SHOT

Serious Hazards of Transfusion

Insights from SHOT: Errors reported where transfusion specific requirements were not met

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Medical Director, SHOT


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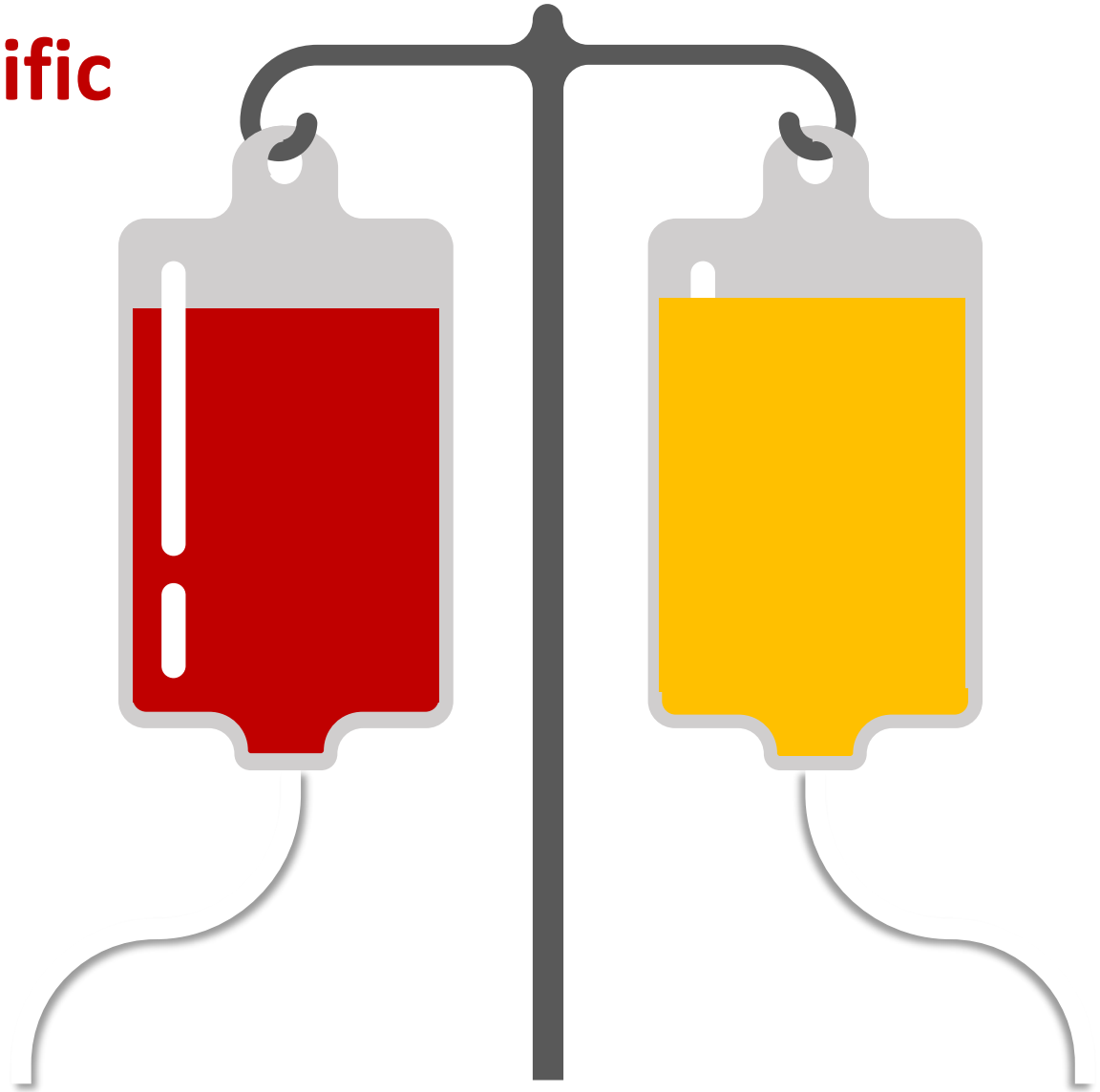
YOU

Transfusion specific requirements

Blood components



Blood administration

What are the main transfusion specific requirements that we need to be aware of?

01 Irradiated blood components

02 Antigen negative blood components

03 Phenotype matched components

04 CMV screened negative components

05 IgA deficient blood components

06 HLA-HPA matched blood components

07 Use of blood warmers

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Risks when these specific transfusion requirements are not met

1 Irradiation

Potential risk of transfusion-associated graft versus host disease

2 Ag-negative

Maternal sensitisation leading to HDFN or HTR

3 Phenotype-matched

Sensitisation, HTR, poor Hb increments, ↑↑ transfusions

4 CMV negative

CMV infection in the recipient or fetus

5 IgA def

Allergic anaphylactic reactions

6 HLA/HPA-matched

Poor platelet increments and risk of bleeding

7 Blood warmer

Destruction of transfused red cells

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Definitions of current SHOT reporting categories & what to report

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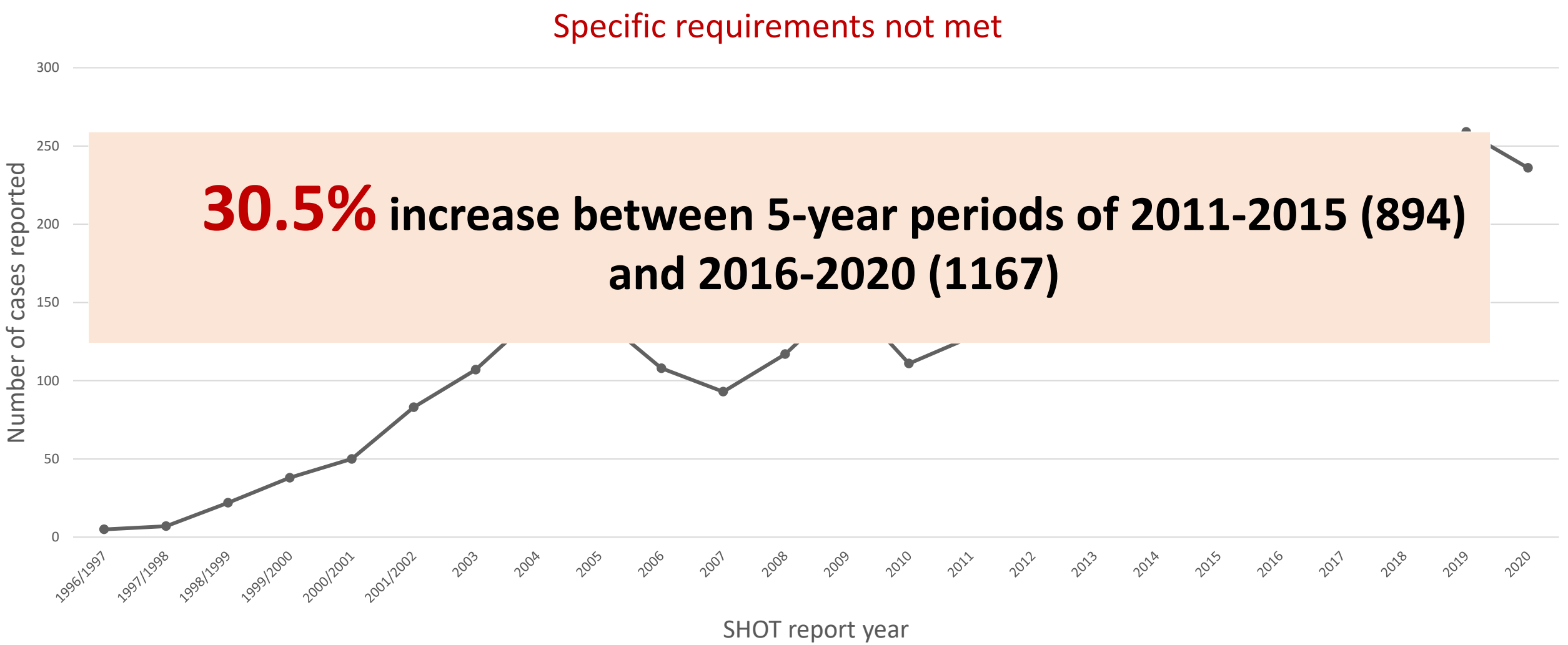
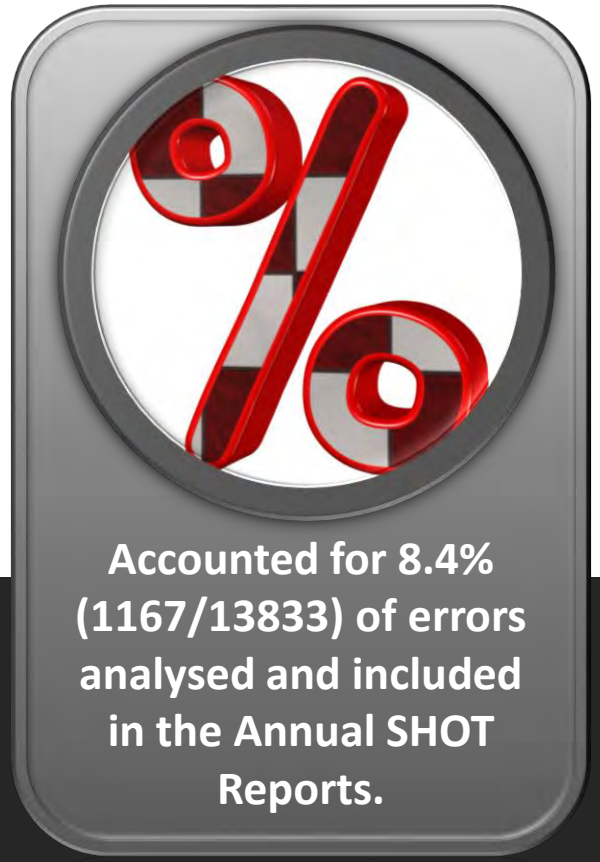
Revised February 2021

ADVERSE EVENTS		
TERM	**DEFINITION**	**WHAT TO REPORT**
IBCT – SRNM (Incorrect Blood Component Transfused – Specific Requirements Not Met)	Where a patient was transfused with a blood component that did not meet their specific transfusion requirements. ***Do NOT report** if a clinical decision has been taken to knowingly transfuse components not meeting specification in view of clinical urgency.* *N.B. Occurrences where pathogen inactivated plasma components or apheresis platelets are not supplied for those born after 1996 or with TTP are no longer SHOT reportable. SaBTO (the advisory committee on the Safety of Blood, Tissues and Organs), review on this matter can be found here.*	Transfusion of a blood component of inappropriate specification or that did not meet the patient's individual requirements Examples currently include *failure to transfuse:* • Cytomegalovirus (CMV)-negative components • Irradiated components • Human leucocyte antigen (HLA)-matched platelets • Antigen-negative red cells for patients with known irregular red cell antibodies • Incorrect specification of component transfused to patient as a result of incorrect sex/gender allocation (e.g., K negative not provided) • Red cells of correct phenotype in accordance with national guidelines e.g., haemoglobinopathy, patients with childbearing potential Also: • Testing or release of components when the status of the sample does not comply with the guidelines • Release of components prior to completion of laboratory testing (including internal quality control) • Failure to use blood warmer when clinically indicated • Inappropriate use of electronic issue

Trends in SRNM error reports submitted to SHOT 1996-2020



IBCT-SRNM errors reported to SHOT 2016-2020



Accounted for 8.4% (1167/13833) of errors analysed and included in the Annual SHOT Reports.

Ten percent (117/1167) (10.0%) of cases involved paediatric patients.

IBCT-SRNM errors reported to SHOT 2016-2020

Distribution of errors

Most clinical errors are failure to request irradiated or CMV screened blood components and most laboratory errors are failure to complete testing prior to issue, inappropriate use of electronic issue or providing the incorrect phenotype.

Impact on patient safety

No deaths occurred due to IBCT-SRNM during this period, but 12 cases of major morbidity were directly caused by these errors with 11 cases of sensitisation to K-antigen, and one case of haemolytic transfusion reaction.

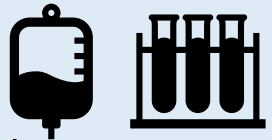
Communication failures between clinical areas including shared care, or between clinical and laboratory areas were stated as a contributory factor in **39.4%** (459/1169) of reports.

This reiterates the **importance of good communication** links between all areas involved with patient care as outlined by SHOT 2020 recommendations.

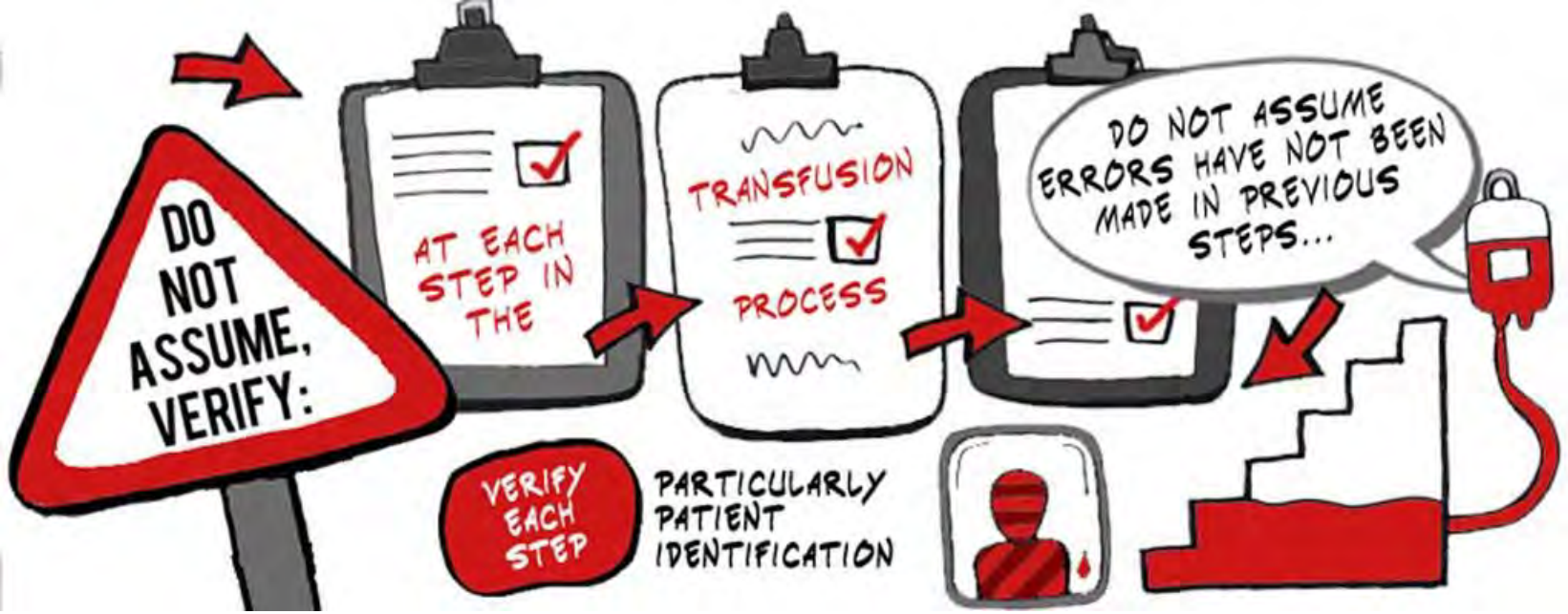
CLINICAL ERRORS

- Failure to request irradiated (39.4%)
- Failure to request CMV screened (8.1%)
- Poor communication between clinical area and laboratory
- Missed opportunities to detect error at patient bedside

LABORATORY ERRORS



- Failure to complete testing prior to issue (5.3%)
- Inappropriate electronic issue of red cells (8.9%)
- Providing incorrect phenotype for red cells (9.7%)
- Failure to heed information on request forms
- Overriding IT alerts due to alert fatigue



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Illustrative cases reported to SHOT

Case 1: Failure to consult available historical records in a patient with sickle cell disease prior to exchange transfusion (1/2)

- A woman was under shared care between two different hospitals
- She required specialist surgery at another centre which was not her usual base

- She had a history of anti-S, anti-E, anti-Fy^a, anti-Fy^b and anti-Fy3
- She had been transfused with appropriate phenotype, and the antibodies were not detectable from 2013

- She underwent preoperative exchange transfusion at the specialist centre with eight units
- Neither her base hospital transfusion laboratory records nor Sp-ICE data were accessed for her antibody history

Case 1: Failure to consult available historical records in a patient with sickle cell disease prior to exchange transfusion (1/2)

- Four days later she presented to her own hospital unwell with haemoglobinuria and was initially thought to be in sickle crisis
- However this was a delayed haemolytic transfusion reaction associated with anti-Fy^a and anti-Fy3 (identified in the eluate)
- She made a full recovery

Learning points

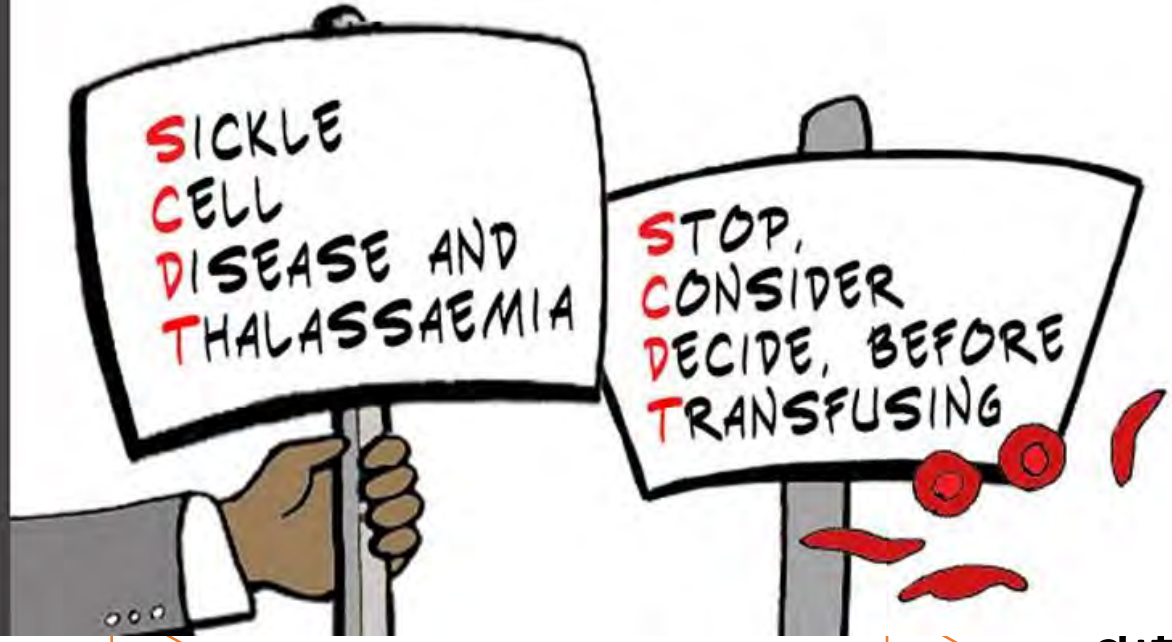
Actively seek

Patient

Access help from

different ABID cards

PATIENTS WITH HAEMOGLOBINOPATHIES HAVE SPECIFIC REQUIREMENTS FOR RED CELLS



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Case 2: Non-irradiated platelet units issued to a <10-year-old patient despite a warning flag, 3 errors (1/2)

A BMS issued two bags of platelets for a patient who required irradiated cellular components

This specific patient requirement was recorded on the LIMS. BMS 2 was covering for a break during a night shift, and receipted the platelets on arrival from the Blood Service

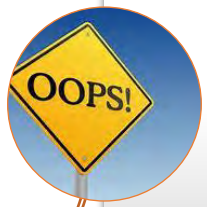
When BMS 1 returned from their break, they received a handover message that the platelets had been placed on the agitator but required irradiation. This message was taken verbally but not written down

It is usual practice at this hospital for all platelets to be irradiated on arrival from the Blood Service and then placed on the agitator, however in this instance that did not happen

Case 2: Non-irradiated platelet units issued to a <10-year-old patient despite a warning flag, 3 errors (2/2)

The shift ended and day staff arrived. BMS 3 issued the platelets assuming they had been irradiated

A message flagged up that they had not been irradiated but was overridden



At administration BloodTrack® was used but it did not pick up the need for irradiated platelets, and it was not picked up by the registered nurse administering them and so the patient received the transfusion

The error was noticed during the bedside check for the second unit

The unit was returned to the laboratory and an incident form completed

Structured handovers for safe transfusions

ORIGINAL ARTICLE

Safe handovers: Safe patients-why good quality structured handovers in the transfusion laboratory are important

Victoria Tuckley, Jennifer Davies, Debbi Poles, Chris Robbie, Shruthi Narayan

First published: 02 March 2022 | https://doi.org/10.1111/tme.12853

Funding information: Liverpool University Hospitals NHS Foundation Trust; University Hospitals of Derby; Burton NHS Foundation Trust

Read the full text > PDF TOOLS SHARE

Abstract

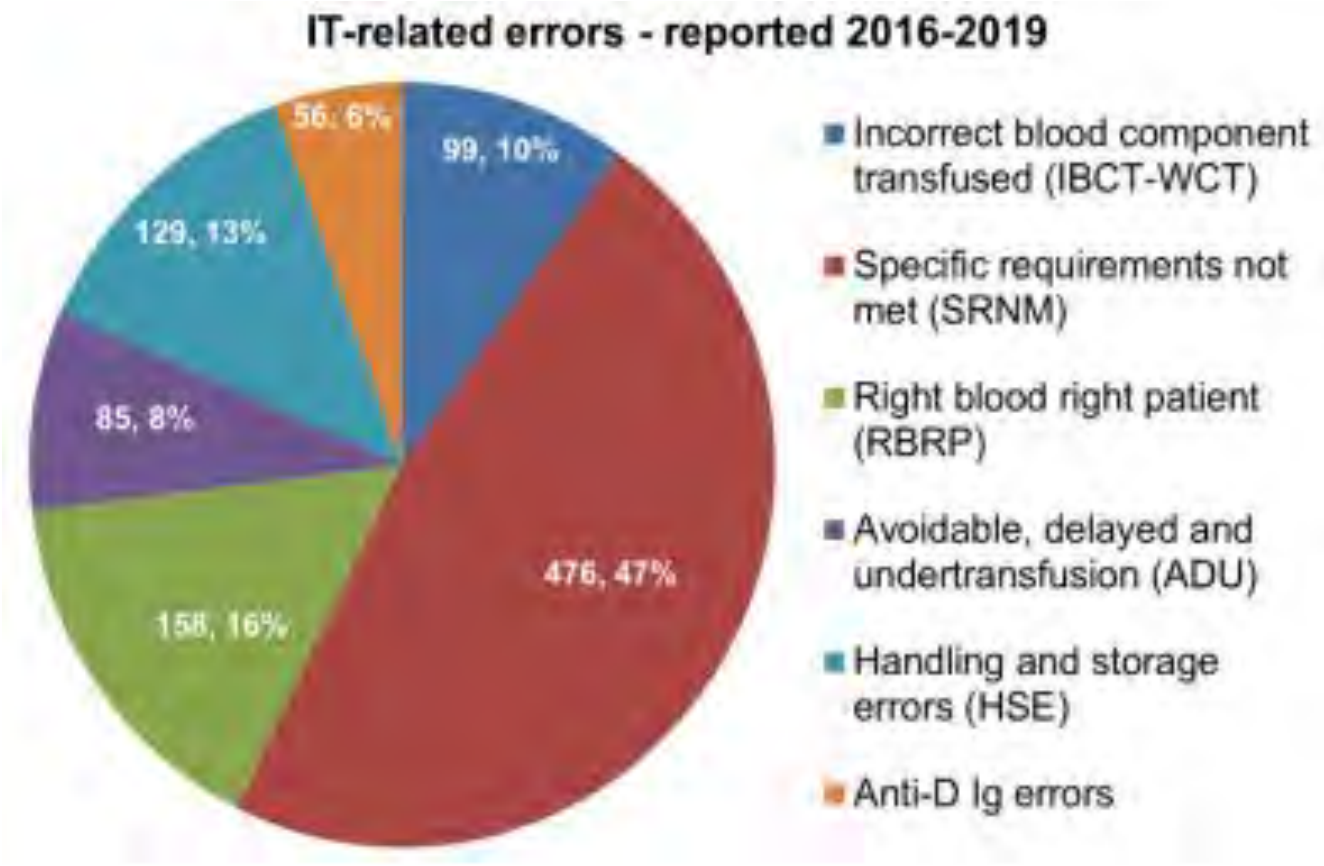
Background

Effective transfer of information relating to patient care is vital in healthcare. In the UK formal handover is an established and well reported process in the clinical setting but less so in transfusion laboratories. Blood transfusions occur within many hospital specialities and across clinical and laboratory staff shifts, making robust handover critical

Key principles for safe handovers

- Who should be involved?
- When should it take place?
- Where should it occur?
- How should it happen?
- What needs to be handed over?
- Does the handover capture if tasks have been appropriately actioned?
- Are procedures for escalation clearly outlined?
- Have cognitive biases been considered in handover design?

Looking at IT errors over time



IT-related error	Number of errors
Failure to use flags and/or logic rules	217
Warning flag not updated	119
Warning flag in place but not heeded	109
Equipment failure	93
Failure to consult or identify historical record	84
Errors related to electronic blood management systems	72
Incorrect result/data entered/accessed manually	67
Anti-D related	56
Computer or other IT systems failure	49
Failure to link, merge or reconcile computer records	36
Discrepancy between LIMS and PAS	36
Blood issued against wrong patient ID (sample or request form)	36
Miscellaneous	29
Total	**1003**

https://www.shotuk.org/wp-content/uploads/myimages/SHOT-Bite-No.-13-IT.pdf

Reducing ‘Alert fatigue’

https://www.shotuk.org/resources/current-resources/shot-bites/

Case 3: Failure to provide irradiated blood components

- Patient was for a peripheral blood stem cell transplant that had previously been cancelled. The patient's notes had been updated
- Request form stated that IRRADIATED blood was required and that the patient was pre- transplant
- Blood was serologically cross matched and sent to the ward. When the ward staff were checking the unit, it was noticed that the unit was NOT irradiated (Lab error)

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.

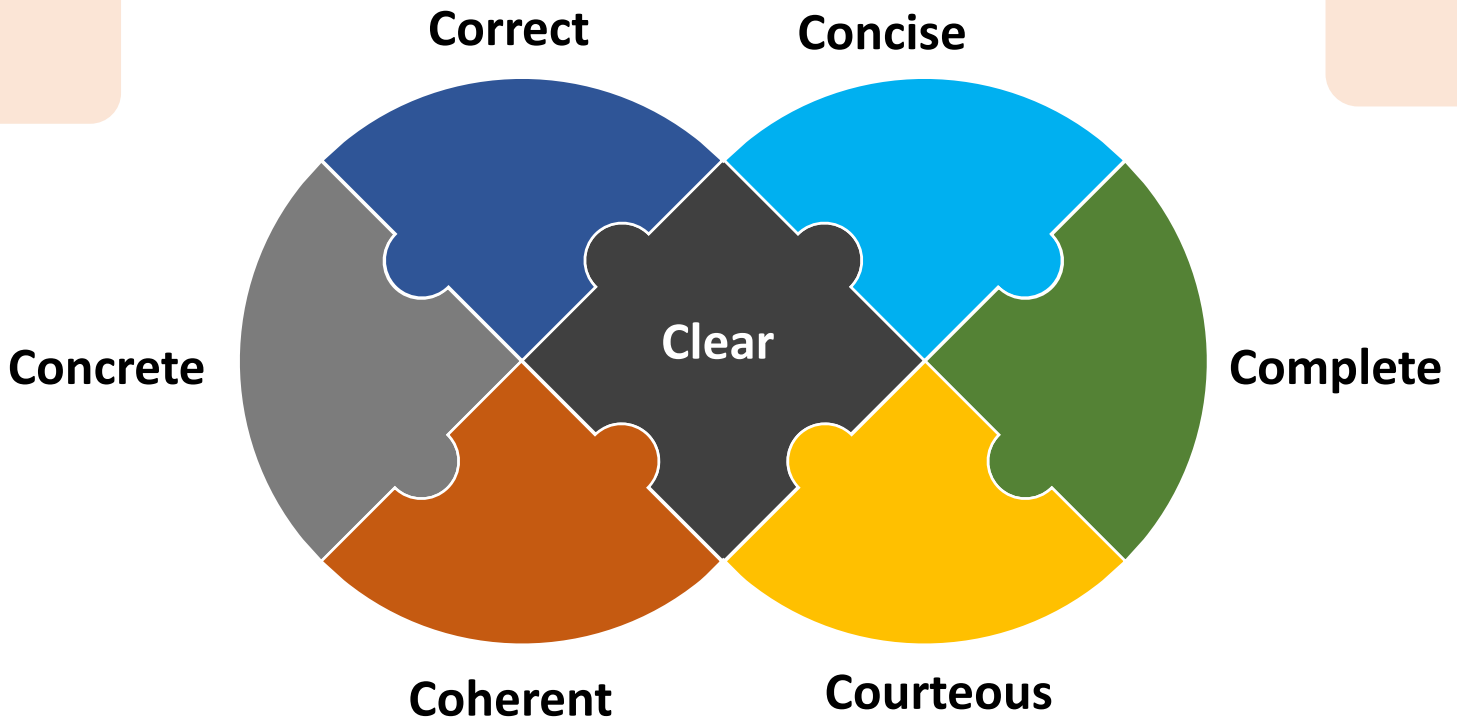
The checklist below is based on the emerging themes and weak points identified from the error reports submitted to SHOT and has been approved by the Transfusion Medicine Specialty Advisory Committee of the Royal College of Pathologists, the National Blood Transfusion Committee, the British Society of 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	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
6	Has the copy of the transplant protocol been sent to the transfusion laboratory at transplant centre?	Y/N
7	Has the clinical team received confirmation that the Laboratory Information Management System (LIMS)	Y/N

Safe and effective communications – the 7 Cs

Listen

Inclusive, empathetic approach



GET IT RIGHT FIRST TIME EVERY TIME

HAVE YOU COMPLETED THE CHECKLIST BEFORE STARTING THE BLOOD TRANSFUSION?

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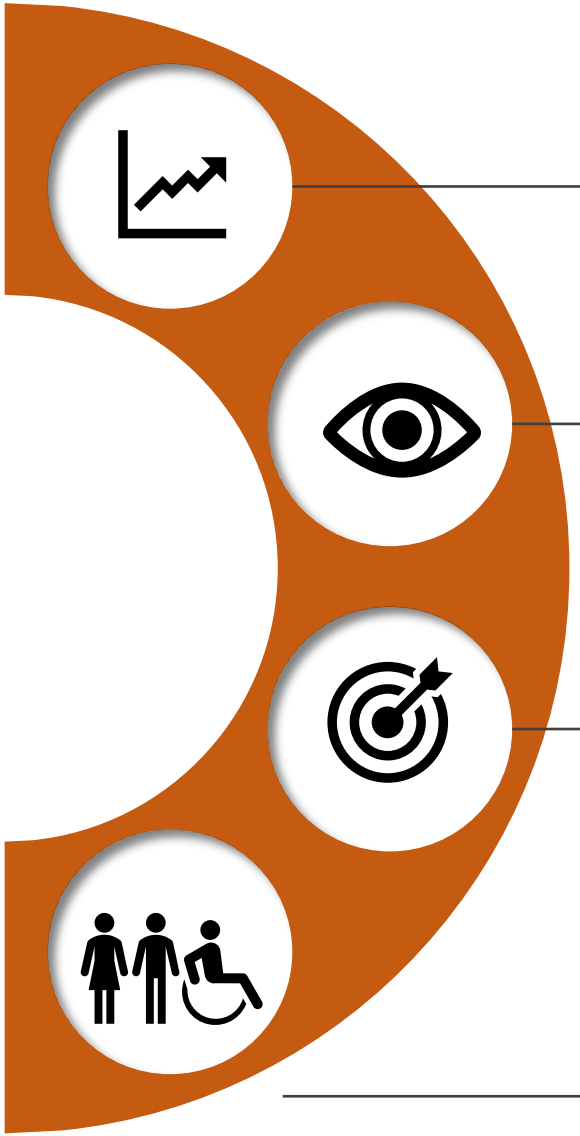
Learning from Near Misses



Near Misses

Near Misses may occur many times before an actual harmful incident

Organisational culture

A learning, resilient, high reliability organisation will endeavour to learn from near miss incidents

NM as learning opportunities

NM represent error-prone situations and have been picked up by vigilant staff and processes. These also need to be investigated thoroughly to help build robust systems and prevent real events

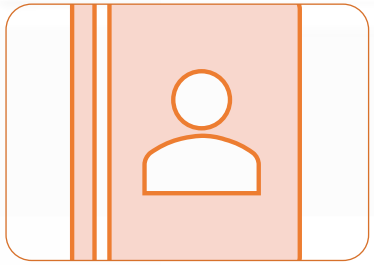
Safety is everyone's responsibility

Raising awareness, improving patient/donor education and involving donors/patients in decision making and checks where possible is vital

Near misses IBCT-SRNM cases reported in 2020

Overview

- There were 19 clinical SRNM and 48 laboratory SRNM near miss cases reported in 2020



Clinical

- 15/19 (78.9%) – patients could have received non-irradiated blood components and 13/15 of these errors were made at the request stage

Laboratory

- Mainly at the component selection step. Most NM IBCT-SRNM were detected at the pre-administration bedside check 26/48 (54.2%). In others the error was detected by chance.
- Most cases involved patients requiring irradiated blood, 25/48 (52.1%).

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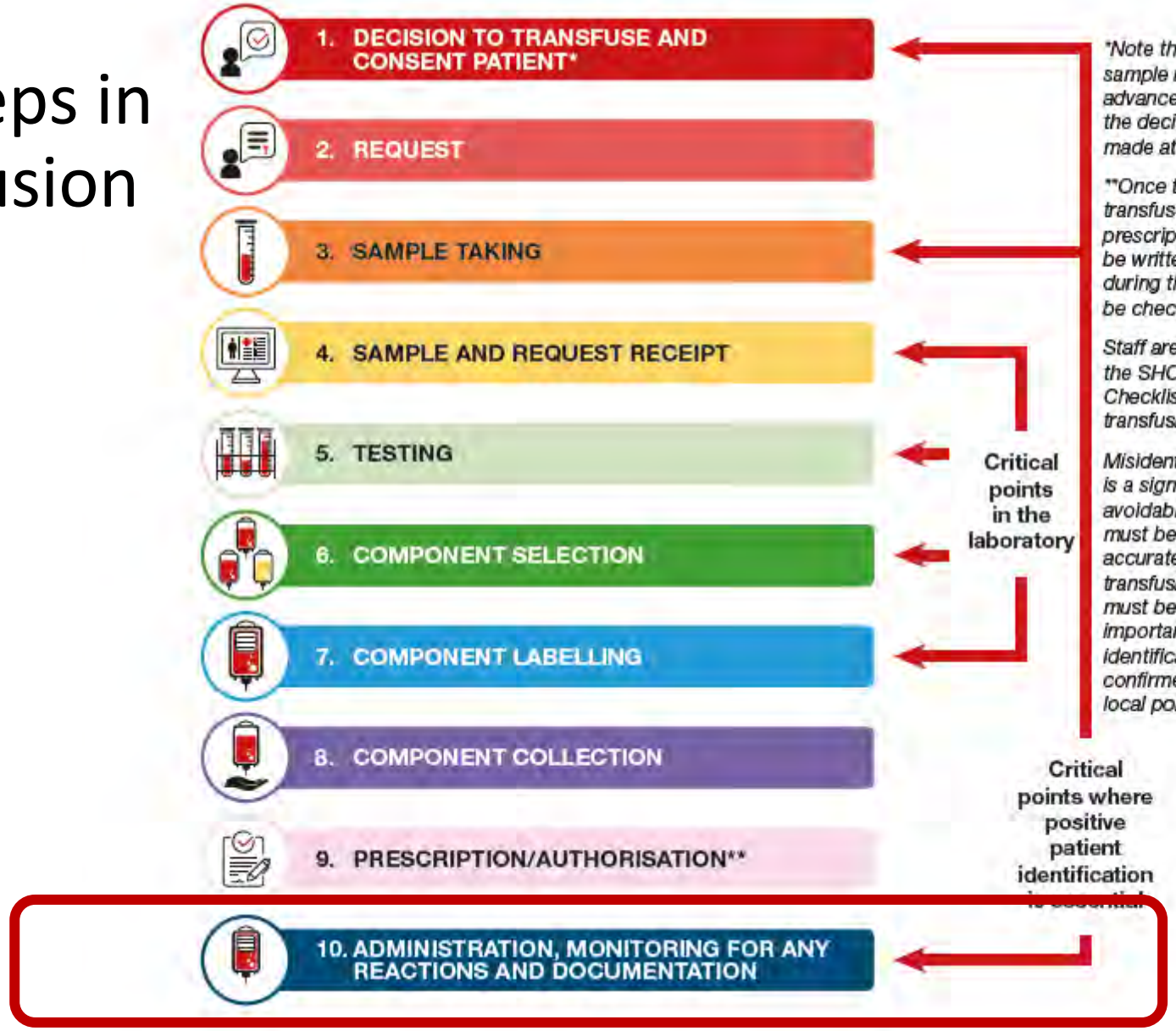
Ten steps in transfusion



Chapter 4 2020 SHOT Report

Pre-administration patient side safety checks

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Safe Transfusion Practice: Transfusion Checklist

Transfusion Request Ensure that:	Signature to confirm
The reason for transfusion is documented in the patient record	
Details on the transfusion authorisation (prescription) sheet are completed and any specific requirements documented	
All fields on the transfusion request form are completed and the form is signed	
The identity details on the transfusion sample are completed correctly and samples labelled at the patient's bedside. These must be handwritten unless electronic systems are available that generate and print a label at the bedside from the patient ID band are available	
The patient has (and where appropriate family/carers have) received information, has agreed to the transfusion, and this is documented **Or** In cases where the patient is unconscious and/or unable to consent and the blood component is given in patient's best interest, ensure this is documented in the patient's notes, and information given retrospectively	
The laboratory is informed of the degree of urgency of the request	
Pre-Transfusion Checks **Ensure that**	
There is adequate and satisfactory venous access: establish or verify patency of peripheral or central venous access device	
A formal pre-transfusion risk assessment for transfusion-associated circulatory overload (TACO) is undertaken whenever possible (especially if older than 50 years or weighing less than 50kg), and appropriate preventative actions taken	
The blood component is ready to be collected	
Collection **Ensure that:**	
Documentation stating the patient identity details is correct and matches the details on the unit	
You have the correct component as per the prescription or authorisation	
The unit has the special requirements that are documented on the prescription or authorisation	
The patient blood group matches or is compatible with the group of the unit	
The unit is in date and is in good condition (i.e. no leaks/clots or discolouration)	
The unit is signed for by a person trained and competency assessed in blood collection	
The time the component was removed from temperature control (e.g. refrigerator) and received in the clinical area are both recorded	
Administration **Ensure that:**	
Pre-transfusion observations are taken and recorded within 60 before commencement Temperature | Blood pressure Pulse | Respiration rate	
Documentation for the transfusion record is complete and accurate	
The unit has the special requirements that are documented on the prescription or authorisation	
You have the correct component as per the prescription or authorisation	
The patient blood group matches or is compatible with the group of the unit	
The correct blood transfusion administration set is used, (and a fresh set if transfusing platelets)	
Pre-administration identification checks are performed at the bedside, including a check of the identity band against the unit compatibility label. Confirm identity verification with the patient where possible, using open ended questions	
A blood warmer or infusion device (if used) is set correctly and monitored	
Observations are carried out, as a minimum at 15 minutes Temperature | Blood pressure Pulse | Respiration rate	
Any adverse events/complications are reported to the responsible clinician and the transfusion laboratory, and are immediately acted upon and documented in the patient record and reported	
The finish time of the transfusion is documented	
The transfusion is completed within 4 hours of removal from temperature-controlled storage *(Note that once thawed, FFP should be transfused as soon as possible. If delay is unavoidable, FFP should be used within 4 hours if stored at 20–24 °C or within 24 hours if stored at 2–6 °C. Cryoprecipitate, once thawed has to be kept at room temp and used within 4 hours)*	

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Safe Transfusion Practice: Transfusion Checklist

Post Transfusion Ensure that:	Signature to confirm
Post-transfusion observations are taken and recorded Temperature | Blood pressure Pulse | Respiration rate	
The traceability documentation record is completed and correctly returned or scanned electronically as, as per local policy	
The component pack and other equipment is disposed of correctly	
The outcome of the transfusion is documented in the patient record	
A post-transfusion information sheet given to the patient (if a day-case or received the transfusion in an emergency)	

The A-E Decision Tree to facilitate decision making in transfusion

A
- Assess patient
- Any avoidable blood loss (frequent, unnecessary tests/interventions)

B
- Blood results (all) reviewed including trends - ensure results valid and reliable
- Best treatment option- is transfusion the best treatment option? If yes, what components needed, how many, what order and any specific requriements needed?

C
- Consent/Communication (adequate patient information- both verbal and written) to patients and where appropriate families and carers
- Correctable factors to be addressed like bleeding, haematinic deficiency

D
- Do not forget other measures (vitamin K, tranexamic acid, cell salvage, etc)
- Do not hesitate to question colleagues regarding decisions made and ask for rationale
- Do not forget to document in patient's notes and in discharge summaries

E
- Ensure timely communications to laboratory- need to be clear, concise and accurate
- Ensure all relevant transfusion checklists including TACO risk assessment and actions rising thereafter have been completed
- Evidence based decisions made weighing risks, benefits and options available
- Ensure patient receives adequate post-transfusion information if transfusion given as a day case

Transfusion process (nine steps)

The NHSBT Patient Blood Management team and SHOT have co-produced a 'Pre-transfusion blood sampling' animated video and another outlining critical steps for completing 'Pre-administration bedside checks of blood components'. These can be found here: https://www.shotuk.org/resources/current-

This checklist has been updated in June 2020 and provides a structured process to ensure that the right component is transfused to the right patient at the right time for the right reason and will help ensure patients have received the right information about their transfusion in a timely manner where possible. There is a lack of unequivocal evidence to support either a one- or two-person checking procedure. There is no evidence from SHOT reports (Bolton-Maggs, 2015) to suggest that two-person checking is safer than one. If local policy requires a two-person checking procedure, each person should complete all the checks independently (double independent checking).The checklist will help improve transfusion safety and is a requirement following the CMO CAS alert sent out in November 2017: CEM/CMO/2017/005 and can be found at this link: https://www.cas.mhra.gov.uk/ViewandAcknowledgment/ViewAlert.aspx?AlertID=102663. We encourage users to utilise this document to help draft checklists locally.

Administration

Ensure that:

Pre-transfusion observations are taken and recorded within 60 before commencement

Temperature		Blood pressure	
Pulse		Respiration rate	

Documentation for the transfusion record is complete and accurate	
The unit has the special requirements that are documented on the prescription or authorisation	
You have the correct component as per the prescription or authorisation	
The patient blood group matches or is compatible with the group of the unit	
The correct blood transfusion administration set is used, (and a fresh set if transfusing platelets)	
Pre-administration identification checks are performed at the bedside, including a check of the identity band against the unit compatibility label. Confirm identity verification with the patient where possible, using open ended questions	
A blood warmer or infusion device (if used) is set correctly and monitored	

Observations are carried out, as a minimum at 15 minutes

Temperature		Blood pressure	
Pulse		Respiration rate	

Any adverse events/complications are reported to the responsible clinician and the transfusion laboratory, and are immediately acted upon and documented in the patient record and reported	
The finish time of the transfusion is documented	
The transfusion is completed within 4 hours of removal from temperature-controlled storage *(Note that once thawed, FFP should be transfused as soon as possible. If delay is unavoidable, FFP should be used within 4 hours if stored at 20–24 °C or within 24 hours if stored at 2–6 °C. Cryoprecipitate, once thawed has to be kept at room temp and used within 4 hours)*	

NHS
Blood and Transplant

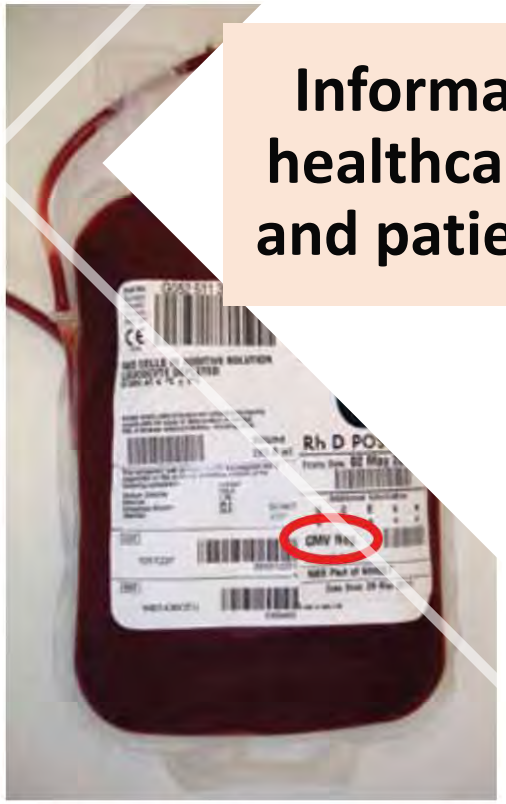
FACTSHEET

Cytomegalovirus (CMV) Negative Blood Components

Information for Healthcare Professionals

What is Cytomegalovirus?

Cytomegalovirus (CMV) is a type of herpes virus. Primary infection is usually asymptomatic but may cause a flu or glandular fever like illness, leading to a lifelong infection in all age groups. The virus can reactivate from its latent state and it is commonly shed asymptomatically in various bodily secretions, such as nasopharyngeal secretions and urine. More severe disease may occur in individuals with impaired immunity such as foetuses, neonates and patients of any age who have been immuno-suppressed by disease or treatment.



How are people exposed to CMV?

Infection frequently occurs in childhood and in the UK it is estimated that 50-60% of adults are CMV positive. As CMV is very common, most adults

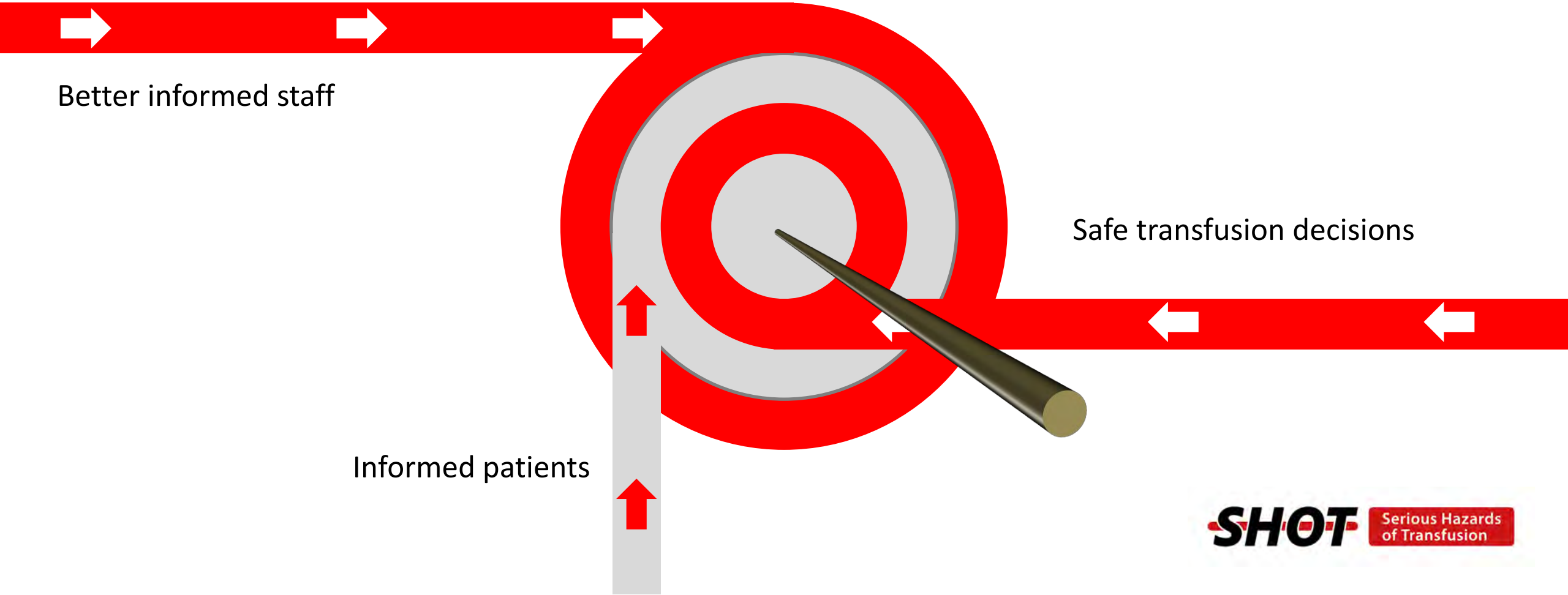
Information sheets for healthcare professionals and patients from NHSBT

NHS
Blood and Transplant

Information for patients
eeding irradiated blood

t information

Trnasfusion safety



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Consenting patients prior to transfusions (based on the SaBTO guidance and NICE guidance NG24)

	Key aspects to be covered when consenting patients for transfusion
1	Patient and/or family/carer have been provided with relevant information about blood transfusions that would help in their decision-making process
2	The reason for the transfusion has been discussed
3	The benefits of the transfusion have been explained
4	Transfusion risks, both short and long-term risks have been discussed with the patient and/or family/carer (including any additional risks pertinent to long term multi-transfused patients)
5	The risks, benefits, and consequences of NOT accepting blood transfusion have been elaborated
6	Transfusion issues specific to the patient have been highlighted
7	Relevant alternative options have been discussed including how they might reduce the need for a transfusion
9	The transfusion process has been explained
10	The need for any specific requirements for blood components and rationale, including need for anti-D Ig post transfusion as appropriate has been elaborated and relevant patient information leaflet has been provided
11	Patient and/or family/carer has also been informed that once transfused, they are no longer eligible to donate blood
12	Patients and carers/family have been given the opportunity and been encouraged to ask questions
13	Patient and/or family/carer is aware that if they change their mind at any point before the transfusion, they are entitled to withdraw their consent, and this should be documented and managed appropriately
14	Synopsis of discussions and decisions taken documented in patient's clinical notes

Conclusions and recommendations

- Staff awareness through education and training
- Communication – clear, accurate, timely all along the transfusion pathway
- Laboratory and IT Safety: LIMS algorithms, addressing alert fatigue
- Patient education and empowerment

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Suggestions for service improvement projects

- Check the process end to end and see how these are managed in your organisation
- Patient consent audit
- Pre-transfusion safety checks- are they BAU? How effective are these checks?
- Number of cases of missed irradiation in the preceding 6 months, thematic analysis with CAPA
- Communications including transfusion requests and discharge summaries

Safety is a team effort. Communication, collaboration and coordination amongst all healthcare professionals involved in the patient care (both clinical and laboratory) is vital.

Resources

- Many more resources, including the 2020 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

SCAN ME

Coming soon… free e-learning module on transfusion specific requirements from SHOT

Resources

DOWNLOAD THE NEW SHOT APP

Download on the App Store

GET IT ON Google Play

ihn-shot-2022.orcula.co.uk

Gmail YouTube Maps Should Real Airway... Reducing Harm in B... Biovigilance: A Glob...

Haemovigilance Past, Present & Future

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IHN-SHOT 2022

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6-8 July 2022 / Brighton, UK

REGISTER NOW

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Acknowledgements

- The SHOT team
- The Steering Group and Working Expert Group members
- MHRA haemovigilance team
- The vigilant reporters and hospital staff who share their incidents
- The UK Forum for funding
- Everyone who has contributed to and supported our activities

For further information visit: www.shotuk.org

Special thanks to:

- Jenny Leonard https://jennyleonardart.com/
- Team at ARC Document Solutions https://www.e-arc.co.uk/about-us/