6. Incorrect Blood Component Transfused (IBCT)

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Definition

The category Incorrect Blood Component Transfused (IBCT) includes all reported episodes where a patient was transfused with a blood component that was intended for another patient or which was of inappropriate specification and did not meet the particular requirements of the patient.

Chapter 6 only includes analysis of clinical IBCT cases. Laboratory IBCT cases are analysed in Chapter 7, which this year has a full discussion of all laboratory errors, including those counted in other categories, such as handling and storage errors (HSE) and anti-D.

DATA SUMMARY - IBCT combined clinical and laboratory
Total number of cases: 247

Implicated components		Mortality/morbidity	
Red cells	192	Deaths due to transfusion	0
FFP	9	Deaths *probably/likely* due to transfusion	0
Platelets	32	Deaths *possibly* due to transfusion	0
Cryoprecipitate	3	Major morbidity	2
Red cells & platelets	10	Potential for major morbidity *(Anti-D or K only)*	12
Platelets, FFP & Cryo	1		

Gender		Age		Emergency vs. routine and core hours vs. out of core hours		Where transfusion took place	
Male	128	≥ 18 years	216	Emergency	32	A&E	15
Female	113	16 years to <18 years	2	Routine	153	Theatre	17
Not known	6	1 year to <16 years	16	Urgent	44	ITU/NNU/HDU/Recovery	27
		>28 days to <1 year	3	Not known	18	Wards	143
		Birth to ≤28 days	6			MAU	15
		Not known	4	In core hours	185	Community	1
				Out of core hours	45	Outpatient/day unit	21
				Not known	17	Antenatal Clinic	1
						Not known	7

In 2011 there were 247 cases which is an increase from 200 in 2010. The number of ABO incompatible transfusions also increased from 4 in 2010 to 12 in 2011.

Clinical IBCT wrong component transfused (WCT) events n=35

Overview

There were 35 reports analysed in this subcategory this year. Nineteen reports related to male and 16 reports to female patients. The median age was 65 years and the range was 0-85 years. Four reports related to patients <18 years old. The first was a 2 day old neonate who received platelets instead of the prescribed fresh frozen plasma (FFP), in the second case during an emergency with multiple casualties the staff member administering the component confused the patient ID which lead to an incorrect but compatible transfusion. In the third case, an RhD positive component was supplied for a patient who was now RhD negative following haemopoietic stem cell transplant (HSCT) seven years previously, and

in the fourth case adult emergency O RhD negative blood was collected and administered to a neonate when crossmatched blood was available. These cases are discussed further in the paediatric chapter (Chapter 22).

Table 6.1 Summary of Clinical Errors leading to IBCT WCT

Type of error	Number of cases in 2010	Number of cases in 2011
Wrong blood in tube (WBIT)	3	5
Collection and administration	7	21
Administration alone	8	8
No information provided to the laboratory concerning the required group change following HSCT	1	1
TOTAL	**19**	**35**

Table 6.2 Summary of ABO and RhD mismatches resulting from Clinical cases of IBCT WCT

Incompatibilities	Number of cases in 2010	Number of cases in 2011
ABO incompatible	3	6
RhD incompatible	3	2
ABO and RhD incompatible	0	2
ABO and RhD compatible	13	25

Deaths n=0

There were no deaths that were directly attributable to transfusion.

Major morbidity n=1

There was 1 case of major morbidity as a result of an ABO incompatible transfusion.

Potential for major morbidity n=2

Both cases in this category were women of child bearing potential who were RhD negative and received RhD positive components.

Case 1 Major Morbidity

Transposed patient ID during phlebotomy leads to ABO incompatible transfusion

Patient A, blood group O RhD negative, was transfused 2 units of A RhD positive blood during cardiac surgery (mitral valve replacement and coronary artery bypass grafting) On arrival in the critical care unit he received two more group A units without apparent adverse events. Following transfusion, the patient showed evidence of haemolysis, with a fall in Hb requiring further transfusions, and rise in bilirubin to 241micromol/L within 6 days and an extended stay in the intensive therapy unit (ITU).

Blood samples were taken from patient A and patient B at the same time in the preoperative clinic. The nurse was distracted in the middle of bleeding the first patient, did not complete the process at the bedside, and so patient details were transposed when labelling the samples. Patient B's mislabelled sample was detected by the biomedical scientist (BMS) because a historical group was available. Patient A had no historical group and was therefore not initially implicated in the mix-up. Patient A's repeat sample grouped as O RhD negative when he required further transfusion.

This case was one of 5 wrong blood in tube (WBIT) incidents that led to an incorrect blood component being transfused. In 3/5 cases the patient group and the component group were fortuitously compatible. Instances of wrong blood in tube are discussed in more detail in the near miss chapter (Chapter 25).

ABO and/or RhD incompatible transfusions n=10

In addition to the two cases of incompatible components transfused due to WBIT above, there were 8 other reports where incompatible components were transfused.

Case 2

ABO incompatible unit of blood transfused after a failure in all blood collection and administration checks

Two patients had been crossmatched. These patients had the same surname but different date of birth, hospital numbers, forenames and blood groups. A health care assistant (HCA) collected the blood for patient A, only checking the surname and no other demographics. The bedside checks, involving two registered midwives, were incorrectly carried out. The error was detected by a staff nurse from a different ward when she went to return a wrong blood unit that she had collected; she found no units available for her patient B and queried where they were. Patient A was O RhD positive and the donor unit was A RhD positive. Fortunately, less than 50mL was transfused before the error was discovered and the patient suffered no adverse effects.

The vignette above identifies four separate errors. The initial collection and administration error involved three people, none of whom were following the correct basic procedures. The fourth error was by a staff nurse from another ward who realised the wrong component had been collected before it was transfused to a patient.

Combined blood component collection and administration errors n=21

The wrong component was collected on 21 occasions and the implicated staff members were 2 HCAs, 5 porters, 2 nurses, 1 student operating department practitioner (ODP), 1 ODP, and 1 theatre nurse. No details were given for the other 9/21 collections. Collection of the correct blood component is a crucial part of the transfusion process and staff administering the component should not presume that this step has been completed correctly. The correct blood component should be verified by completing an adequate final ID check at the patient's side prior to transfusion. The final ID check is the last opportunity to prevent an incorrect blood component being transfused. Incorrect blood components transfused as a result of WBIT cannot be identified at the bedside (as in case 1).

Case 3

Collection and transfusion of the wrong unit

A nurse collected the wrong unit of blood for patient A. The nurse returned to the ward and started transfusion of the blood to patient A. It was not until the same nurse went to the blood bank to collect a unit for patient B (on the same ward), that she realised she had taken the wrong unit for patient A as there was no blood for patient B. The nurse only used the first 3 digits of the hospital number to identify the unit. Patient B also had the same first 3 digits for the hospital number.

In addition to collecting the wrong unit, where there was failure to check the documentation against the unit of blood, the bedside checks were not done properly (where the mistake would have been identified prior to transfusion). Fortunately, the unit was compatible with the patient's group.

In 8 cases the wrong component type was administered to the patient, for example red cells when platelets had been prescribed.

Table 6.3 Discovery of the error in cases where the wrong component type was transfused

Prescribed component	Administered component	How was the error discovered?
Platelets	Red blood cells	BMS contacted the ward to enquire if the platelets were still required
FFP	Red blood cells	Patient was transferred to another ward and error noted when prescription chart checked
Platelets	FFP	Signatures against platelet prescription. Both FFP and platelets were prescribed – realised incorrect after 8mL FFP transfused
Platelets	Red blood cells	Noted by anaesthetist when patient was admitted to theatre
FFP	Platelets	Noted by nurse that platelets had been given (not prescribed) when she was about to send for prescribed FFP
Platelets	Red blood cells	Theatre staff noted error when patient transferred to theatre
FFP	Cryoprecipitate	Staff called BMS to request cryoprecipitate. BMS queried if clotting had been checked as cryo had already been given when FFP had been prescribed
Red blood cells	Platelets	When patient was reviewed it was noted that platelets had been running for an extended period

Case 4

Patient received red cells instead of platelets

A 66 year old female patient was scheduled for hemiarthroplasty. She had been prescribed platelets on haematological advice because she had a low platelet count of 86x10^9/L. The patient received red cells instead of platelets pre-operatively which were checked by two staff members. She arrived in theatre with red cells in progress. The patient was already anaesthetised when this was noted. Surgery went ahead. The patient bled during the operation and the Hb dropped by 5 g/dL which required further transfusion.

In 3 cases, the collection of multiple units at the same time was identified in the root cause analysis as a contributing factor in the incorrect blood component being transfused.

Case 5

Collection of blood for several patients leads to transfusion to the wrong patient

Nurse A set up a unit of blood for patient M. Nurse B realised that the wrong patient was being transfused immediately and stopped the transfusion when only 1mL had been administered. Nurse B had noticed the error as she prepared to start transfusion of a unit of blood for patient R but found that the unit was labelled for patient M in the next bed.

Due to the high volume of transfusions in this clinical area, it had become common practice for several units of blood to be collected for different patients at the same time and left in a cool box placed centrally on the ward. The error was compounded by the failure to complete a correct final ID check at the patient side prior to starting the transfusion.

The findings from the root cause analysis (RCA) conducted following the event have initiated a change in practice to reflect the Trust transfusion policy which is to collect a single unit for a single patient at a time as is recommended practice according to British Committee for Standards in Haematology (BCSH) guidelines[14].

Administration errors alone n=8

In these cases, the correct component was collected or delivered but failure of the final ID check at the patient's side led to the component being transfused to the wrong patient.

Case 6

Assumption that unit of blood was for emergency patient

Blood was delivered to the ward for patient X but had not been handed over to a nurse. Patient Y on this ward had arrested following sudden haematemesis. The unit for patient X was put on the bed of Patient Y. Emergency O RhD negative had been ordered for Patient Y and because the unit for patient X was group O it was assumed that this blood was the urgent blood ordered for patient Y. The blood was not checked against details for patient Y and was transfused. Patient Y was group B RhD positive and the unit group was O RhD positive and therefore the unit was fortuitously compatible. Patient Y was transferred to ITU post arrest and survived.

It is important that when a component is delivered to the clinical area, a trained and competent member of staff should receive it and ensure it is correct (National Comparative Audit (NCA) bedside audit[31], BCSH administration guidelines[14]).

Evidence of wristbands/other ID

Wristbands were documented as present and correct in 21/34 cases, missing in 3/34 and in 10/34 reports, no patient ID information was provided.

Case 7

Multiple unknown patients result in identity confusion

A member of staff was called to Accident and Emergency (A&E) to assist with multiple unknown patients following a major road traffic accident (RTA). The member of staff was attending to a 2 year old unknown female child who had received O RhD negative blood followed by a unit of blood labelled 'unknown female 2'. Subsequently, it was realised that 'unknown female 2' was the baby's mother and the baby was identified as 'unknown female 1'. The blood was discontinued. The baby was group A RhD positive and the blood given was fortunately compatible as it was O RhD positive but it was not intended or labelled for that child who was not wearing a wristband.

Case 8

Duplicate paperwork for trauma patients

A 23 year old man with multiple injuries was admitted to a trauma bay and the prepared identity documents and wristband attached to him. However, the same registration had already been issued to the previous occupant of that trauma bay. The paperwork is prepared and left in the trauma bay ready for emergency admissions but was not cleared after the previous patient had been discharged. An incompatible component was collected and transfused to the second patient using the details for the first patient. The second patient received 2 units of group A RhD positive blood when his own group was O RhD positive. All the checks for identity at collection and administration were correctly performed. The patient suffered a coagulopathy (which was likely multifactorial in association with extensive trauma and massive transfusion) and haemoglobinuria but recovered.

Review of this case resulted in a change in practice to ensure that all paperwork and documentation is cleared from each trauma bay after patient discharge.

Total bedside administration errors n=29

Table 6.4
What was the pack ID (issue label/ compatibility label) checked against?

Checks reported	Number of cases
Reporter documented no checks carried out	8
Compatibility form alone	3
Compatibility form and patient notes	1
Prescription	1
Refrigerator sign out sheet	1
Patient verbal confirmation of name & DOB	1
Patient verbal confirmation of name & DOB and compatibility form	1
Patient ID band and prescription	1
Patient ID band, verbal confirmation of name & DOB and prescription chart	2
Patient ID band	2
Patient ID band, compatibility form, patient label and case notes	1
Patient ID band and verbal confirmation of name and DOB	1
Patient ID, case notes and prescription	1
Unknown	5
Total	**29***

** In 11/29 cases the patient was unable to participate in the final ID check*

There were 13 different procedures used for the final check prior to transfusion taking place. In 16 cases the process definitely did not include confirmation of the patient ID by checking the wristband. It is evident that the compatibility form is still being used for part of the final check (6/29 reports) despite National Patient Safety Agency (NPSA) SPN 14 and learning points in the 2010 Annual SHOT Report[12]. All those involved in transfusion must fully identify the patient at every step of the process[8]. It is of particular concern that in 8 cases, the reporter commented that there were no checks completed at all. In 11/29 cases the patient was unable to participate in the final ID check but the patient wristband was only documented as being used in 4/11 of these cases.

Table 6.5 Volume of wrong component transfused

Volume given	Number of cases
< 50mL	8
50 - 99mL	4
100mL	6
Whole unit	6
> 1 unit	5
Unknown	1

COMMENTARY on clinical IBCT WCT errors

It is disappointing that individuals participating in the transfusion process still make assumptions about patient identity and fail to perform each step of the process rigorously. Patients should always be asked to identify themselves where possible. These errors occurred despite the presence of two checkers in the majority, 18/29 cases. It is likely that each assumes the other is correct. As indicated in the BCSH guidelines a single person checking can be as safe or safer as he/she knows that he/she has full responsibility[14]. A systematic review found no evidence of a difference between 1 and 2 checkers[32].

Emergency situations are associated with heightened anxiety, rushing and a tendency to take short cuts. Emergency departments must have a robust system of emergency numbering for multiple unidentified victims of trauma.

In 3/35 cases confusion over emergency numbering played a part in the incorrect administration of components. This included duplicate numbers being issued to two separate patients, confusion around emergency numbers versus the patient age (‘unknown female 2’ above) and patients labelled as ‘unknown/unknown’.

There are two particular areas of concern.

1) In case 5 above the child was not wearing a wristband, which was against local and national guidelines, and which should apply in an emergency.

2) The numbering system used by Trusts/Hospitals/Health Boards for unknown patients attending A&E needs to be reviewed in order to identify patients more clearly. It was not Trust policy in the case above to identify patients as ‘unknown female 1,2,3’ etc.

Patients are receiving the wrong components due to failure of the checking process at several points.

Clinical cases where special requirements were not met n=77

In 77 cases special requirements were not met (39 male, 37 female patients and 1 gender not specified). The median age was 56 years and the range was 0-87 years. There were 5 reports related to patients <18 years of age (one 23-day old neonate, one 1-year old, two 3-year olds and one 6-year old). The majority of cases occurred in normal working hours 63/77 (82%) and 11/77 (14.3%) took place out of normal working hours. Most of these cases - 40/75 occurred in haematology departments and mainly relate to failure to request irradiated components (33/40).

Table 6.6 Special requirements not met where the error was clinical

Category of error	No. of clinical cases
Required irradiated components	52
Required cytomegalovirus (CMV) negative components	10
Required both irradiated and CMV negative components	7
Phenotyped and HbS negative units required for patients with sickle cell disease	2
Required human leucocyte antigen (HLA) matched platelets	2
Required phenotyped & K negative <7 days old for a patient with thalassaemia major	1
Blood warmer required for patient with cold agglutinins	2
Washed platelets	1
Total	**77**

Of the 59 clinically based omissions for irradiated components (52 + 7 who required CMV negative in addition to irradiation), the indications for transfusion are as follows:

- 30 treated with fludarabine or other purine analogues
- 9 Hodgkin lymphoma
- 7 pre/post solid organ or HSC transplant
- 3 recipients of antithymocyte globulin
- 3 immunodeficency
- 3 leukaemia
- 1 recipient of Campath®
- 1 baby who had received a previous Intra-uterine transfusion
- 2 unknown

Table 6.7 Location of the patient for whom irradiated components were indicated but not provided

Location	No. of clinical cases
Haematology ward	33
Oncology ward	3
Critical care	5
Neonatal intensive care unit (NICU)	1
Paediatric intensive care unit (PICU)	1
Medical assessment unit (MAU)	5
Theatre	1
General medical ward	2
Respiratory medical ward	1
Renal medical ward	2
Renal surgical ward	2
Trauma and orthopaedic	1
Gynaecology ward	1
Care of the elderly ward	1
Total	**59**

Case 9

Failure to provide irradiated products

An elderly man was admitted after a fall to a 'care of the elderly' ward. He was transfused 9 units of blood for chronic anaemia. Subsequently a haematology registrar found that he had been treated with cladarabine several years before.

In addition to the above, there was one instance where a patient had a stem cell harvest which had to be repeated due to failure to provide irradiated products.

Failure to request appropriate red cells for patients with haemoglobin disorders

There were three patients with haemoglobin disorders whose requirements were overlooked. As a consequence one patient with sickle cell disease (SCD) developed an irregular red cell antibody. The two SCD cases are discussed in the chapter on haemoglobin disorders (Chapter 23). The other was a woman described below:

Case 10
Failure to inform the laboratory of the diagnosis of beta thalassaemia major
A 33 year old woman with beta thalassaemia major was referred from another hospital. There was no documentation of transfusion special requirements in the referral paperwork.

She should have received K negative/C negative/e negative red cells less than 7days old but this was not discovered until the patient had received 63mL of red cells not meeting these requirements

COMMENTARY on SRNM clinical cases

Failure to provide irradiated components where indicated remains the most common omission, as in previous years. In 67/77 (87%) of cases, the origin of the error was in the request or the prescription. This included cases where the transfusion laboratory was not informed about the patient having special requirements. Communication between clinical and laboratory staff is a key element to ensuring that patients' special requirements are met.

Many cases of failure to request irradiated products originate in haematology wards or departments. These demonstrate a lack of adequate knowledge in clinical staff and frequent failure to communicate properly to the laboratory.

Further problems arise when patients who have historical reasons for continued provision of irradiated components (e.g. a history of Hodgkin lymphoma, history of treatment with fludarabine) are admitted acutely with new problems, or to another hospital or department. There is also failure to communicate between teams where patients are under shared care.

There were 17 cases where patients should have received CMV screened components but did not. Although SHOT collects this information, there have been no reports of CMV infection or activation. The infections questionnaire asks for 'viral infections' but not for CMV specifically. Recommendations for CMV screened components have been revised by the Advisory Committee on the Safety of Blood, Tissues and Organs (SaBTO)[33]. As leucodepletion has reduced the risk on CMV transmission, CMV negative products are no longer required for patients receiving HSCT, but are retained for neonates, intrauterine transfusion (IUT) and exchange transfusion. Pregnant women requiring elective transfusion should also receive CMV negative products but this may not be possible for emergency transfusions in pregnancy or at delivery. SaBTO recommends CMV polymerase chain reaction (PCR) monitoring of HSCT and solid organ transplant recipients to detect infection. Transfusion-transmitted CMV infection should be reported to SHOT and Serious Adverse Blood Reactions and Events (SABRE).

Patients with haemoglobin disorders need phenotyped blood which will not be provided if the laboratory staff are not aware of the diagnosis.

Learning points

- Clinical staff have a duty of care to the patients to ensure that all requests for blood and blood components are properly completed and include any information indicating special requirements.
- Clinical staff in haematology departments continue to forget to inform laboratories of patients' special and changing requirements.
- Patients transferred between departments and between hospitals are at particular risk that the documentation of special requirements will be missed.
- Patients with a history of disease or treatment requiring lifelong irradiation of cellular products[26] are at risk of this being missed when admitted for other reasons and to other departments or hospitals.

Recommendations

- Every person involved in the transfusion process must perform rigorous identity checks at each point and ensure that the component collected is the one prescribed (see Chapter 5 - Back to Basics).
- Emergency numbering systems must be robust, and particularly in an emergency all patients must have wristbands issued with a unique ID. Emergency numbers should be ideally random numbers rather than sequential ones, and as much identification information as possible should be included e.g. sex, approximate age, and time of admission.

  Action: Trust/Hospital/Health Board CEOs, Transfusion Laboratory Managers, Accident and Emergency Medicine and Trauma departments

Care needs for patients with special transfusion requirements

- Patients who require irradiated and other special products should be provided with an appropriate card as recommended by the British Committee for Standards in Haematology (BCSH)[26 34].

  Action: Hospital Transfusion Teams (HTTs)

- Patients with cards noting special requirements should be educated about their meaning and importance, in particular always to show these to clinical staff on admission to any hospital.
- Haematologists are advised to confirm that there has been appropriate handover of information and to audit this process.

  Action: HTTs, Consultant haematologists

- Patients with Sickle Cell Disease should be identified to the transfusion laboratory whenever admitted to hospital.

  Action: HTTs

- All patients with irregular antibodies should be issued with antibody cards, and be educated about their importance. General practitioners can also note important transfusion requirements, and include these in any referral to hospital whether emergency or elective.

  Action HTTs

- Suspected transfusion-transmitted cytomegalovirus (CMV) infection infection should continue to be reported to SHOT and the Medicines and Healthcare products Regulatory Agency (MHRA) via SABRE.

  Action: HTTs.

Recommendations still active from previous years:

Recommendations made in the SHOT reports for 2007 and 2009 are still applicable. These are:

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[35].

2009 - 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[27].

Progress with implementation Education is currently under review by a subgroup of the National Blood Transfusion Committee (NBTC) commissioned in October 2011

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