Control Alt Delete:

a case review of IT related errors reported to SHOT

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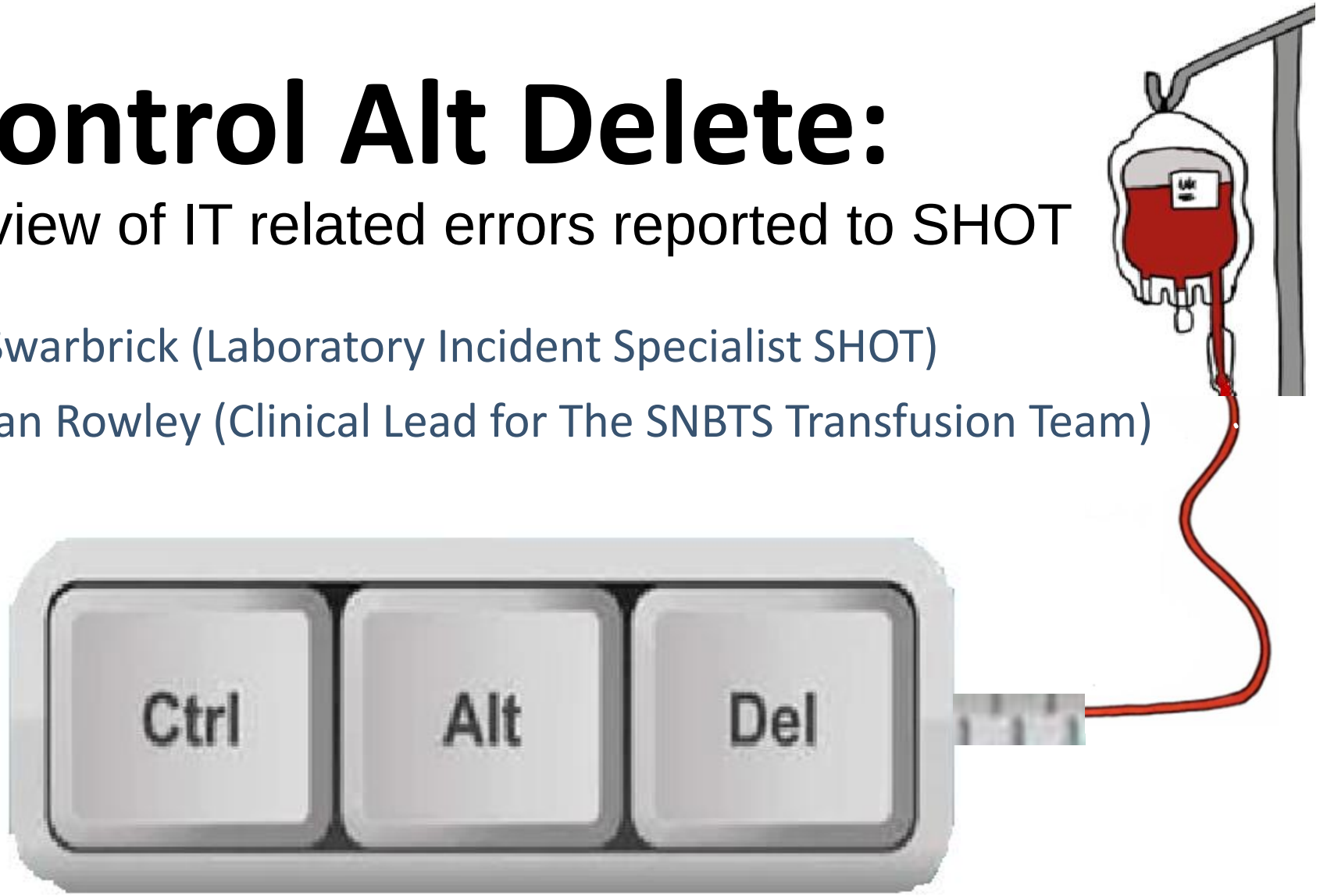


Information Technology Errors

Errors caused or contributed to by IT systems

Errors caused by using IT systems incorrectly

Errors where implementation of an IT solution would have/could have prevented the error

Corrective and preventative action in response to an error included an IT solution

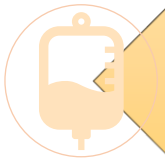
IT related errors

Primary reporting category	Number of cases 2021
Incorrect blood component transfused (IBCT-WCT)	41
Specific requirements not met (SRNM)	116
Right blood right patient (RBRP)	109
Avoidable, delayed and under or overtransfusion (ADU)	41
Handling and storage errors (HSE)	67
Total	**374**
Anti-D Ig	25
Total including anti-D	**399**

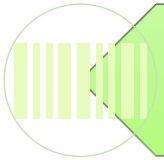
Interactive case studies

- What Corrective Actions and Preventative Actions would be appropriate following an incident relating to IT?
- Could this happen in your organisation?
- What would you do differently?
- What worked well?

Case - Wristband



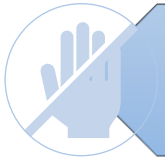
Platelets required for patient A



Wristband was faint, and nurse decided to reprint

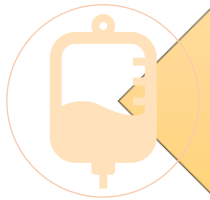
On way back from printer dropped wristband, and picked up someone else's from the floor

Did not check wristband, and attached to patient

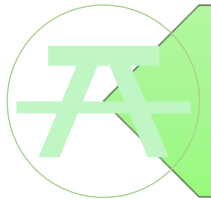


Tracker detected error and new wristband applied and unit transfused safely

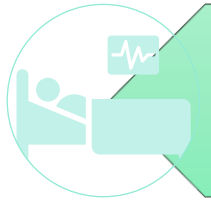
Case - ABO-incompatible red cell transfusion



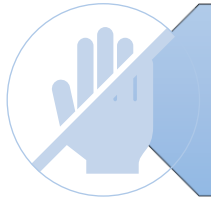
Nurse collected two at the same time, for Patient A (group A) and Patient B (group B)



Both units on a trolley at patient bedside



Used the electronic tracking system correctly, but then spiked and connected the other unit in error

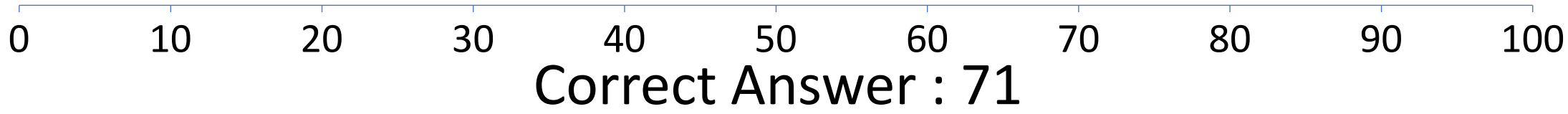


Noticed immediately, no reaction

Join: **vevox.app** ID: **XXX-XXX-XXX** POLL OPEN

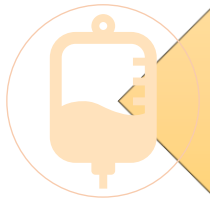
Between 2010 - 2021 how many red cell ABO-incompatible transfusions have been reported to SHOT?

Please enter a value between 0 and 100.



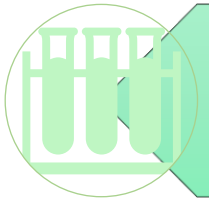
Correct Answer : 71

Case - Cognitive bias

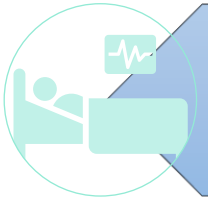


Patient A required unit of red cells – had K- and IRRADIATED specific requirement flag

BMS issuing units rushing at end of the day as wanted to use short dated stock

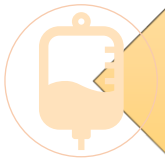


Selected K-, but missed the irradiated requirement, and overrode LIMS alerts



Error detected at bedside

Case - IT Alerts unclear

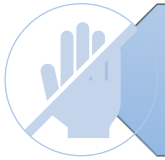


Patient A required unit of platelets, ordered on EPR

Prior to admission, patient surname amended on EPR. Not automatically updated in LIMS

Platelets issued with incorrect patient details

Tracker detected discrepancy between wristband and unit, but nurse tried 3 times to scan as did not understand alert

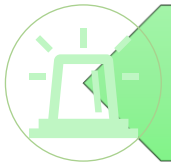


Nurse contacted laboratory who identified error and relabelled unit

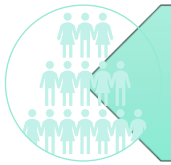
Case - Remote printer

Delay in provision of red cells due to remote issue printer error

Printer had run out of labels and theatre staff were not trained to restock



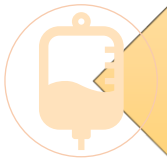
Printer not configured to generate a local alarm or remote alert when empty, but designed to count number of labels used



Access to the printer was open to everyone and easily knocked, resulting in misalignment of the feed and loss of counting ability

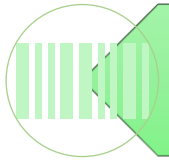
No mention of contingency plan should there be an IT failure

Case - Tracker downtime



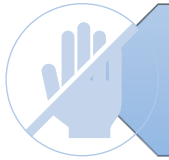
Patient A transfused with RBC intended for Patient B

Nurse collected unit correctly, but bedside tracker lost power during bedside checking stage



Nurse did not follow downtime procedures and continued to check unit without second checker

Next shift nurse noticed wrong patient's details on unit and transfusion stopped

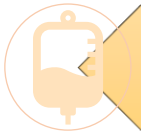


Fortuitously both patients were O D-positive with no red cell antibodies

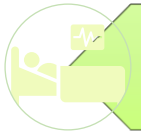
Do you have clearly defined processes for periods of IT downtime?

1. Yes - for all systems
2. Yes - for some systems
3. No

Case - HSCT



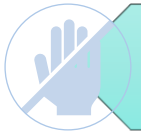
Patient admitted and grouped as AB D-positive



Patient advised clinical team they had received a HSCT 6 months prior

Primary treating hospital was contacted who inform team that patient now required B D-positive irradiated red cells

LIMS note was added to reflect this requirement

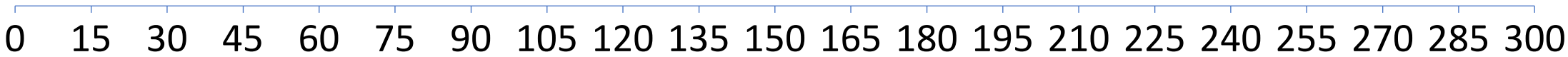


BMS issued 2 x B D-negative and 1 x A D-Negative red cells

Ward did not detect ABO incompatibility.

Between 2010-2020 how many HSCT transplant patients have been transfused with wrong components?

Please enter a value between 0 and 300.



Correct Answer : 277

Safe transfusions in haemopoietic stem cell transplant recipients

The following checklist has been created to reduce errors and optimise safety of transfusions in autologous and allogeneic haemopoietic stem cell transplant (HSCT) recipients and should be used by the transplant centre team as part of every transplant recipient's journey. The blood group changes are only applicable to allogeneic stem cell transplants where ABO and/or D groups are different. This document should be used in conjunction with local policies relating to provision of blood components for HSCT.

Key action point for all HSCT centres: Design a process to incorporate this checklist into your local policy with a procedure describing how to use/ follow it.

The checklist below is based on the emerging themes and weak points identified from the error reports submitted to SHOT and has been approved by the Transfusion Medicine Specialty Advisory Committee of the Royal College of Pathologists, the National Blood Transfusion Committee, the British Society of Blood and Marrow Transplantation & Cellular Therapy, the SHOT Steering Group and the SHOT Working Expert Group. The actions in the checklist below have been grouped according to phases of the patient's transplant journey.

Actions at the transplant centre for every transplant recipient		
Pre-transplant admission		
1	Is a representative from the hospital transfusion team (scientist, clinician, or transfusion practitioner) available to support the transplant planning meetings if advice is needed?	Y/N
2	Does the transplant protocol clearly identify all centres involved in the care of the patient?	Y/N
3	Does the transplant team have the contact details for shared care/referral centre and other teams involved?	Y/N
4	Have samples been taken from both donor and recipient and tested for ABO and D groups, antibody screen, anti-A and anti-B titres by Indirect Antiglobulin Test (IAT) where indicated and direct antiglobulin test (DAT)?	Y/N
5	Has the transplant recipient's baseline CMV status been checked prior to blood transfusions?	Y/N
6	Are all the transfusion specifications (e.g., donor and recipient blood groups in different phases of the transplant and all specific requirements) clearly identified on the transplant protocol?	Y/N
7	Has the copy of the transplant protocol been sent to the transfusion laboratory at transplant centre?	Y/N
8	Has the clinical team received confirmation that the Laboratory Information Management System (LIMS) has been updated to reflect transfusion requirements for the patient?	Y/N
9	Has the transfusion laboratory at the referring hospital been notified about the transplant dates and transfusion requirements with confirmation of receipt?	Y/N
10	Has the patient (and family) been informed/educated about transfusion requirements? Have all relevant Patient Information Leaflets been provided, and discussions documented in patient's clinical notes? *Patients and families/carers need to understand the importance of showing any transfusion cards or transfusion instructions they have received if getting admitted or treated for any reason at a site other than their transplant centre post HSCT.*	Y/N
During transplant admission		
11	Is the transplant protocol with documentation regarding transfusion requirements clearly visible and accessible for nursing staff and clinicians on the wards?	Y/N
12	Is the Safe Transfusion Checklist incorporating administration checklist being applied? Where appropriate is the Transfusion Associated Circulatory Overload (TACO) checklist being used for risk assessment? Monitor patient for any evidence of haemolysis (immediate or delayed) as appropriate.	Y/N
Post-transplant prior to discharge		
13	Are details regarding serious transfusion reactions or events during the transplant admission mentioned in the discharge summary? A copy of the transplant protocol should be attached to the transplant discharge summary. Where feasible, details about the number of transfusions received should be included.	Y/N
Post-transplant follow-up		
14	Does the patient continue to need irradiated blood components and for how long? *This needs to be reviewed by the transplant team periodically based on conditioning regimen, type of transplant, engraftment & immune reconstitution and use of immune suppressants. Any changes must be communicated to the referring hospital team.*	Y/N
15	Have the transfusion laboratories both at transplant centre and referring hospital been notified of any changes to transfusion specific requirements?	Y/N
If the answer is 'no' to any of these, then appropriate actions need to be taken locally to ensure safe transfusions		

Safe transfusions in haemopoietic stem cell transplant recipients

Post-transplant after engraftment (Phase III, when all the above criteria are met):
Post engraftment, when ABO antibodies to the donor ABO type are undetectable and the DAT is negative, the donor group may be selected. However, it should be noted that it is increasingly common for multiple cord donations to be used and that each donor cord may be of a different ABO and/or D group. Post-engraftment transfusion management should be decided on a case-by-case basis and will depend on which cord engrafts, in accordance with British Society for Haematology (BSH) guidelines relating to pre-transfusion compatibility procedures in blood transfusion laboratories (Link: https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-3148.2012.01199.x) .

In case of graft rejection, the selected red cells should remain compatible with both the patient and donor until complete reversion to the original recipient ABO and D type. Then provision of all components must revert to recipient-type red cells and platelets.

Table 2: Selecting appropriate blood groups for recipients of ABO mismatched stem cell transplants

	Donor	Recipient	Phase I: All components	Phase II and Phase III				
				Red cells	Platelets		FFP	
					First choice	Second choices**	First choice	Second choices
Major ABO incompatibility	A	O	Recipient	O	A	AB*, B, O	A	AB
	B	O	Recipient	O	B	AB*, A, O	B	AB
	AB	O	Recipient	O	AB*	A, B, O	AB	-
	AB	A	Recipient	A, O	AB*	A, B, O	AB	-
	AB	B	Recipient	B, O	AB*	B, A, O	AB	-
Minor ABO incompatibility	O	A	Recipient	O	A	AB*, B, O	A	AB
	O	B	Recipient	O	B	AB*, A, O	B	AB
	O	AB	Recipient	O	A	A, B, O	AB	-
	A	AB	Recipient	A, O	A	A, B, O	AB	-
	B	AB	Recipient	B, O	B	B, A, O	AB	-
Bi-directional ABO incompatibility	A	B	Recipient	O	B	B, A, O	AB	-
	B	A	Recipient	O	A	A, B, O	AB	-

*Due to the population distribution of group AB and its value as a universal plasma donor, stocks may be limited
**Choices are listed in the order of preference and high titre negative platelets should be selected where available to reduce the risk of haemolysis
The various phases (I,II and II) are explained in the text preceding this table

This table is based on the guidance in the ESH-EBMT handbook (https://www.ebmt.org/sites/default/files/2019-01/2019_Book_TheEBMTHandbook.pdf).

D matching: Incompatibility between donor and recipient for the D red cell antigen occurs commonly in the setting of allogeneic HSCT.

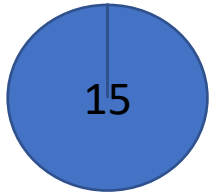
- Major Rh incompatibility exists where a donor is D-positive and a recipient D-negative. Minor Rh incompatibility occurs where a donor is D-negative, and the recipient is D-positive
- In cases of minor Rh incompatibility delayed haemolysis can occur due to donor lymphocyte-derived anti-D. The risk is higher if the donor has been previously sensitised to the D antigen and in recipients of non-D-selected peripheral blood stem cells
- Pre-transplant: recipient-type red cells and platelets should be given
- Post-transplant:
  - HSCT recipients should receive D-negative red cells and platelets except when both the HSC donor and recipient are D-positive
  - Major RhD incompatibility: D-negative blood components to be given until D-positive red cells are detected. Thereafter can receive D-positive components
  - Minor RhD incompatibility: D-negative blood components should be given indefinitely
- Please note that BSH guidelines (https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-3148.2012.01199.x) state that when either the recipient or donor is D-negative, D-negative red cells should be selected. Refer to local policies when making these decisions and consult local transfusion experts

Case - Haemoglobinopathy

- Sickle cell patient required red cell transfusion
- Units issued did not meet specific requirements (were not Rh K matched, HbS negative or <10 days)
- LIMS alert had been added, but at level 1 only so only one BMS could view the alert
- Standard red cells issued
- Patient did not develop red cell antibodies on this occasion

Between 2010-20, how many haemoglobinopathy patients received red cells that DID NOT meet their specific requirements?

Please enter a value between 0 and 150.



0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

Correct Answer : 127

Answered Correctly: 0%

SHOT Serious Hazards of Transfusion

Lessons learned

IT can be helpful, but must be set up correctly

LIMS must be set up appropriately

Alerts must be understandable and actionable

IT can introduce new errors both clinical and laboratory

Interoperability between systems

Alert fatigue, cognitive bias and over reliance on IT

Contingency plans for downtime

Resources

- Many more resources, including the 2021 Annual SHOT Report are available on the SHOT website www.shotuk.org

- In particular our educational resources
  - SHOT Bites
  - SHOTcasts
  - Webinars
  - Videos (Laboratory errors)
  - Email signatures