automation for ABO/D grouping.[5,6]
- D grouping errors resulted in the erroneous administration of anti-D Ig and were reported according to that outcome. Reporters are reminded that if the primary error was in the determination of the D group, then the case should be reported as a grouping error (IBCT).

Wrong ABO- or D-type blood components issued for SCT/BMT recipients *n* = 15

All cases were routine transfusions, 1 case involved a 4-year-old patient and the remainder were in adults. Seven of the cases occurred during normal working hours, 4 were outside normal working hours and 4 were unknown.

There were 12 cases in which BMT/SCT patients received a component of an unsuitable ABO group, 8 red cell and 4 platelet transfusions. In 7 of these cases 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 were given in error in 2 cases following incorrect component selection.

In 1 case the correct red cells were selected but were then electronically issued when a full serological crossmatch should have been performed. In most cases the error occurred when the BMS issuing the component failed to heed appropriate warning flags/comments on the patient notepad on the LIMS. However, in 1 case the instruction on the LIMS was incorrect; in 1 case there were two LIMS in operation on two hospital sites and the flag was on only one system and that system was not checked; and in another case an NHSBT red cell immunohaematology (RCI) department crossmatched the blood but was not informed by the referring hospital that the patient had undergone an allo BMT and therefore needed blood of the donor group.

Other pre-transfusion errors *n* = 34

The number of cases in this category has fallen from 48 cases last year. Eight cases involved paediatric patients: 1 neonate, 3 who were ≤5 months, 2 who were 1 year of age, a 10-year-old and a 14-year-old. Table 21 illustrates the time and circumstances under which these pre-transfusion errors took place.

Table 21
Summary representing when pre-transfusion incidents occurred

	Out of hours	In core hours	Unknown
Emergency	7	1	1
Routine	4	14	2
Unknown	1	3	1

The staff involved out of hours included 1 BMS who normally works in transfusion, 1 who does not routinely work in transfusion and 11 cases where the status of the BMS was not known. It would be helpful if this information was complete on reports submitted to SHOT so that a fuller picture of staff groups involved in making errors could be obtained.

The 34 errors have been divided into:

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

Testing errors *n* = 8

Eight errors occurred during pre-transfusion testing:

- Crossmatch results were entered into the LIMS and blood was issued before the crossmatch was read. When the crossmatch was read 1 of the units was incompatible.
- Antibody screen and crossmatch results were entered into the LIMS and blood was issued before either test was read.
- A contaminated tube led to a false positive antibody screen and an erroneous antibody identification of auto anti-D and the unnecessary use of RhD negative red cells.
- During a crossmatch an analyser gave an error code of 'wrong liquid level'. The wells were manually edited and reported as compatible. In fact insufficient plasma had been added to the crossmatch wells for both units, i.e. units were issued without a full crossmatch being performed.
- Four interpretation errors occurred during antibody identification, all leading to red cells, positive for the antigen to the correct antibody, being transfused. One of these cases involved an erroneous interim report to a hospital laboratory from an NHSBT RCI laboratory. No reactions were reported.

Procedural errors *n* = 26

There were many different types of procedural errors.

Testing unsuitable samples *n* = 7

There were 7 cases where an inappropriate sample was used to issue blood:

- In 1 case a transfusion at another site complicated the sample timing calculation.
- In a second case transfusion of an emergency O RhD negative unit had complicated the sample timing calculation.
- In another case the complete transfusion record was not found due to different numbers being used as the primary identifier. This led to the wrong sample being used for crossmatch.

- In another case a pre-transfusion reaction sample was used to issue further units of blood when a post-reaction sample was available.
- In 1 case a new sample was not requested for a baby who was now 5 months old and a unit was electronically issued.
- In 1 case a unit was re-issued in error and transfused >72 hours after transfusion of a previous unit.
- In the final case a BMS failed to test a fresh sample sent to the laboratory and issued blood using a sample that was >72 hours old. The patient had received 4 units of blood issued using the original sample.

Failure to find historic records *n* = 3

Of the 3 cases, historic records were not found by the laboratory for the following reasons:

- In 2 cases patients were registered under two numbers and the laboratory's patient search strategy failed.
- In 1 case the BMS failed to search a legacy database, which is against laboratory protocol.
- All 3 patients had clinically significant red cell antibodies on file that were no longer detectable. No reactions were reported.

Cases in which blood was issued with incomplete pre-transfusion testing or failure to follow correct procedure *n* = 10

- In 2 cases appropriate action was not taken to update patient computer records based on the patient history.
- In 3 cases blood was issued without an antibody panel, following a positive antibody screen. One of these cases resulted in a DHTR due to anti-Jk^{a}.
- In 1 case blood was transfused to a 15-month-old without an antibody screen being performed. The patient was treated as a neonate.
- In 1 case a 14-year-old was transfused 2 units of RBCs before the G&S results had been authorised.
- In 1 case an O RhD negative paedipak unit was issued to a 19-week-old baby without a group and antibody screen being performed.
- In 1 case a female patient of childbearing potential with sickle cell disease was given blood that was not RhD phenotype matched. An RhD phenotype had been requested on the LIMS but was not performed over the weekend. The patient formed anti-C.
- In 1 case a haemolytic transfusion reaction was caused by a missed anti-Jk^{a} in the pre-transfusion sample (see Case 11).

Case 11

Antibody identification must be current

A patient was crossmatched for a 2 unit transfusion. Both crossmatches were negative; the patient was previously known to have an anti-E and a weak auto-antibody. The antibody screen results agreed with previous findings and an antibody identification panel was not performed despite the patient having been transfused since the last antibody identification. While the first unit was being transfused the patient became hypotensive, was sweating and shaking, had loin pain and was breathless. A transfusion reaction investigation revealed an anti-E plus anti-Jk^{a} in both the pre and post transfusion samples. The transfused unit was Jk(a+b+).

Errors during crossmatching *n* = 5

There were 5 cases in which blood was electronically issued inappropriately:

- 2 cases involved babies where an EI was performed when maternal antibodies had been detected.
- In 1 case, despite anti-E being clearly flagged on the patient's record, blood was issued by EI.
- In 1 case EI was performed erroneously because the patient record was wrongly updated to state that the patient was suitable for EI when a report from NHSBT RCI actually stated that blood should be crossmatched by an IAT method.
- In the final case EI was used inappropriately following a manual edit of a result from an automated analyser. The problem was that the edit had been made on the LIMS and no record of the edit made – a comment should have been added to the group and antibody screen results.

In addition, in 2 of the 3 cases in the preceding paragraph, where antibody identification was not performed prior to blood issue, blood was issued by EI.

An additional procedural error was due to a communication failure between NHSBT and a hospital laboratory. A fax was sent by NHSBT to recall a unit of blood, the fax got jammed and the message was not followed up by a phone call in accordance with the procedure. This resulted in the unit being issued and transfused when this could have been prevented.

NHSBT-related errors are collated towards the end of this chapter for clarity. There are also a number of pre-transfusion testing errors reported in the near miss chapter (Chapter 21, page 128):

Table 22
Examples of pre-transfusion testing errors reported as near misses

Category	No. of errors
Sample booked in under incorrect record	9
Incorrect patient identifiers entered into LIMS	27
Incorrect patient merges on LIMS	2
Incorrect sample used for grouping	2
Incorrect sample used for crossmatching	4
Invalid sample used in crossmatching for a frequently transfused patient	9
Incomplete testing prior to issue	7
Inappropriate editing of results from analyser	4
Expired antibody identification panel in use	4

COMMENTARY on pre-transfusion testing

Pre-transfusion testing errors have decreased from 21% (48/230) in 2009 to 16% (34/205) in 2010. Errors in pre-transfusion testing mirror those of previous years: incomplete testing, inappropriate actions following alerts and misinterpretation during antibody identification. To echo the advice given by UK NEQAS BTLP, 'when interpreting antibody identification results all available information should be reviewed including patient phenotype, differential reaction by technique and results of all cells tested including screening cells. Interpretation and documentation of antibody identification results is an error prone manual process and this should be considered when establishing procedures for reporting antibody identification'.

The procedural errors also mirror those of previous years, including failure to find patients' historical records. This problem is discussed further in the chapter on errors relating to IT (see Chapter 7.1). Use of unsuitable samples for crossmatch and incomplete testing remain issues and laboratories should look critically at their LIMS and assess whether all computer algorithms and alerts that can be applied are being used as effectively as possible, e.g. alerts when samples are unsuitable in terms of timing, alerts when tests are incomplete and reflex testing such as automatic requesting of an antibody identification test when a positive antibody screen is obtained. These alerts should be used as reminders for staff and do not replace thorough training and competency-based assessment, which must include appropriate actions on receipt of alerts/warnings whether these are on the LIMS or an analyser.

All laboratories should have implemented the requirements of the Medicines and Healthcare products Regulatory Agency (MHRA) Guidance on Electronic Issue (May 2010) by March 2011.[7] Properly implemented use of this guidance would have prevented 4 of the cases reported above.

Learning points

- Laboratories need to look critically at the way in which mother and baby records are linked and assess how robust this linkage is.
- Laboratories should critically assess the use of alerts/warning/algorithms on the LIMS and ensure they are being used as effectively as possible. The ability to easily override warnings/alerts should be discouraged.
- Training and competency-based assessment must include appropriate actions on receipt of alerts/warnings, whether these are on the LIMS or an analyser.
- Training and competency-based assessment must include, and indeed highlight, the less common transfusion scenarios and standard operating procedures (SOPs) must give clear instructions on the use of infrequently used components.

LABORATORY-BASED CASES OF SRNM *n* = 37

There has been a big reduction in the number of cases reported, 37 compared to 67 cases last year. Due to the smaller number of cases reported it has been possible to analyse these cases more fully.

Eleven cases (11/37 or 29.7%) involved paediatric patients and in 6 of these cases the special requirement missed was age related: 5 cases where MB-treated FFP/cryoprecipitate should have been issued to patients under 16 years of age but was not and 1 case where a child under 1 year old was issued with red cells that were not CMV negative.

The 37 SRNM errors have been divided into SRNM due to:

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

SRNM due to poor serological knowledge/failure to recognise the special needs of a specific patient group *n* =19

Failure due to poor serological knowledge/carelessness in selection *n* = 3

- 1 case involved a 39-year-old female who was known to be R_2R_2 (cDE/cDE) and have anti-C. She was transfused RhD negative RBCs and developed anti-E as a result.
- 1 case in which a BMS ignored a warning flag stating the need for E- and C- units to be selected for a patient with sickle cell disease. Red cells that were not phenotypically matched were issued and anti-E was detected 18 days later.
- In the final case the BMS misunderstood the requirements for a 91-year-old patient with autoantibodies, and rather than issuing units identical to the patient's own Rh phenotype, i.e. E- and K-, issued e- and K- units, resulting in the patient receiving 1 E+ unit.

There was 1 additional case in which the BMS failed to update the special requirements on the patient notes and did not communicate the need for using a blood warmer to clinical staff (see communication errors, towards the end of the chapter, page 40).

Failure to recognise the needs of specific patient groups *n* = 15

There were 6 cases in which K+ units were issued against national recommendations and/or local protocol:

- In 4 cases K+ units were issued to women of childbearing potential. All cases were emergencies involving acute blood loss. In 3 cases no LIMS alerts, based on gender and age, were present. In 1 case an alert was missed.
- In 1 case the local protocol dictated that all blood issued as group specific should be K- and K- units were not issued. The patient receiving the group-specific unit was found to have an anti-K when pre-transfusion testing was completed.
- In 1 case the local protocol dictated that all flying squad units should be K-. One unit was not and was transfused to a woman of childbearing potential.

There were 5 cases involving 9 patients of failure to supply MB-treated FFP or MB-treated cryoprecipitate to children under 16 years of age. In only 1 of these cases was a warning flag missed. In the other cases the LIMS did not appear to have warning flags set up, based on age of patient, which may have alerted staff to the incorrect component selection. Neither was addition of a warning flag mentioned as a corrective action in any of the cases.

There were 3 reports involving 4 patients where pregnant women were not issued CMV negative units.

There was 1 case which involved a patient under 1 year old receiving components that were not CMV negative.

Table 23
SRNM due to failure to consult patient records thoroughly *n* = 18

Failure	No. of cases 2009	No. of cases 2010
Failure to provide irradiated components ■ Missed tick on request form ■ Missed flags ■ Clerical error ■ Flag required irradiated, CMV negative issued ■ NHSBT failed to irradiate buffy coats, not detected in the laboratory	22	**9** 2 4 1 1 1
Failure to provide CMV negative components ■ Missed tick on request form ■ Flag input error	10	**4** 3 1
Failure to provide CMV negative and irradiated components ■ Missed tick on request form ■ Failed to order correct special requirements on BTS order form and error not detected at issue	4	**3** 2 1
Failure to provide human leucocyte antigen (HLA) matched platelets ■ Missed flag – BMS busy	4	1
Failure to provide human platelet antigen (HPA) matched platelets ■ Flag input error as a result of inadequate handover	0	1
Total	**40**	**18**

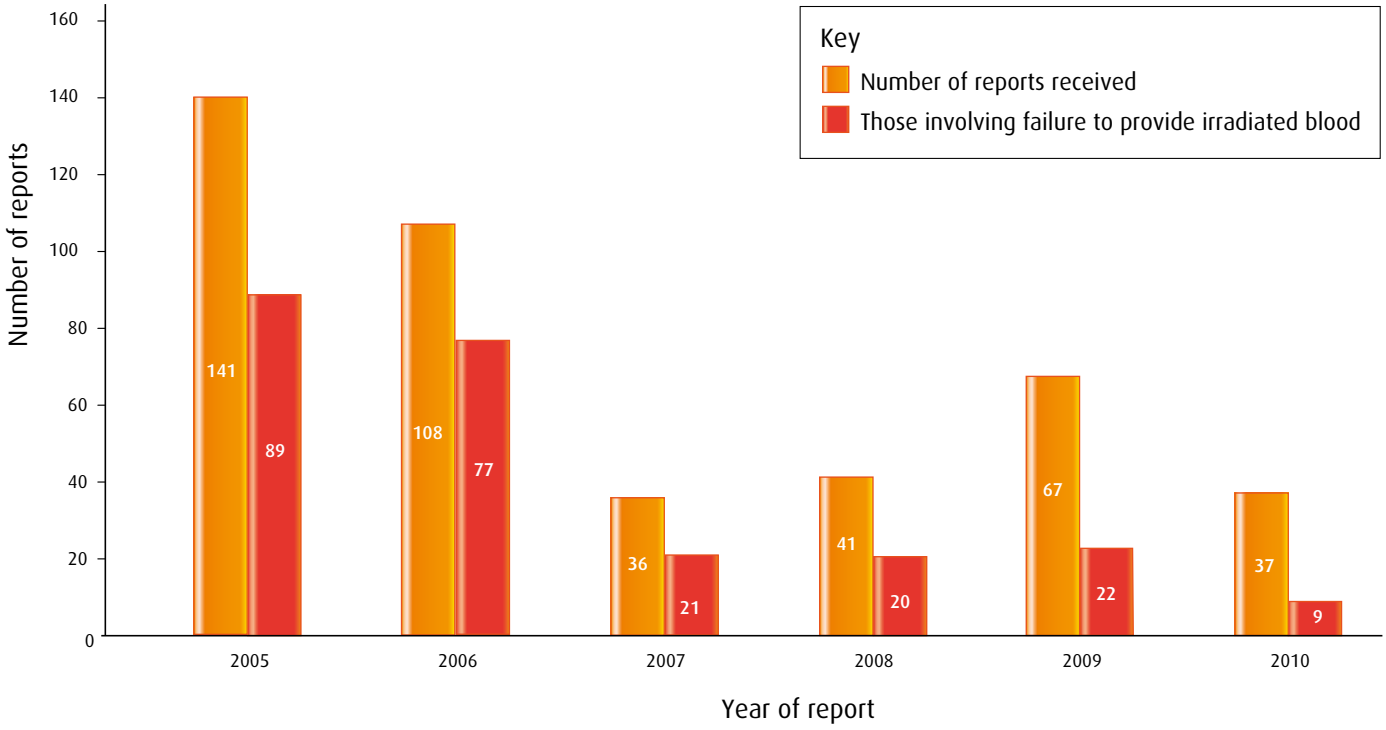
COMMENTARY on SRNM laboratory cases

In a climate of increased reporting there has been a significant reduction in the number of laboratory-based SRNM cases this year, which is very encouraging. There could be a number of factors involved in this improvement, for example the effects of the BSQR 2005[4] and the ethos of good manufacturing practice with improvements in root cause analysis and CAPA following errors and or audits. It will be interesting to see whether this reduction in SRNM cases can be sustained or improved upon further.

There were still 11 cases where warning flags were missed/misinterpreted, 9 cases where warning flags were not in place and could have alerted BMS staff to a special requirement, and 2 cases where flags were entered incorrectly on to the LIMS. Consequently there are still occasions when appropriate, robust warning flags/alerts do not appear to be in place, for example a warning based on age and gender for the issue of K- red cells and a warning based on age for the issue of MB-treated FFP. Whether this is due to the deficiencies of the LIMS or failure of the hospital to configure the LIMS appropriately is not always clear. However, errors do also continue to occur when warning flags/alerts on the LIMS are missed by BMS staff. Whether these are due to poor alerts, lack of training or simple oversight again is not always clear.

There were 7 cases where the tick box on the request form indicating the need for a special requirement was missed. Hospitals must risk assess the process in place for communicating special requirements and ensure that it is as robust as possible. A number of ways of pre-alerting transfusion laboratories to special requirements are in use, for example notification from the pharmacy on receipt of a prescription for a purine analogue or notification from the haematology department when a purine analogue is prescribed. Different processes work best in different places and the simplest, most robust system for the particular environment must be selected. Of course, pre-alerting the laboratory is only a good idea if the LIMS has robust alert mechanisms.

Figure 5
Laboratory-based cases of SRNM 2005–10



Learning points

- Critically assess the use of alerts/warning/algorithms on the LIMS and ensure they are being used as effectively as possible.
- Risk assess the process in place for alerting the laboratory to the need for special requirements and ascertain if that method is as robust as possible.

Errors involving NHSBT *n* = 4

There were 4 cases in which NHSBT was involved. These are discussed in the text but grouped here for clarity:

- There was 1 case in which a recall was initiated by NHSBT and a fax sent to the appropriate laboratory; however, unknown to NHSBT, the fax got jammed and the message of a recall was not followed up with a phone call or another form of communication, which resulted in the recalled unit being transfused.
- In 1 case incorrect information was passed onto the laboratory following antibody identification. NHSBT reported that anti-Le^{a} and Le^{b} were detected but it was only 2 days later that the laboratory received a phone call from NHSBT informing them that there was a mistake in the antibody identification and that the antibodies detected were anti-M and anti-S. Unfortunately, incorrectly phenotyped blood had already been transfused to the patient.
- In 1 case buffy coats were not irradiated.
- In 1 case issue of non-MB-cryoprecipitate when MB-cryoprecipitate was requested. This was not noticed by the laboratory.

Errors involving miscommunication *n* = 4

There were 4 cases where failures in communication between staff resulted in an error; these are all reported in more detail throughout the chapter but have been grouped here for further emphasis:

- In 1 case the blood transfusion laboratory did not communicate to clinical staff the need for the use of a blood warmer.
- In 2 cases NHSBT did not communicate effectively with the hospital laboratory: 1 case involved the recall of a unit and the other involved erroneous antibody identification results.
- In the final case the hospital laboratory failed to inform the NHSBT RCI laboratory that the patient had recently received a BMT.

Recommendations

Recommendations for clinical IBCT cases

See the Key Messages and Main Recommendations in Chapter 6 on page 15.

Recommendations for laboratory IBCT cases

- Robust communication procedures are required both within the laboratory and to cover the laboratory/clinical interface.

  Action: Transfusion laboratories, HTTs, hospital transfusion committees (HTCs)

- Easily interpreted flowcharts should be considered to clarify existing policies and procedures.

  Action: Transfusion laboratories, HTTs, HTCs

- Successive SHOT reports have demonstrated that the majority of ABO/D grouping errors are incurred with manual procedures. The UKTLC has therefore recommended the use of 24/7 automation. In the event that resources cannot be made in the short term to fund this development, a risk assessment must be conducted with clear mitigation strategies.

  Action: Transfusion laboratories, pathology managers, clinical risk committees

For active recommendations and an update on their progress, please refer to the SHOT website.