Incorrect Blood Component Transfused (IBCT) Case Studies

2016-2022

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Collection error and lack of pre-administration positive patient identification leads to an ABO-incompatible (ABOi) transfusion

- *Following cardiac surgery, a female in her 70s received an ABOi transfusion during a major haemorrhage (MH)*
- *The patient was group O D-negative and was inadvertently given B D-positive*
- *A unit of red cells was collected by a porter from the issue refrigerator, but this was for another patient on a different ward*
- *None of the details on the issue label/compatibility label were checked*
- *Soon after, the porter realised the error and reported to laboratory staff, but the red cell unit had already been transfused*
- *BloodTrack® was available but not utilised and ward staff did not carry out any pre-administration checks*
- *The emergency response team were not trained to use BloodTrack®*
- *The ward staff were inexperienced in dealing with MH and this event was very unusual and traumatic for those involved*
- *The patient died on return to theatre and the death was attributed to complications of cardiac surgery*

Collection error and incomplete pre-administration checks lead to a haemolytic reaction (1)

- *A patient with blood group O D-positive was admitted to the high dependency unit following a surgical procedure associated with a history of life-threatening sepsis on the background of poorly controlled diabetes*
- *The patient was transfused A D-positive red cells as part of a routine transfusion*
- *The collector transported the red cells from the transfusion laboratory for two patients in two different clinical areas and accidentally mixed the two blood boxes up, therefore the wrong blood component went to the wrong location*
- *In the clinical area the pre-transfusion checking procedure was significantly disrupted as the patient would not permit the nurses to check their identification band, was displaying challenging behaviour and was demanding that staff use their chosen name (the patient was known by a chosen name that did not bear any resemblance to their formal name)*
- *There was a determined effort by staff to undertake the usual pre-transfusion checks, but this was unsuccessful*

Continued…

Collection error and incomplete pre-administration checks lead to a haemolytic reaction (2)

- *The error was detected when the other clinical area phoned the transfusion laboratory to ask where the red cell unit was that was intended for their patient*
- *This was 45 minutes after the blood components had been delivered to each location*
- *Laboratory staff phoned the clinical area to explain the error, asking for the unit to be returned immediately but staff confirmed the transfusion was almost complete*
- *The remainder of the transfusion (10-15mL) was stopped immediately*
- *Senior medical staff were informed, and emergency treatment was commenced*
- *The patient required plasma exchange and renal replacement therapy*
- *The patient died one week after the ABO-incompatible transfusion*

Distractions, familiarity and assumptions lead to an ABO-incompatible transfusion

- *A male patient in his 40s (patient 1) with sickle cell disease was due to receive a routine exchange transfusion as an out-patient*
- *The patient was O D-positive but was given B D-positive red cells*
- *The nurse was about to administer a unit of red cells to patient 2*
- *They became distracted because patient 1's infusion alarm sounded*
- *The nurse, still holding the unit, addressed the alarm and then connected the unit to patient 1 in error*
- *The patient was not wearing an identification band, positive patient identification was not carried out as the nurse was familiar with patient 1, and no other pre-administration checks were completed*
- *The patient consequently experienced chest and groin pain with a feeling of impending doom and was admitted to the high dependency unit for additional observations and monitoring*
- *This gentleman recovered but is consequently very anxious about future treatments*

Communication failure and lack of positive patient identification leads to an ABO-incompatible transfusion

- *A female patient in her 50s with pneumonia and respiratory failure received an ABOi red cell transfusion*
- *The patient was blood group O D-positive and was given B D-negative red cells during a routine transfusion*
- *Nurse 1, caring for this patient, was about to go on their break and asked nurse 2 to arrange for the porter to collect a unit of red cells for this patient*
- *This was carried out, but nurse 2 requested the unit for their own patient in error*
- *Both nurses checked the unit number on the blood component, blood group and expiry date on the red cell unit but did this outside of the patient's room*
- *They did not check the patient's identity (ID) band*
- *Nurse 1's familiarity with the index patient resulted in an assumption that they knew the patient without having to check their identity, unaware of the errors that had already occurred*
- *Earlier, nurse 1 had removed the patient's ID band as it was making it difficult to remove one of the patient's intravenous cannulas*
- *They intended to re-apply a new ID band but forgot to do so*

A wrong blood in tube error leads to ABO-incompatible transfusion in 2016

- *In 2022 a male patient in his 70s was admitted to the emergency department with acute kidney injury, diabetes, and cardiac problems*
- *A pre-transfusion sample was sent for crossmatching and showed an ABO/D grouping discrepancy from historical bloods taken in 2016*
- *During a lookback at the patient's clinical records, it appeared that the patient had received two units of group B D-positive red cells during an urgent transfusion on a general ward during the previous admission*
- *There was no indication of a transfusion reaction, and blood results showed no signs of haemolysis*
- *The patient was confirmed to be group A D-positive*

D-positive red cells issued to a D-negative patient due to cognitive bias

- *A female patient in their 60s was admitted in renal failure, and a request of two units of red cells was made to the transfusion laboratory*
- *The patient had a flag for irradiated components on the laboratory information management system (LIMS) but, due to local policy, this required confirming with the clinical area as several years had passed since their previous admission*
- *The local team completed the required specific requirements form, but two forms were sent to the laboratory with disparity between the requirement for irradiated components*
- *As a precaution the biomedical scientist (BMS) updated the LIMS to state continue to give irradiated until the discrepancy could be resolved*
- *The patient was group AB D-negative, but the BMS issued A D-positive red cells in error*
- *Information technology alerts were overridden as the BMS assumed these were due to ABO substitution, and as their focus remained on the irradiated requirement, they did not detect the D-incompatibility*

Crossmatching errors resulted in a patient receiving uncrossmatched red cell units

- *A biomedical scientist (BMS) performed automated crossmatches for Patient 1 and Patient 2 on the blood grouping analyser*
- *In error they crossmatched the same two units of red cells against both patients*
- *Patient 1 received the two crossmatched units, but Patient 2 received two uncrossmatched units*
- *Later during the day, the BMS detected their error and retrospectively crossmatched Patient 2 with the correct two units, but this was after the transfusions had been completed*
- *The staff member was a bank BMS with known stress-related issues but was working a supported day shift*

Omission of pre-administration checks leads to a wrong patient transfusion (1)

- *Patient 1 and Patient 2, in adjacent rooms, were under the care of a regular agency nurse*
- *Red cells were prescribed and crossmatched for Patient 1 (a male in his 70s) who was group A D-positive*
- *The agency nurse did not have access to the electronic administration system which would have allowed them to collect the red cell units for transfusion*
- *Another ward nurse collected the red cells (same blood group) on their behalf and on return scanned a pre-printed ID band which was in the patient's clinical notes*
- *The red cell unit was then handed to the agency nurse to administer*
- *The blood component had been scanned away from the patient's bedside*

Continued…

Omission of pre-administration checks leads to a wrong patient transfusion (2)

- *The agency nurse, who was not trained to administer blood transfusions, took the unit to Patient 2 (a female in her 80s) in error and the other nurse did not go to the patient's bedside with them to complete pre-administration checks*
- *Pre-transfusion observations and bedside checks against the blood unit, prescription and patient were not completed and the transfusion was started*
- *Patient 2 needed assistance to use the bathroom and at this point the ward nurse noticed the error and stopped the transfusion*
- *By now 176mL had been administered to the wrong patient*
- *Both patients had the same blood group and the patient who had been given the transfusion incorrectly suffered no adverse effects*

Lack of clear communication leading to incorrect component transfused

- *A male in his 70s with neutropenic sepsis and lymphoma had been prescribed platelets*
- *The patient had also been prescribed red cells but they were not to be transfused unless there was a drop in the patient's haemoglobin from 69g/L*
- *The nurse contacted the porter and asked them to 'collect a blood unit from blood bank'*
- *The porter went to the laboratory refrigerator and collected a unit of red cells*
- *Upon arrival of the component on the ward, the red cells were handed over to the nurse*
- *The blood component and patient details were checked by two registered nurses*
- *Although the details checked were all correct, staff failed to recognise that the blood component being transfused was red cells and not the platelet unit that was meant to be given*
- *The error was discovered 15 minutes into the transfusion when the nurse was about to check the patient's first set of observations*
- *The transfusion was discontinued immediately, and the patient was reviewed by the medical team*
- *The patient was stable throughout and no complications occurred 24-48 hours post transfusion*
- *The patient then received their platelet transfusion*

Lack of consideration of pregnancy and Hodgkin lymphoma on transfusion requirements

- *A female in her 20s who was pregnant and had very recently been diagnosed with Hodgkin lymphoma attended the haematology/oncology clinic for transfusion of red cells as she had a haemoglobin result of 86g/L*
- *Two units of red cells were requested and were issued by the laboratory*
- *The staff nurse later contacted the laboratory to report a possible transfusion reaction during administration of the first red cell unit*
- *When the biomedical scientist was taking these details, the nurse happened to mention that the patient was pregnant*
- *No information had been given on the request form, pregnancy 'yes' was not circled*
- *The two units issued were not cytomegalovirus (CMV)-negative*
- *The second unit was recalled*
- *This patient should have also received irradiated blood components*

Lack of consideration of pregnancy on transfusion requirements

- *A female in her 30s was pregnant at 36/40 weeks gestation*
- *She had been admitted due to experiencing reduced fetal movements, hypertension and a haemoglobin of 82g/L*
- *The transfusion laboratory received a request for four units of red cells*
- *The transfusion request did not specify the transfusion requirements namely 'cytomegalovirus (CMV)-negative units required' or that the patient was pregnant*
- *The midwife informed the biomedical scientist that the red cells were for standby and would only be transfused post delivery, if required*
- *The following day it was identified that the red cells were required to treat the patient's anaemia, not to cover for any blood loss relating to a caesarean section*
- *One of these red cell units had been transfused to the patient at this point*
- *As the patient was pregnant, she should have received CMV-negative units for all routine transfusions prior to delivery*

Incorrect ABO group issued via electronic issue in error for a liver transplant patient

- *A group A male patient in his 30s underwent a liver transplant from a group O donor*
- *The laboratory information management system was not updated with the appropriate flag to reflect the transplant and the requirement of group O red cells and exclusion from electronic issue, with only a note of the liver transplant added to the notepad section*
- *Six units of group A red cells were transfused during theatre, and 5 days post transplant a further unit of group A red cells was released via remote issue*
- *The investigation stated the standard operating procedure was not clear on when the flag should be added*

Incorrect D-positive platelets issued to a child post haemopoietic stem cell transplant (HSCT) with preventative actions for other transplant patients

- *A young D-positive child received a D-negative HSCT but was issued D-positive platelets in error*
- *Preventative action in this organisation was to create new laboratory information management system flags for transplant groups with this new alert being added to all patients who had received a transplant in last 4 years*

Incorrect ABO platelets issued following haemopoietic stem cell transplant (HSCT) with contributory human factors

- *A group O D-positive male in his 30s received an A D-positive HSCT but was issued with group O platelets in error*
- *There were laboratory information management system (LIMS) alerts in place, but the reporter stated that there were limitations associated with management of platelets in transplant patients*
- *The laboratory relied on biomedical scientist staff being familiar with these limitations when selecting appropriate platelets*
- *Multitasking of multiple crossmatches and platelet requests and rushing to complete work prior to the end of their shift also contributed to this error*
- *Workload management has been discussed with the transfusion laboratory team, and the limitations within the LIMS have been escalated on the local risk register*

ABO-incompatible (ABOi) error related to convalescent plasma

- *A male in his 60s with a blood group of A D-positive was issued a unit of O D-positive COVID-19 convalescent plasma (CCP) in error by the transfusion laboratory*
- *The laboratory information management system (LIMS) alerted the biomedical scientist (BMS) to the ABO discrepancy, but this was overridden, and the unit issued*
- *The nurse administering the CCP noted the ABO discrepancy but believed O plasma could be transfused to group A recipients*
- *Within 17 minutes of the transfusion commencing the patient began complaining of loin pain and the transfusion was stopped and patient was medically reviewed*
- *It was felt the loin pain was consistent with previous medical history and given pain relief*
- *The pain settled and the transfusion was restarted*
- *Following administration of the CCP unit the patient complained again of loin pain, and the ABO discrepancy was detected*
- *The patient was monitored closely and fully recovered*

ABO-incompatible (ABOi) error due to misunderstanding of instructions on the laboratory information management system (LIMS)

- *A major haemorrhage protocol (MHP) was initiated for a male in his 40s following transfer from an outlying hospital where he had received group O D-negative emergency red cell units*
- *Blood grouping results indicated a mixed field population of both O and A, and D-negative and D-positive red cells*
- *The ABO/D group was entered into the LIMS as A D-positive, with a note in the patient record stating to crossmatch and issue group O D-positive components until the group could be confirmed by further samples*
- *A request was made to the transfusion laboratory for fresh frozen plasma (FFP) and group O FFP was selected and issued as per instructions*
- *The patient received 3 units of ABOi FFP*
- *There was no mention of clinical harm to this patient*

ABO-incompatible (ABOi) error due to miscommunication during handover

- *A telephone call was received in the transfusion laboratory requesting two units of cryoprecipitate for a male in his 40s*
- *During the same telephone call two units of cryoprecipitate were also requested for another patient*
- *Both patients were group A*
- *The telephone order was taken during handover between the day and night shifts*
- *In an informal conversation between the two biomedical scientist (BMS) staff the day shift BMS mentioned that there were only two units of group A cryoprecipitate remaining in stock and the night shift would need to order more group A or find out if another group (group O) would be a suitable substitute*
- *The night shift BMS misunderstood the day shift BMS and thought they had been instructed to issue group O to the second patient and proceeded to issue group O cryoprecipitate units to the patient*
- *The laboratory information technology (IT) system warned the BMS that the units they were issuing were 'incompatible'*
- *At this point the BMS acknowledged and overrode the warning to proceed with the product issue*
- *No harm was detected in the patient*

Dealing with two units of blood for two different patients at the same time

- *A patient in his 30s with oesophageal varices was having an endoscopy as an out-patient. Some bleeding was identified, and he was found to have deranged clotting and a haemoglobin of 91g/L. He was admitted to the ICU for monitoring and treatment*
- *The unit was treating patients with COVID-19. There were two patients (one located within the 'hot' zone and the other within the 'cold' zone) and the porters had been asked to collect their blood units at the same time*
- *Both units were collected and delivered to the 'hot' zone. The temporary agency nurse covering the shift set up the first unit and it was transfused to the patient quickly as he was actively bleeding*
- *The second unit was then set up for the same patient and administered. Soon into the transfusion, the patient complained of intense back pain, melaena and shivering. It was then identified that the unit intended for another patient had been set up and was immediately stopped*
- *Further information provided with the report alluded to poor lighting in the work environment as also being contributory*

Patient given red cells instead of platelets

- *A male patient in his 60s with acute myeloid leukaemia, neutropenic sepsis and a low platelet count of $15x10^9$/L was admitted to a medical ward*
- *A platelet transfusion was prescribed*
- *Nurse 1 went to the platelet agitator, but it was not operational at the time (nurse had not been informed of this), the patient had red blood cells in the issue refrigerator, so these were collected instead of the platelets*
- *The nurse checked the unit with a colleague but not at the patient's bedside*
- *Nurse 2 read the prescription and questioned if this was the correct component as she was concerned that it had been prescribed to be administered over 30 minutes*
- *Nurse 1 sought the advice of the prescribing doctor (but did not show the doctor the unit of red cells) and was reassured platelets can be transfused over 30 minutes*
- *The patient raised his concerns about what he was being given due to the colour of the component, but despite this, Nurse 1 started the transfusion without Nurse 2 present to complete the checks*
- *Nurse 1 realised she had made an error after 10 minutes and the transfusion was stopped. There was no harm to the patient*

Non-irradiated component administered despite the patient highlighting the specific requirement to the administering nurse

- *A female patient in her 60s with acute myeloid leukaemia was admitted to a haematology ward for chemotherapy (purine analogue). As she had symptomatic anaemia, neutropenic sepsis and a haemoglobin (Hb) of 76g/L she was transfused two units of red cells and 1 unit of platelets*
- *The units issued and transfused did not meet the specific requirements as they were not irradiated. Fludarabine had been prescribed and issued from pharmacy without an irradiated components registration number, which should have been the correct process for ensuring a patient receives irradiated components if a transfusion is required*
- *The transfusion laboratory was not informed that the patient required irradiated components and as there was no flag on the laboratory information management system (LIMS) to alert the biomedical scientist (BMS) to the irradiation requirements, standard units were issued*
- *The patient asked staff to check that the components had been irradiated but this was not acted upon. Nursing staff did not accurately complete the pre-transfusion checks when administering the transfusion and it was commenced*
- *A pre-administration bedside checklist had been used ineffectively and it was recorded that specific requirements had been met when they hadn't*
- *They had also failed to respond to alerts on the ward handover and the electronic prescription which highlighted the need for irradiated components. Staff had assumed that the components were irradiated but did not check*

Requirement for irradiated red blood cells missed

- *A male patient in his 50s with non-Hodgkin's lymphoma in shared care was prescribed Bendamustine*
- *The transfusion laboratory in hospital 1 had been informed about the need for irradiated blood components*
- *Patient attended hospital 2 where the transfusion laboratory was not aware of the specific transfusion requirement*
- *Irradiated blood components were not requested appropriately on the transfusion request form and as the laboratory information management system (LIMS) had not been updated with the irradiated blood requirement this was not flagged in the transfusion laboratory*
- *Two units of non-irradiated red cells were issued*
- *The nurses checking the first unit at the patient's side were unaware that irradiated red cells were required as it was not on the prescription, and the whole unit was transfused*
- *It was only on checking the second unit by a junior member of the clinical team who had recently attended transfusion training, which had detailed specific requirements for patients treated with Bendamustine, that the error was discovered*
- *The second unit was not transfused and returned to the laboratory*

Beta thalassaemia on request not investigated

- *A woman in her 60s attended the emergency department (ED) requiring a blood transfusion*
- *The patient told ED staff they had beta thalassaemia and presented their antibody card from the Blood Service*
- *The request received in the laboratory stated 'Beta thalassemia major, regular red blood cell (RBC) transfusion and intra op femoral nailing', but the biomedical scientist (BMS) did not investigate this further and two standard red cells were issued by two different members of staff over the following hours which did not meet extended phenotype and red cell antibody requirements*
- *A further blood request was received by a third BMS who determined that further investigation was needed*
- *Specialist Services electronic reporting using Sunquest's Integrated Clinical Environment (Sp-ICE) was checked, which detailed presence of known antibodies and an extended phenotype*

Antigen-negative requirements missed due to cognitive bias

- *A woman in her 40s with known anti-e and anti-C requiring a blood transfusion due to multi organ failure received red cells not antigen-matched for known red cell antibodies*
- *The biomedical scientist (BMS) received a request for two red cell units for this patient, and upon seeing the patient's date of birth (DOB) and assumed that, as the patient was of childbearing potential, they should receive R1R1 (c-E-) red cells in accordance with local policy, rather than identifying that patient required R2R2 (C-e-) red cells due to presence of anti-C and anti-e red cell antibodies*
- *Laboratory information management system (LIMS) warning flags were in place but were not heeded*
- *C and e-positive red cell units were serologically crossmatched and issued*
- *There was no clinical reaction in the patient following blood transfusion*

Post-haemopoietic stem cell transplant (HSCT) issued incorrect ABO/D platelets

- *A male post-HSCT patient in his 60s who now grouped as O D-negative was issued B D-positive platelets by the biomedical scientist (BMS)*
- *The post-HSCT comments for this patient were on the 4th page of the laboratory information management system (LIMS) record, and the BMS did not check all the available comments*
- *The error was detected at the bedside*

D group incorrectly transcribed from the laboratory information management system (LIMS) onto request form

- *An ABO/D group was transcribed from the LIMS incorrectly onto the transfusion request form of a woman in her 50s by a biomedical scientist (BMS) as B D-positive, but the patient was in fact B D-negative*
- *The newly qualified BMS, who should have been under supervision, was rostered to work on a late shift due to extremely low staff levels*
- *The BMS issued three red cells units, with the LIMS alerting to the incorrect D group, but alarms were overridden by the BMS*
- *The error was detected during the pre-administration checks*

Red cells issued not meeting cytomegalovirus (CMV) or irradiation requirements (CMV local requirement)

- *A request form received in the laboratory for a child <10 years old stated a requirement of CMV-negative and irradiated components*
- *The biomedical scientist (BMS) did not update the laboratory information management system (LIMS) with this information*
- *At the point of issuing the red cell units the BMS thought they remembered this patient's specific requirements from earlier in the day and issued standard components*
- *The report stated that the BMS was rushing to get work completed as they were lone working out-of-hours without a break in 6 hours with a high workload reported*
- *The error was detected at the bedside*

Distraction during bedside checks

- *Patient 1 was a gentleman in his 80s who had recently had surgery for a fractured neck of femur but did not require a blood transfusion*
- *The nurse was dealing with Patient 2 in the next bed who did require a transfusion. The appropriate checks were made on the blood prescription, the unit of blood and the patient identification using a bedside checklist*
- *Before the transfusion could commence Patient 1, who was being cared for by an aspirant nurse*, became acutely unwell and required the assistance of the nurse. When Patient 1 was stable the nurse preceded to connect the unit of red cells for Patient 2 to Patient 1, without restarting the checking process, and commenced the transfusion*
- *The error was noted at a handover meeting approximately 15 minutes later, by this time Patient 1 had received approximately 15mL of the unit prescribed to Patient 2.*
- *This patient went on to have a delayed haemolytic transfusion reaction, and the patient subsequently recovered*

**Aspirant nurses were introduced nationally as a rapid response to staffing concerns during the first wave of the COVID-19 pandemic. This role enabled student nurses in the final 6 months of their training programme to be employed as Band 4 nurses to use the skills and experience they had attained whilst they were supported to complete their training, through observational assessment of the use of their knowledge and skills in practice. Although these nurses could manage the care of a group of patients under the supervision of a registered nurse, they were not able to administer medication or blood products*

Transfusion of antigen-positive blood due to misidentification of alloantibodies in non-ideal working conditions

- *A male patient in his 50s undergoing chemotherapy required a red cell transfusion*
- *The antibody identification panel showed a historical anti-C, however a newly presenting anti-Fy^b was missed and an appropriate antigen-negative unit was not selected*
- *The BMS performing the panel was rushing to avoid leaving unfinished work for the next shift. They failed to perform full antibody exclusions on the panel and relied on previous history to guide decision making*
- *The unit was crossmatch-compatible by indirect antibody test and the mistake was detected 4 days later when panel results were second checked by a senior BMS*

Positive patient identification not carried out

- *A patient in his 60s with bladder cancer was being given a second unit of blood to increase his haemoglobin from 91g/L (result after first unit was transfused)*
- *A paper 'authority for collection of bloods and blood components' form was completed and was taken by the porter to the laboratory to collect the blood component. The patient's identification (ID) label should be added to this form, signed and dated by the nursing staff. The incorrect patient's ID label was put onto the request form, and this was used to collect the unit*
- *The unit of blood arrived on the ward with details on the tag matching those on the collection slip. The nursing staff failed to check the patient name on the unit of blood directly against the patient's ID wristband or to check the patients name, hospital number and date of birth on Prescribing Information and Communication* System *against the unit of blood*
- *The checks were made between the authority for collection of blood and blood components form only*
- *After 15 minutes the patient began to experience shortness of breath and abdominal pain, the transfusion was stopped but the tag details were not checked. The doctor was informed and the advice was to wait until symptoms settle (thought to be related to underlying condition) and restart transfusion.*
- *The nurse then went off shift and the incorrect unit of blood was only recognised by the nurse on the next shift when they went to re-start the blood*

Confusion over documentation leads to incorrect transfusion (1)

- *A patient (patient 1) in his 50s was being treated for a gastric adenocarcinoma with chemotherapy*
- *It was noted during his outpatient consultation that his haemoglobin had dropped to 44g/L. The patient was admitted to hospital for an urgent blood transfusion of three units of red blood cells*
- *The first two units were transfused without any issues. A few minutes after the third unit was commenced the patient complained of an 'impending sense of doom'*
- *A doctor, who was already dealing with an emergency elsewhere, advised giving hydrocortisone and chlorphenamine and to restart the blood if the patient settled. The medication was given as advised and the patient initially responded to the treatment and became settled but subsequently developed rigors*
- *It was then noted that the unit of blood connected to the patient was intended for another patient (patient 2) with the same surname*
- *Staff from the security team are allocated to collect blood components overnight. The security member of staff went to the ward to obtain the paper collection card and then went to the blood collection room*

Confusion over documentation leads to incorrect transfusion (2)

- *This collection card contained the details of patient 1. The staff member selected the correct compatibility slip in the blood collection room folder, placed the ward collection card in the appropriate box and went to the refrigerator to collect the unit of blood*
- *He recalled that the blood was not in the allocated shelf as indicated on the compatibility slip. He lost his place in the compatibility folder but could recall the patient's surname. He found patient 2's compatibility slip and proceeded to collect the unit of blood intended for patient 2*
- *The blood component should be tracked and signed out on Clinical Web Portal (CWP) using the computer in the blood room but the member of staff was unable to log on that evening and had experienced issues previously with the computer in this respect*
- *The blood was taken to patient 1's bedside and verbal checks were attempted but the patient complained about being woken up. The nurse recalls checking the surname (same surname as patient 2) on the patient's wristband and commencing the transfusion*

More than one unit of blood checked at the same time and bedside checks not carried out

- *A patient in his 50s with sickle cell disease was having a 'top up' blood transfusion in the haematology outpatients department*
- *The nurses checked two units for two different patients at the same time against the electronic prescriptions and administered the unit intended for one patient to the other*
- *The alarm on the pump sounded as the cannula had blocked and was at this point it was realised the patient was being given a unit of blood intended for another patient and the transfusion was stopped*
- *The final checks had been completed by two nurses but away from patient's bedside. A bedside checklist had not been used and the final bedside checks had not been carried out. The patient was not wearing a wristband and positive patient identification was not made*

Bedside check not carried out leading to ABO incompatible (ABOi) transfusion

- *A patient in his 60s was being treated for anaemia which was still being investigated, pre-transfusion haemoglobin was 68g/L. A unit of blood was ordered and was collected by the healthcare assistant*
- *When the unit arrived on the ward two nurses undertook the pre-administration checking procedures at the nursing station, and not at the patient's bedside. One nurse then took the unit of blood and the associated paperwork to the patient's bedside (the other nurse was called away to deal with something else)*
- *The nurse proceeded to complete the bedside checks alone but did not carry out positive patient identification by checking the patient's identification wristband and the transfusion was started*
- *Approximately 35 minutes later the patient began to experience breathing difficulties and became 'shaking and jittery'. The transfusion was stopped and at this point it was noticed that the unit of blood being transfused was for another patient*
- *The patient was admitted to high dependency unit overnight for observations due to the reaction to the wrong blood administration*

ABO-incompatible transfusion caused by a distraction

- *A patient in her 80s was being treated in the Haematology day care unit for chronic anaemia and was due to have a blood transfusion. The unit was short staffed and another patient was seriously ill requiring the full attention of another qualified nurse*
- *The nurse collected red cell units for several patients and opened the transport box in the department, placing two units on the work surface*
- *Administration checks were carried out for patient 1 using the electronic blood tracking system with the correct unit. The nurse was momentarily distracted and when they turned back picked up a unit of blood, set this up and began administration via a pump*
- *When the nurse turned to deal with the second unit of blood (for patient 2) it was realised that the wrong unit had been started for patient 1*
- *The pump with the wrong unit was stopped immediately. No volume change had been registered on the pump so although it was connected and started it was unlikely that the patient had received any of the wrong blood, an estimate was less than 0.1mL of blood transfused if at all*

Two units of group O fresh frozen plasma (FFP) transfused to a group A recipient despite a laboratory information management system (LIMS) flag being present

- *A female patient in her 50s was admitted as a code red trauma patient following a road traffic accident. She suffered a massive haemorrhage, arrived in the emergency department and received several units of emergency group O red cells before a group and screen sample could be taken*
- *A sample was taken and processed by the laboratory, but the results showed dual populations because of the O red cells transfused and the group was inconclusive*
- *There was a historical blood group from 1992, but this could not be linked to the current record in the LIMS. The patient's blood group was manually edited to group O with a flag added to the LIMS record to give universal components only as stated in the laboratory procedure for this situation*
- *FFP was later requested and the biomedical scientist on duty selected, thawed, and issued two units of group O instead of AB or A as a universal plasma component*
- *The alert flag to give universal components was shown but not acted upon. Both units were collected and transfused with no reported harm to the patient*

Group O COVID-19 convalescent plasma (CCP) transfused to a group A recipient

- *A female in her 30s who was blood group A, was enrolled on the convalescent plasma arm of the REMAP-CAP trial and was transfused with a unit of group O CCP*
- *On investigation there was no ABO-compatible convalescent plasma in stock and instead of ordering this from the Blood Service the BMS selected group O after discussion with a less experienced member of staff and thought this would be acceptable because the unit was high titre-negative*
- *The laboratory information management system (LIMS) had an alert flag for the ABO-incompatibility, but this was not heeded*
- *A unit of group O CCP was also issued to the same patient the previous day, however this was wasted as it had been stored inappropriately in the ward refrigerator*
- *The ABO-incompatibility was not detected upon return of this unit and was only raised when a different BMS was issuing the 2nd dose (3rd unit) and saw the ABO-incompatible units in the patient's history*
- *The laboratory has now had the LIMS updated to prevent group O plasma components being issued to a non-group O recipient. No patient harm was reported*

Group A red cells selected for major haemorrhage pack

- *During a major haemorrhage protocol (MHP) activation for a ruptured aneurysm a component selection error in the transfusion laboratory resulted in a unit of group A red cells being transfused to a group O patient*
- *The patient had no known group at the time of selection, and the error was not detected at collection or bedside administration*

A more detailed case is provided under laboratory errors

Collection error and failure to carry out positive patient identification (ID) (1)

- *A patient in their 70s was admitted with abdominal pain following a road traffic collision*
- *The patient had a past medical history of abdominal aortic aneurysm (AAA)*
- *The following morning the patient deteriorated and lost a massive amount of blood per rectum*
- *This was subsequently identified as secondary to aorta-enteric fistula*
- *Urgent blood transfusion was prescribed*
- *Less than a minute after starting the transfusion it was noticed that the name on the blood bag didn't match the patient and the transfusion was immediately stopped*

(continued)

Collection error and failure to carry out positive patient identification (ID) (2)

- *The blood collected from the satellite refrigerator had a different patient name on it*
- *The nurse who collected the blood from the satellite refrigerator did not follow the correct procedure*
- *Pre-administration checks were not fully completed as the blood pack was not checked against the patient ID band*
- *Of the four staff that were involved in the incident only one had their blood transfusion collection competency and theory learning up to date*

Bed number used as sole patient identifier

- *A man in his 50s had recently received a liver transplant*
- *Two units of blood were prescribed due to his low haemoglobin (Hb)*
- *The blood transfusion was not considered to be urgent*
- *Blood was ordered via the electronic ordering system, at the request of the nurse looking after the patient to the nurse in charge*
- *The only information shared between the two nurses was the patient's bed number*
- *The two nurses did not have any discussion to verify the patient's identity*
- *One nurse then went alone to administer the blood but did not positively identify the patient as she believed that as she knew the patient well this was not necessary*

Failure to carry out positive patient identification

- *A female patient in her 50s was admitted due to a declining Hb level of less than 70g/L and chronic obstructive pulmonary disease (COPD)*
- *Red cells were prescribed*
- *Two nurses checked the red cells at the nurse's station and one of them took the unit to the wrong patient, did not carry out positive patient identification, and started the transfusion*
- *A healthcare assistant noticed the transfusion was being given to the wrong patient, sought immediate advice and the transfusion was stopped two minutes after it started*

Group O fresh frozen plasma (FFP) selected in error for a major haemorrhage pack

- *During an major haemorrhage protocol activation for intra-abdominal haemorrhage group O red cells and group O FFP were selected by the biomedical scientist (BMS) prior to completion of patient blood grouping, the patient group was subsequently found to be A D-positive*

- *The patient received four units of incompatible FFP and unfortunately passed away, however this was thought to be unrelated to the transfusion*

Group O fresh frozen plasma (FFP) incorrectly selected for transfusion of a neonate

- *Group O FFP was mistakenly selected for a group A neonate*

- *The unit was selected by one biomedical scientist (BMS) and issued by another who overrode laboratory information management system flags believing the previous BMS had defrosted the correct unit*

Incomplete interpretation of serology leads to transfusion of antigen-positive blood (1)

- *During a nightshift, two units of red cells were requested for a patient with myelodysplastic syndrome and known alloantibodies (anti-K and anti-Lu^a)*
- *The antibody panel showed additional reactivity, therefore biomedical scientist (BMS)1 performed a secondary panel*
- *Two units of crossmatch-compatible blood were issued without complete interpretation of the second panel*
- *The following day whilst inputting the results into the laboratory information management system, BMS2 noticed a positive reaction which was previously overlooked*
- *Additional testing was performed which identified an anti-E antibody*

(continued)

Incomplete interpretation of serology leads to transfusion of antigen-positive blood (2)

- *One of the units issued and transfused was E-positive, however the patient suffered no adverse effects*
- *The transfusion was a routine request and could have been performed during the next day shift*
- *The laboratory had four long term vacancies causing routine work to continue into non-routine shifts*
- *The BMS performing initial testing was the sole BMS covering haematology and transfusion*
- *They were inexperienced and had not received optimal training due to senior staff covering night and weekend shifts*
- *The hospital management have now agreed to allow locums to cover vacancies*

Wrong blood issued for non-urgent transfusion during IT downtime

- *An elderly female with no red cell antibodies was given two units of O D-positive blood during IT downtime*
- *She was actually O D-negative and this was identified when the manually issued units were retrospectively entered into the laboratory information management system (LIMS)*
- *The error was an incorrect manual interpretation of the blood group, but also failing to have a second checker of the results and the issue of correct components when manual procedures were in place*
- *The scheduled IT downtime lasted for 6 hours, 2 hours longer than expected, and the hospital transfusion laboratory was issuing blood for non-urgent patients during this time which made the laboratory staff very busy*

Incorrect use of electronic blood tracking system

- *A postoperative female patient aged less than 50 years with a haemoglobin (Hb) of 70g/L required an 'urgent' transfusion*
- *A registered nurse did not follow the correct procedure when collecting blood from a remote issue refrigerator*
- *Two units of group O D-positive red cells were removed without entering the patient's details or printing a compatibility label*
- *The blood was then transfused to the patient without any bedside checks*
- *Fortunately, the patient was O D-positive and suffered no adverse effect*

Laboratory information management system (LIMS) defaults to 18-week sample validity

- *A problem with the LIMS configuration was identified during a sample audit*
- *It was recognised that two units of red cells had been collected from a remote issue refrigerator and transfused during an emergency in theatres based on a sample that was invalid (16-week-old)*
- *The local policy stated a maximum of 12 weeks for sample validity for remote electronic issue*
- *Investigations during the audit showed that the LIMS defaults to a fixed sample validity of 18 weeks*
- *This highlights the importance of configuring the LIMS to reflect local policies*
- *Initial validation or periodic revalidation should have detected this discrepancy*

An update to report printing has an unexpected effect on electronic issue (EI)

- *An upgrade to the laboratory information management system (LIMS) was requested with the purpose of changing how transfusion reports for the general practitioner (GP) were printed*
- *An algorithm intended to be run overnight identifies a GP report, prints the report and removes the flag from the sample*
- *This had an unexpected effect on a completely different and unrelated task – that of identifying sample unsuitable for EI*
- *The new algorithm turned off the flag that states a sample has been manually edited and the case is ineligible for EI*
- *This could potentially result in inappropriate permission for electronic blood issue*
- *The hospital reported to the LIMS provider who have investigated and corrected as well as communicating to all users of their system*

Use of remote electronic issue (EI) fails to provide irradiated blood components

- *Two units of irradiated red cells were requested for a male in his 70s with Hodgkin's Lymphoma*
- *This specific requirement was not flagged on the laboratory information management system (LIMS), but irradiated blood was crossmatched and placed in the issue refrigerator*
- *The clinical staff by-passed the crossmatched blood and opted for remote-issue blood instead*
- *Because the LIMS flag had not been set, Bloodhound360 ® then released short-dated non-irradiated blood and one unit plus 100mL of the second unit was transfused before this error was detected*

Failure to perform the administration checks at the bedside leads to transfusion of ABO-incompatible red cells and results in major morbidity (1)

- *The nurse checked the details on the unit of red cells against the prescription with one of the ward doctors*
- *The checks were performed, and the prescription was signed at the nurse's station, not at the bedside*
- *The nurse failed to positively identify the patient, failed to perform any bedside checks and did not ask another trained and competent member of staff to perform the same checks at the bedside*
- *The transfusion was commenced on the wrong patient*

(continued)

Failure to perform the administration checks at the bedside leads to transfusion of ABO-incompatible red cells and results in major morbidity (2)

- *The patient received approximately 50mL of incompatible red cells, (donor group A D-positive, recipient group O D-negative)*
- *Symptoms of reaction included; desaturation to SpO_2 88%, the respiratory rate increased to 40 breaths per minute and the patient was 'feverish'*
- *The patient was treated with hydrocortisone, chlorphenamine and oxygen and moved to critical care and monitored for organ damage*
- *She remained in critical care for several days before moving back to a general ward and being discharged home*

Major morbidity following transfusion of ABO-incompatible (ABOi) red cells due to misinterpretation of manual ABO grouping (1)

- *Group-specific red cells were requested urgently, during core hours, for a patient with an upper gastrointestinal bleed*
- *No transfusion history was available for the patient at the time of issue*
- *The emergency department (ED) requested group-specific red cells due to the perceived risk to the patient of a delay*
- *Red cells were released prior to completion of the serological crossmatch due to the urgency of the situation*
- *Serological crossmatching identified that the red cells were incompatible*
- *The manual ABO grouping of the patient had been interpreted incorrectly as B D-positive (correct group was A D-positive)*

(continued)

Major morbidity following transfusion of ABO-incompatible (ABOi) red cells due to misinterpretation of manual ABO grouping (2)

- *A second member of staff was available, but it was not policy to second check the result*
- *No testing on a second sample was undertaken to confirm the group and the policy did not specify issuing group O red cells until a second group was obtained*
- *The biomedical scientist (BMS) did not routinely work in the transfusion laboratory*
- *The patient received approximately 90mL of incompatible red cells and was admitted to the intensive therapy unit (ITU) due to the adverse transfusion event*
- *No further ill effects were observed*

Interpretation error and inappropriate electronic issue (EI) resulted in the wrong ABO group transfused to a liver transplant patient

- *Red cells were requested out-of-hours for a patient who underwent an ABO-mismatched liver transplant (patient B D-positive, donor liver O D-positive) in a different centre three weeks earlier*
- *The patient had previously been grouped manually but a historical record was available on the laboratory information management system (LIMS) at the time*
- *The analyser identified anti-B in the patient plasma, but the result required manual interpretation on the LIMS and was misinterpreted as B D-positive*
- *The LIMS then allowed EI when serological crossmatch should have been performed and the electronic tracking system did not alert as the blood issued matched the patient's group*
- *Following transfusion, the patient had a spike in temperature and became tachycardic, tachypnoeic, with an increased oxygen requirement*
- *The transfusing hospital rarely dealt with transplant patients*

Failure to correctly complete the checking process at the administration step leads to transfusion of ABO-incompatible red cells

- *A unit of red cells (group B D-positive) was correctly collected, prescribed and delivered to the clinical area*
- *Two registered nurses using a 'dependent check' checked the unit against the laboratory paperwork and prescription but not the patient*
- *The nurse then went to the wrong patient and commenced the transfusion (patient group A D-negative)*
- *The doctor on the ward noticed that a transfusion had been commenced on his patient for whom he had not prescribed blood, he investigated and immediately stopped the transfusion*
- *The investigation revealed that the patient was not wearing an identification band and would not be able to identify himself*

Failure of the correct checking process at both collection and administration steps leads to transfusion of ABO-incompatible red cells

- *The wrong unit of red cells was collected by a healthcare assistant (HCA) from a remote issue refrigerator without any formal checks*
- *The collection slip included the correct patient details for whom the transfusion was intended*
- *The HCA had been trained and competency-assessed to collect blood components, but this had expired*
- *Red cells were taken for another patient with a similar surname*
- *The nurse on the ward failed to notice the wrong unit of red cells had been collected and then failed to complete the administration checks at the bedside, including failure to positively identify the patient*
- *The patient (group O D-positive) received the full unit of group A D-positive red cells. The patient was admitted overnight as a precaution, no signs of reaction noted and was discharged home the following day*

Intentional transfusion of ABO-mismatched cryoprecipitate

- *Cryoprecipitate was requested for a patient (group A) with ongoing bleeding as per advice from a consultant haematologist*
- *Group A was initially thawed but had to be discarded as not used within the 4-hour time limit. There were no further units of group A cryoprecipitate in stock, only group O*
- *The biomedical scientist (BMS) checked the standard operating procedure (SOP) and blood transfusion policy and could not find any definite statements that said group O could or could not be given to a group A patient*
- *After liaising with a senior BMS and checking the Joint United Kingdom (UK) Blood Transfusion and Tissue Transplantation Services Professional Advisory Committee (JPAC) website (https://www.transfusionguidelines.org/transfusion-handbook/2-basics-of-blood-groups-and-antibodies/2-4-theabo-system), group O high-titre negative units of cryoprecipitate were issued and transfused with no adverse impact noted*

ABO-incompatible fresh frozen plasma (FFP) issued following an interpretation error during testing

- *FFP was requested urgently for a patient with no historical record. A rapid immediate spin of the blood group was performed on the first sample (group B) to allow defrosting to commence*
- *The sample was then placed on the analyser as urgent to perform the group and screen. A further immediate spin was performed on a second sample (again group B) before component issue*
- *The results of the first sample were still not available on the analyser after 40 minutes so the FFP was issued based on two immediate spin groups*
- *When the analyser group was available it was found to be group AB with a weak A antigen*
- *The laboratory had recently installed a new analyser that was configured for efficiency rather than speed and the group did not get processed independently of the antibody screen*
- *At the time the senior biomedical scientist (BMS) was the only competent person in the laboratory and was training and supervising two new BMS staff*

ABO-incompatible cryoprecipitate selected in error

- *A patient with obstetric haemorrhage required cryoprecipitate to maintain their fibrinogen above 2g/L*
- *The patient was group B and the only cryoprecipitate available was either group A or group O high-titre (HT) negative*
- *Although the standard operating procedure (SOP) stated the patient should receive group A the biomedical scientist (BMS) thought that considering it not being HT-negative they would issue group O*

Use of a ‘dependent check’ at the administration step leads to transfusion to the wrong patient

- *A ward sister confirmed the date of birth with the patient against the identification band and prescription*
- *A healthcare assistant (HCA) as the 2nd checker failed to check these details against the compatibility label*
- *A bedside checklist was not in use in this hospital*
- *Recommendations – Trust/Health Board to explore if the use of HCA as 2nd checkers for blood administration is appropriate and consider the use of electronic clinical systems*

Use of a ‘dependent check’ and failure to identify the patient at the administration step leads to transfusion of the wrong patient

- *Two registered nurses performed a dependent check (one nurse checked the identification band and the other nurse checked the blood component and the prescription)*
- *They did not positively identify the patient*
- *Both were competency-assessed and knew they should perform the check using an independent check*
- *The event took place in the emergency department (ED), and was extremely busy and a shortage of staff was noted*

Transfusion to the wrong patient despite the use of an electronic system to alert staff of an error

- *The wrong identification band was placed on a child which was intended for another child that was also due a transfusion that day*
- *The nurse took a unit of red cells to the child wearing the wrong identification band*
- *Although there was an electronic prompt to carry out a verbal positive identification check, this did not take place*
- *The electronic system was unable to alert the nurse this was the wrong patient because the unit matched the wristband*

ABO-incompatible fresh frozen plasma (FFP) selected incorrectly for a neonate

- *A neonate required plasma exchange in the early evening out-of-hours during a shift handover*
- *Due to resource pressure on the laboratory and the fact that the laboratory was not familiar with neonatal transfusion, group O plasma was selected for a group A patient*
- *Soon after starting the shift the biomedical scientist (BMS) on duty was under pressure when clinical staff came to collect the FFP*
- *Assuming the previous BMS staff had selected the correct component and under pressure the BMS ignored the warning flag and overrode it*
- *The clinical staff were unaware that, unlike red cells, group O is not the universal plasma group*
- *The laboratory had logged a request with the laboratory information management system (LIMS) supplier to block issue of group O plasma components to non-group O recipients, but this work had not been completed*

A newborn baby (AB D-negative) was transfused with O D-positive red cells due to a manual interpretation error that went undetected on several occasions (1)

Day 1:

- *A newborn baby was admitted with cardiac and respiratory compromise due to tetralogy of Fallot*
- *A group and screen (G&S) sample was received with an electronic tracking number as no unique number was yet assigned*
- *The sample was labelled 'Baby' plus the last name containing one 'L'*
- *BMS 1 processed the sample on the analyser*
- *The analyser was unable to interpret the result*
- *BMS 1 manually interpreted the result incorrectly as AB D-positive and entered this on to the laboratory information management system (LIMS)*
- *Patient identification (ID) check was carried out by BMS 2 and results authorised*

(continued)

A newborn baby (AB D-negative) was transfused with O D-positive red cells due to a manual interpretation error that went undetected on several occasions (2)

Day 17:

- *Another sample was received with a unique number and labelled with a forename and the same last name as above but spelt with two 'L's*
- *BMS 3 assumed that it was the same patient as detailed above because blood group AB D-positive was stated on the request form*
- *The sample was processed on the analyser which was unable to interpret the result*
- *BMS 4 incorrectly manually interpreted this again as AB D-positive*
- *BMS 5 carried out the patient ID check and the results were authorised*

(continued)

A newborn baby (AB D-negative) was transfused with O D-positive red cells due to a manual interpretation error that went undetected on several occasions (3)

Day 34:

- *The baby eventually required extracorporeal membrane oxygenation (ECMO) following sudden deterioration*
- *A further sample was received labelled the same as the one from day 1*
- *The request was for a G&S, four red cell units and two units of platelets according to the ECMO protocol*
- *BMS 6 selected four O D-positive red cell units (no suitable AB D-positive available) for crossmatching*
- *As the baby had a previous G&S on file an uncrossmatched O D-positive unit was prepared to prime the ECMO system because of low blood volume in newborn children*
- *BMS 7 carried out the patient ID check and the unit was released*
- *Once analysis of the sample was complete, BMS 7 identified a difference in blood group (AB D-negative) from that on file (AB D-positive)*
- *The clinical area was contacted who advised that the ECMO system had already been primed with the O D-positive unit*

(continued)

A newborn baby (AB D-negative) was transfused with O D-positive red cells due to a manual interpretation error that went undetected on several occasions (4)

- *BMS 7 returned all other blood components and suitable O D-negative components were ordered (no suitable AB D-negative available)*
- *The baby had received 200mL of O D-positive red cells*
- *The haematology consultant recommended exchange transfusion to avoid alloimmunisation to the D-antigen by removing the bulk of the D-positive red cells, followed up with measurement of residual D-positive red cells and administration of an appropriate dose of anti-D Ig*
- *The baby was unstable for other reasons and was not fit enough for exchange until day 4 post D-incompatible transfusion*
- *A 1.5 x blood volume exchange transfusion took place which reduced D-positive red cells to 2.8mL and a suitable dose of anti-D Ig was given*
- *There were no side effects, however, the baby's underlying clinical condition deteriorated and the decision was made to withdraw organ support and the baby died*

Failure to complete the administration check at the bedside correctly leads to an ABO-incompatible red cell transfusion

- *Two units of red cells were issued for Patient 1*
- *A healthcare assistant collected the correct unit and took this to the correct ward and handed it to the nurse looking after Patient 1*
- *Two nurses then checked the component against the prescription in the clinical utility room and not next to the patient*
- *The nurse who was to administer the blood then went to the wrong side room and administered the blood (donation group A D-positive) to Patient 2 (group O D-positive)*
- *Within 5-10 minutes the patient complained of lumbar pain, a general feeling of being unwell, a hot sensation on his back, and had developed tachycardia*
- *Transfusion was stopped and the clinical team informed*
- *The patient stabilised and recovered with minimal medical intervention*
- *No further information was provided*

Duplicate samples lead to unintentional ABO-incompatible platelet transfusion because of a wrong blood in tube error

- *A male patient post chemotherapy for a brain tumour was admitted via the emergency department with a fever but no obvious focus for infection*
- *Two samples were obtained from the patient in the medical admissions unit and received in the transfusion laboratory from the same person but different times documented, both grouped as A D-negative*
- *Platelets were issued based on these two results*
- *Seven weeks later a new request form and sample were received for this patient, which grouped as B D-positive*
- *Due to the discrepancy in the group history a full blood count sample taken 3 days earlier was tested which grouped as B D-positive*
- *The duplicate samples from the original admission were from a different patient, i.e. WBIT, and led to the issue and subsequent transfusion of incompatible platelets; group A D-negative to a group B D-positive patient*
- *The patient had no adverse outcome*

ABO-incompatible platelets selected incorrectly by a BMS who was not paying attention to the task

- *A unit of platelets was requested for a patient with non-Hodgkin lymphoma and critical site bleeding*
- *The laboratory staff issued group O platelets by mistake for a group A patient*
- *The ward staff completed the pre-transfusion checks and transfused the unit*
- *When the error was identified by the laboratory staff they contacted the ward staff and advised them not to transfuse the platelets but were informed that the transfusion had been completed*
- *The BMS issuing the platelets was experienced and had regularly worked in transfusion but was new to this laboratory*
- *The BMS assumed that they were to take the platelets from the top shelf of the stock incubator*
- *The LIMS flagged that group O platelets were being selected for a group A patient but the BMS overrode the warning*
- *The BMS could not explain why they issued mismatched platelets but it was discovered that although the BMS had most competencies up to date they did not have competency for issue*
- *The patient did not suffer any untoward harm*

A patient whose blood group was B was transfused with group O FFP resulting from poor communication during handover

- *A patient received multiple transfusions of red cells, FFP and platelets for recurring gastrointestinal (GI) bleeding in the presence of liver disease*
- *The patient had been grouped as O due to the presence of donor red cells in the test samples (the patient's actual blood group was B)*
- *Several messages had been hand written on a single sticky note by a junior member of laboratory staff undergoing transfusion training*
- *During handover these messages were misinterpreted and in addition, no formal request form for FFP had been received from the clinical area*
- *Unused, pre-thawed group O FFP prepared for an earlier patient was issued knowingly against national guidelines (BSH O'Shaughnessy et al. 2004) as the BMS thought that concessionary release had been approved*
- *The LIMS allowed major ABO mismatches for plasma components although it did display a warning flag that was overridden*
- *The laboratory staff did not seek formal confirmation before handing the FFP to a porter*
- *The patient was transfused the incompatible FFP*
- *There was no reported clinical adverse outcome*

Staff under pressure to collect and administer platelets before surgery results in WCT

- *A woman in her 50s was admitted for planned dental surgery and required platelets*
- *Platelets were prescribed but the healthcare assistant thought she had been asked to collect red cells and was unaware there were other types of components*
- *The staff nurse administered the red cells following the correct identity checks but failed to notice it was the wrong component according to the prescription*
- *The patient was an unexpected admission to the ward and was due in theatre after the platelet transfusion; there was pressure and distraction from several calls from theatre asking if the patient was ready*

Laboratory staff removed blood from a satellite refrigerator and handed over incorrect blood components to clinical staff

- *A male patient in his 20s required red cell transfusion in theatre following major trauma*
- *Ten units were crossmatched and available in the remote issue theatre refrigerator*
- *Clinical staff were unable to gain access to the refrigerator; it was 'thinking' so they asked the attending laboratory staff for help*
- *The laboratory staff managed to open the refrigerator and removed two O D-negative units (that were designated for remote allocation) rather than the available crossmatched components*

A demographic data entry at sample receipt results in a patient receiving ABO-incompatible FFP

- *Five units of FFP were ordered by telephone for Patient 1*
- *During the laboratory IT process, the copy and paste function was used to populate the sample identification number field*
- *However, the sample ID number pasted into the sample ID field belonged to the previous patient (Patient 2)*
- *At collection, the porter noted the discrepancy between patient details of the person he was sent to collect for and those on the FFP that was given to him by the BMS*
- *The FFP was then re-labelled for Patient 2, but the BMS failed to note that the FFP was incompatible*
- *The nurse administering the FFP noted the group was different to the patient but believed that group O components were compatible for all patients*
- *This resulted in group O (Patient 2) FFP being administered to Patient 1 (group A)*

Failure at multiple points in the transfusion process both in clinical and laboratory steps leads to a patient receiving CMV-unscreened red cells

- *A request form was received in the transfusion laboratory for red cells, diagnosis stated as 'at risk of PPH' (postpartum haemorrhage) and was marked as 'urgent'*
- *There was no indication that the red cells were required for antenatal anaemia and the laboratory staff assumed the red cells were required during or at delivery*
- *A new request form was completed, but the transfusion laboratory was not contacted by telephone to inform them of the change*
- *The pneumatic tube system was not working so the original form was printed by the BMS and used to issue CMV-unscreened red cells*
- *At both collection and administration staff failed to notice the requirement for CMV-screened blood despite this being evident on the prescription*

Wrong blood transfused despite having a full electronic blood management system

- *Incorrect but compatible blood was transfused to a day-case patient in a hospital with a full electronic blood management system including both refrigerator collection and bedside safety checks*
- *The same nurses were caring for two patients*
- *The health care assistant was asked to collect blood for Patient 1 (B D-positive)*
- *She was given the compatibility tag from the first unit to collect the second unit for Patient 1 (incorrect practice)*
- *At the same time, she was given the compatibility tag from Patient 2 (O D-positive) to return to the laboratory for traceability purposes*
- *She used the blood audit and release system (BARS) to collect blood from the refrigerator but used Patient 2's details on the compatibility tag in error*
- *Back on the day-case unit, the BARS system was available but was not used*
- *The error was not detected at the beside with manual checking so the O D-positive blood labelled for Patient 2 was transfused, fortunately without adverse event*
- *The error was detected when someone went to collect the next unit of blood for Patient 2, and it was found to be missing*

LIMS not correctly configured for sample validity

- *The transfusion laboratory identified that the incorrect sample validity had been set up in the LIMS*
- *This was correct at the time of configuration but had not been changed when new British Society for Haematology guidelines were issued in 2012 (BSH Milkins et al. 2013)*
- *In a look-back over 2 months it was identified that 30 units of red cells were transfused to 12 previously transfused individuals using 7-day rather than 3-day sample validity*

Specific requirements message does not transmit from the hospital information system (HIS) to LIMS

- *A patient for solid organ transplant required irradiated blood components*
- *Although there was no specific requirements form provided to the laboratory, the request for blood was made electronically and the requirement for irradiated blood components was indicated in that request*
- *Unfortunately, this message did not auto-populate the specific requirement field on the LIMS*
- *Investigation showed that a recent update to the specific requirement wording on HIS had not fully been tested to see if it still auto-populated*

Selection error results in a 4-day-old baby with haemolytic disease of the fetus and newborn (HDFN) due to anti-D receiving incompatible red cells (O D-positive) and requiring further exchange (1)

- *A maternal antenatal sample (the second) taken at 16/40 was found to contain anti-D+C. The mother was monitored at a specialist fetomaternal centre throughout pregnancy.*
- *The baby was induced and born (at the local hospital) at 36+3/40 with hyperbilirubinaemia but levels were below the threshold for exchange transfusion, so the baby was treated with phototherapy and intravenous immunoglobulin*
- *By the third day the serum bilirubin had risen so the clinician alerted the transfusion laboratory (verbally) that an exchange would be needed; the BMS stated he had O D-positive (the baby's group) neonatal red cells in stock. On the fourth day a request for two red cell units for exchange transfusion was made verbally*

Selection error (2)

- *The BMS issued two units of O D-positive red cells without checking maternal group and antibody details, and without crossmatch against maternal plasma. Two registered nurses checked the units during the final bedside check. Three days after the exchange the baby's bilirubin continued to rise and a further two units were requested*
- *A clinician reviewing the case realised that the wrong group red cells had been administered and requested a further exchange transfusion with two units of O D-negative red cells*
- *The baby's bilirubin reduced and the baby was discharged 5 days later*
- *In addition, a Kleihauer test was wrongly requested on the mother, and she had inappropriate anti-D Ig administered*

Elderly male patient given incorrect phenotype due to transcription error

- *An 81-year-old male patient with myelodysplastic syndrome undergoing routine transfusion for anaemia required two units of red cells*
- *The patient had a laboratory record of anti-S, a pan-reactive enzyme antibody and was direct antiglobulin test (DAT)-positive*
- *Transfusion of the first unit was uneventful, however during the second unit the patient experienced a rise in temperature (35.5°C to 37.6°C) with rigors, hypotension (140/70 to 100/60mmHg) and tachycardia (70 to 104 bpm), there was no change in respiratory rate*
- *Haemoglobinuria was detected*
- *Following the reaction the pre- and post-transfusion samples were sent to the Blood Centre and the second unit was found to be incompatible (S-positive)*
- *The symptoms were treated and the patient was discharged the same day*

Wrong blood in tube leads to ABO-incompatible transfusion and major morbidity

- *A 61-year-old male (Patient 1) was admitted for coronary artery bypass graft*
- *He received four units of group A D-positive red cells, had an uneventful stay in hospital and was discharged home*
- *Fourteen days later he was admitted to critical care via the emergency department (ED) with renal impairment and a falling haemoglobin*
- *On this second admission Patient 1 was grouped as O D-positive*
- *The sample used for the crossmatch 14 days previous had been taken from the wrong patient (Patient 2) and labelled with Patient 1's details*
- *A second sample was not obtained to confirm the ABO group although it was the hospital policy*

Wrong blood in tube leads to ABO-incompatible transfusion

- *A sample was taken from a 66-year-old male with symptomatic iron deficiency anaemia and grouped as A D-positive*
- *One unit of A D-positive blood was issued, a group-check (or second sample) was not obtained despite the hospital having a 2-sample policy in place*
- *Three days later a further sample was sent to the laboratory which grouped as O D-positive; an additional check sample was sent on this occasion which confirmed the group as O D-positive*
- *The patient experienced mild loin pain and mild 'haematuria' lasting 24 hours but made a full recovery*

Collection of the wrong component and subsequent failure of bedside check leads to ABO-incompatible transfusion and major morbidity (1)

- *A 69-year-old male was admitted for an aortic valve replacement and coronary artery bypass surgery*
- *A healthcare support worker (HCSW) was asked to collect two units of blood for this patient and one unit of blood for another.*
- *Both patients had the same forename*
- *The two nurses who requested the collection were each unaware that the HCSW had been asked by the other nurse, however, it was not against hospital policy to collect more than one unit at a time*

(continued)

Collection and administration error (2)

- *Communication between the HCSW and the laboratory staff was unclear but it seems this had an impact on failure to complete identification checks correctly when collecting the three units of blood. The three units were delivered to the correct clinical area*
- *The registered nurse looking after the patient who required two units of blood failed to complete the identification checks for the first unit and consequently did not realise the wrong component was administered*
- *When she commenced the second unit, there was a failure of checks again. Another nurse noted the error and the transfusion of the second unit was stopped. The patient suffered an acute transfusion reaction with haemolysis and respiratory distress*
- *The patient was already in ITU but required re-ventilation*

Failure to heed warning flag results in group A FFP being given to a group AB patient despite group AB FFP being available (1)

- *An 81-year-old male grouped as AB D-positive with anti-E and anti-K. The sample was also DAT-positive and further testing identified the patient phenotype to be C-E-c+e+ (Ro) and K-negative*
- *Two units of red cells were requested and the consultant haematologist authorised group AB D-negative CDE-negative K-negative*
- *A major haemorrhage pack (four units of red cells and four units of FFP) was later requested uncrossmatched*
- *Only two group AB D-negative K-negative units were available so the consultant authorised and issued two group A D-negative (CDE-negative) K-negative units*

(Continued)

Wrong group FFP (2)

- *A second BMS came to assist the first BMS and proceeded to thaw four group A FFP although group AB units were available. This BMS overrode the LIMS warning flag alerting them of the incompatibility*
- *The second BMS was experienced in transfusion and had read the SOP and had been observed issuing components on several occasions, but had not been signed off as competent as there was an outstanding question surrounding lone working*
- *This incident happened out-of-hours and was not detected until checking the work the following morning. It is thought the BMS may have been confused by the consultant authorising group A red cells and went on to issue group A FFP as well*
- *The patient suffered no adverse reaction*

Failure to check donation number against the compatibility label results in a serologically crossmatched but incompatible unit transfused to the patient

- *A 21-year-old male in sickle cell crisis with anti-E, anti-Lea, a pan-reacting autoantibody and a positive DAT required transfusion*
- *Two units that were CDE-negative, K-negative and HbS-negative were crossmatched and issued*
- *A unit of compatible red cells was later identified as transfused but found in the stock refrigerator*
- *A further unit associated with this crossmatch should have been returned to stock but could not be accounted for*
- *Unfortunately a unit of blood deemed incompatible on the basis of a reaction with the patient's existing autoantibodies was selected in error and labelled with a compatibility label and transfused instead of being returned to stock*

Two electronic systems fail to prevent D-positive blood being transfused

- *Blood was ordered for an exchange transfusion for a group B D-negative female with sickle cell disease using the OBOS*
- *Group B D-positive blood was ordered in error stating (in the comments box) that O D-negative blood could be substituted if necessary*
- *Six units of O D-positive were provided, crossmatched and transfused*
- *The LIMS did not prevent issue of D-mismatched blood and this error was not detected until the next transfusion was due when an unexplained mixed field was detected in the pre-transfusion sample*

Flags can only be set correctly if clinicians can agree

- *A patient with chronic lymphatic leukaemia (CLL) and anaemia received bendamustine treatment 3 years ago*
- *The transfusion was organised by the FY1 doctor and when the request arrived in the laboratory the BMS noted that, although there was no flag on the LIMS, of two previous transfusions one had been irradiated and one had not*
- *The BMS phoned to ask if irradiated blood was required and the ward staff stated 'no' but when the FY1 discussed the transfusion with the consultant haematologist it became clear that lifelong irradiated components were required*
- *The LIMS was subsequently updated with a warning flag*

No information in LIMS to identify non-eligibility for EI

- *A shared care patient with HbSC disease was transfused prior to routine surgery*
- *The current antibody screen was negative so blood was crossmatched by EI and the patient had a preoperative exchange transfusion*
- *After the transfusion, the details on the patient's condition and history of red cell antibodies detected in the past by another hospital was discovered so the patient should have had a serological crossmatch with appropriate antigen-negative blood*

Computer algorithm does not control eligibility for EI: still need to set manual flag

- *A patient post HSCT was identified as having received blood by EI on three separate occasions*
- *The laboratory policy is to crossmatch blood serologically for these patients*
- *The error was detected during an audit of specific requirements*
- *The flag relating to the HSCT had been correctly set to ensure the correct group and other specific requirements were met but the additional flag required to prevent EI had not been included*

Unknown patient rushed to theatre with reliance that the final checks would be done at the patient's side

- *Four units were scanned out of the ED refrigerator to go to theatre with the patient and to be placed in the refrigerator in theatres*
- *The need was urgent and the staff member scanned the units out without the necessary checks but relying on the fact that the blood would be checked at a subsequent step in the transfusion process prior to administration*
- *In theatres a unit of blood was given that was incorrect, but colleagues assured the clinical team that the unit had already been checked and was ready to be administered*

A renal dialysis patient received 2 units of red cells that were crossmatched but were not intended for transfusion nor prescribed: 4 opportunities for detection (clinical)

- *A regular dialysis patient required two units of platelets prior to a minor surgical procedure to investigate haematuria*
- *Two units of platelets were requested but the crossmatch box was ticked*
- *Following a conversation between laboratory and clinical staff about the tick in the crossmatch box, red cells were crossmatched and issued*
- *Platelets were prescribed before the procedure but not red cells.*
- *The healthcare assistant (HCA) was trained and competency-assessed to collect blood components, but red cells were collected instead of the prescribed platelets and then administered by the registered nurse*

Primary error in laboratory: wrong component transfused, where there were 5 opportunities for detection (laboratory)

- *A unit of red cells was commenced in error instead of the prescribed plasma*
- *The laboratory prepared the wrong component type following a telephone request*
- *It was noted that laboratory staff were very busy and had inadequate staffing levels at the time of the incident*
- *Two registered nurses checked the red cells but did not refer to the prescription so failed to notice it was the wrong component type, and should have been plasma*
- *Verbal evidence from the ward manager confirms all patient details were checked correctly but the prescription form was not checked*