

SHOT

Serious Hazards
of Transfusion

NMA course

Si Carter-Graham

Clinical Incident Specialist



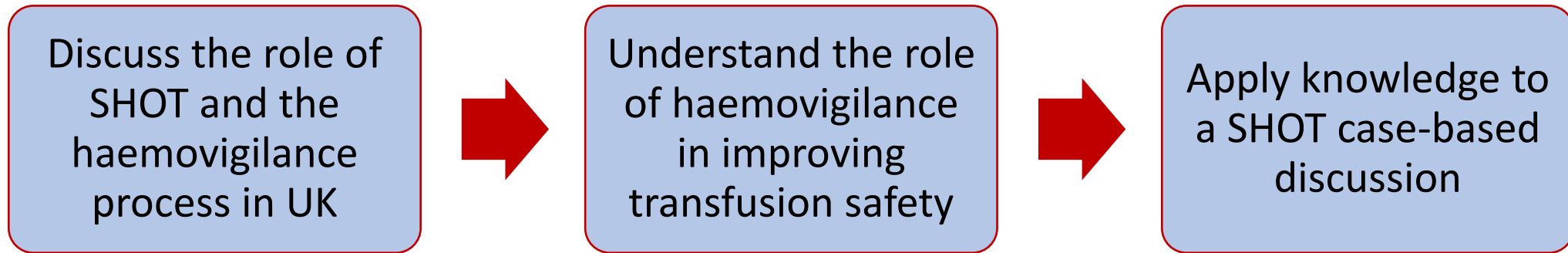
Join at vevox.app

Or search **Vevox** in the app store

ID: 198-067-285



OBJECTIVES: At the end of this lesson you will be able to...



Haemovigilance

Refers to the systematic surveillance of adverse reactions and adverse events related to transfusion with the aim of improving transfusion safety

Haemovigilance in the UK



**‘Competent Authority’ for EU
Blood Safety and Quality
Regulations (BSQR 2005)**

**Confidential enquiry:
National Haemovigilance scheme
since 1996**

**Monitor quality management
systems (QMS) in Blood Service
and Hospital Laboratories**

**Serious adverse reactions and
events in both labs and clinical
environment**

**STATUTORY
reporting**

**PROFESSIONALLY MANDATED
reporting**

How has haemovigilance helped?

Provides assurance regarding safety of transfusions in the UK

Has demonstrated reduction in TTI, ABOi and TRALI

TRALI risk reduction measures including testing of female donors was as a result of HV data

HAEMOVIGILANCE IS EVERYONE'S RESPONSIBILITY -



WORKING TOGETHER TO IMPROVE PATIENT SAFETY



SHOT
Serious Hazards of Transfusion

In which year was SHOT established?

- 1. **1976**
- 2. **1986**
- 3. **1996**
- 4. **2006**

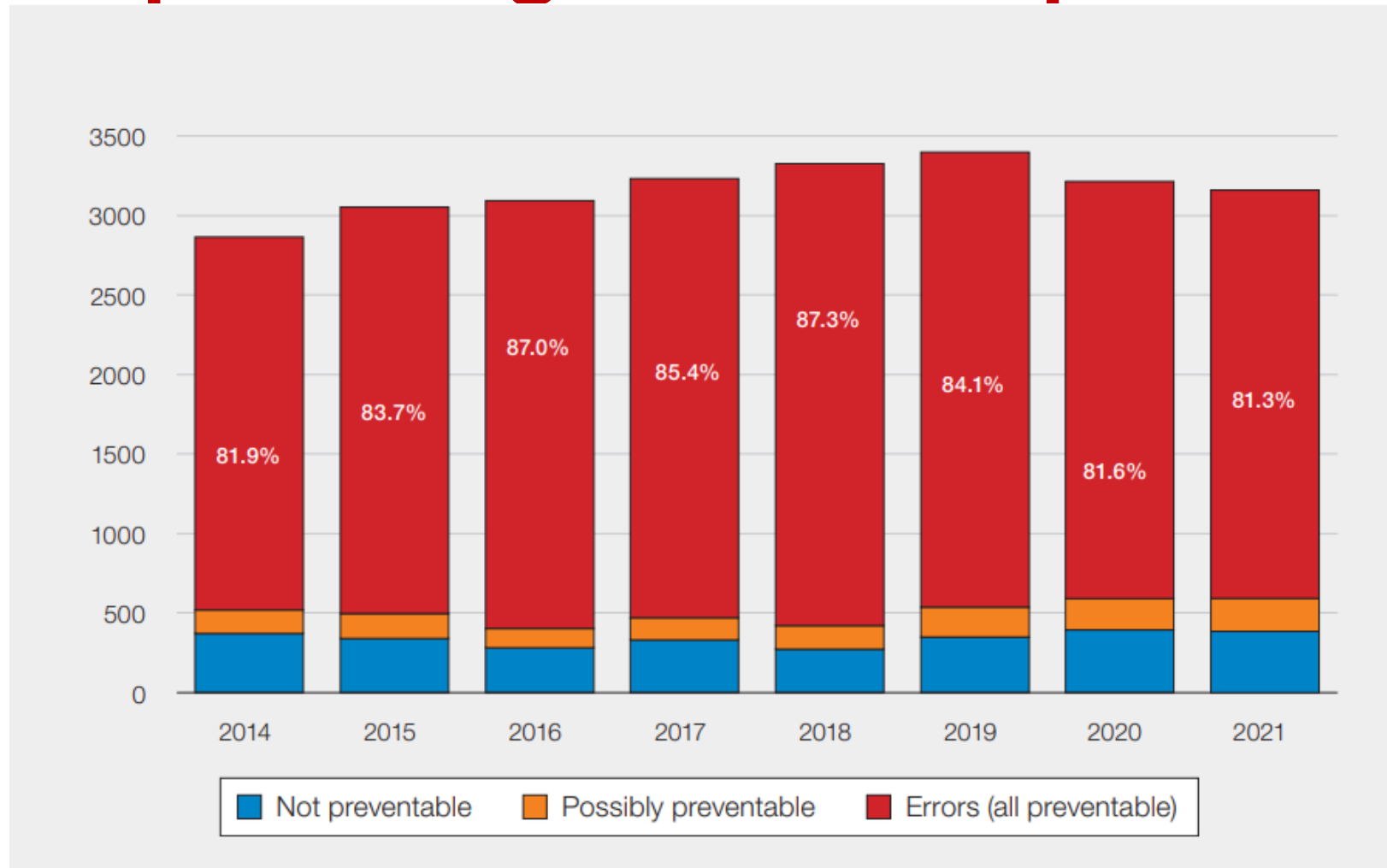


Reporting to SHOT is mandatory?

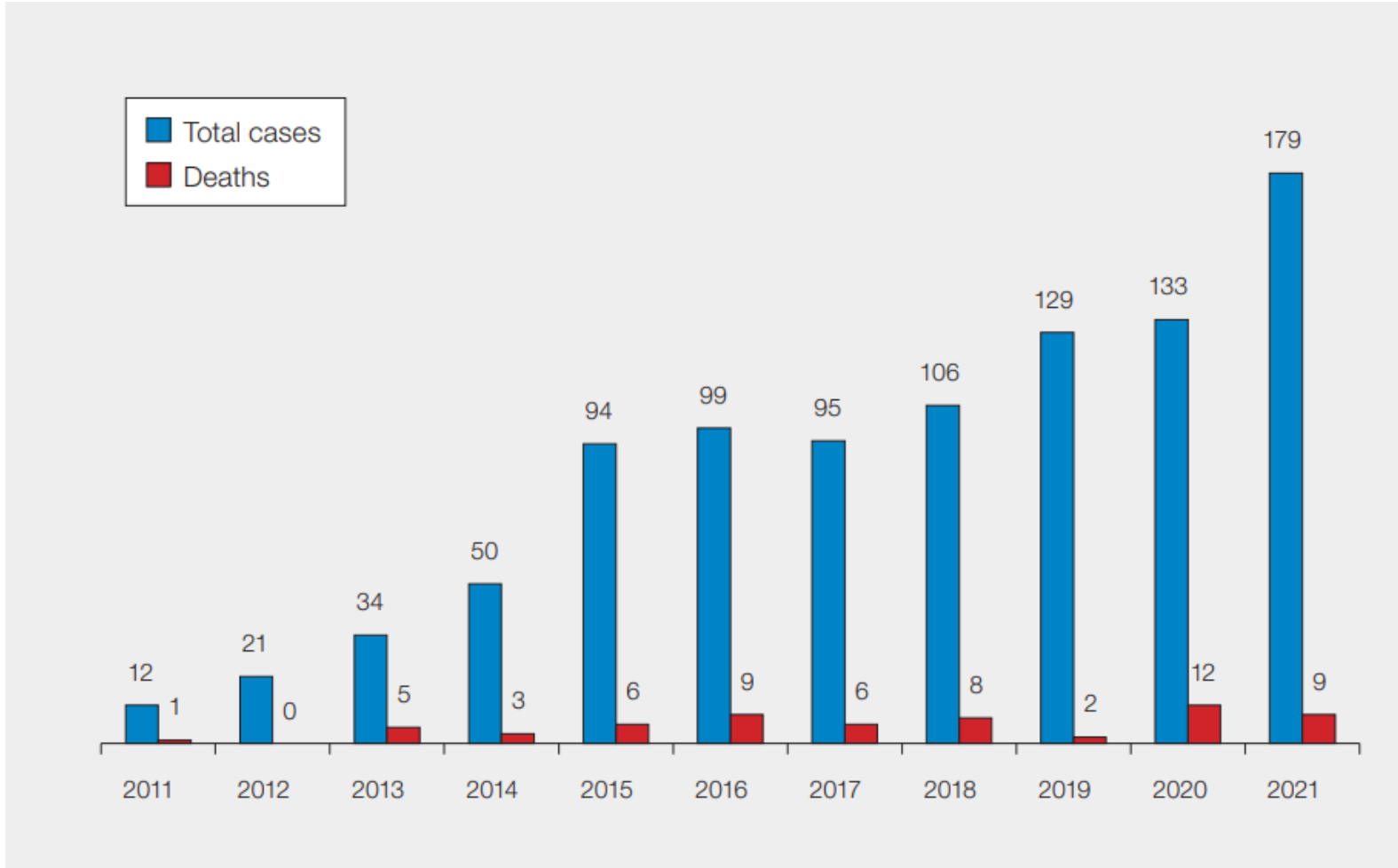
1. **TRUE**

✓ 2. **FALSE**

Errors as a percentage of total reports 2014-2021



Delayed transfusion reports and deaths by year 2011-2021 (n=952, deaths n=61)





**Annual SHOT
Report , 2021**

Case 1 Delayed transfusion contributes to death due to myocardial ischaemia



A man in his 80s with myocardial ischaemia and anaemia, Hb 63g/L, received a first unit of red cells but the second was delayed for 12 hours contributing to his death



The porter did not inform the clinical area of this



The request form had incorrect details so was rejected



A further collection form had to be sent

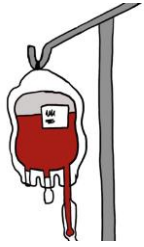


The revised request form could not be found when the porter came to collect the unit



It is important that transfusion requests are completed accurately to avoid delays –
‘Get it right first time every time’

Case 2 Urgent need for blood during surgery - pager failure



Theatre staff needed blood during repair of an AAA for a man in his 80s but could not contact the BMS due to pager failure



Clinical staff must be able to reach transfusion laboratory staff in case of emergencies



The delay was 30 minutes and was thought to have contributed to the patient's death



Major haemorrhage drills should include testing of communication channels and equipment

Preventing transfusion delays in bleeding and critically anaemic patients.

Date of Issue:

17-Jan-22

Reference No:

SHOT/2022/001

This alert is for action by: **NHS and independent (acute and specialist) sector where transfusions are carried out.**

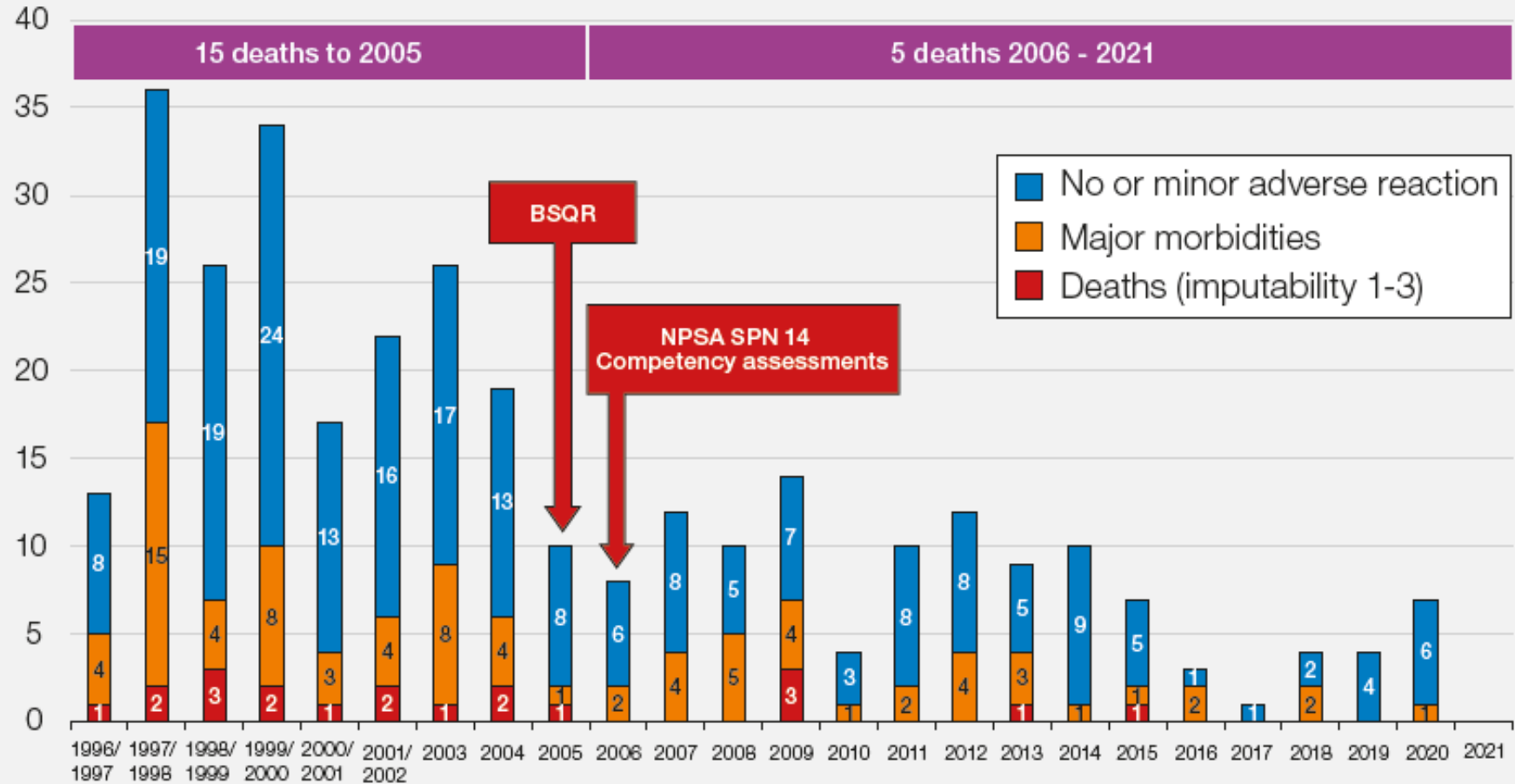
Access to blood components and products is a complex safety critical issue that is relevant across many departments and professions. Implementation of this alert should be coordinated by an executive leader (or equivalent role in organisations without executive boards) and supported by their designated senior leads for medical, nursing and pathology teams.

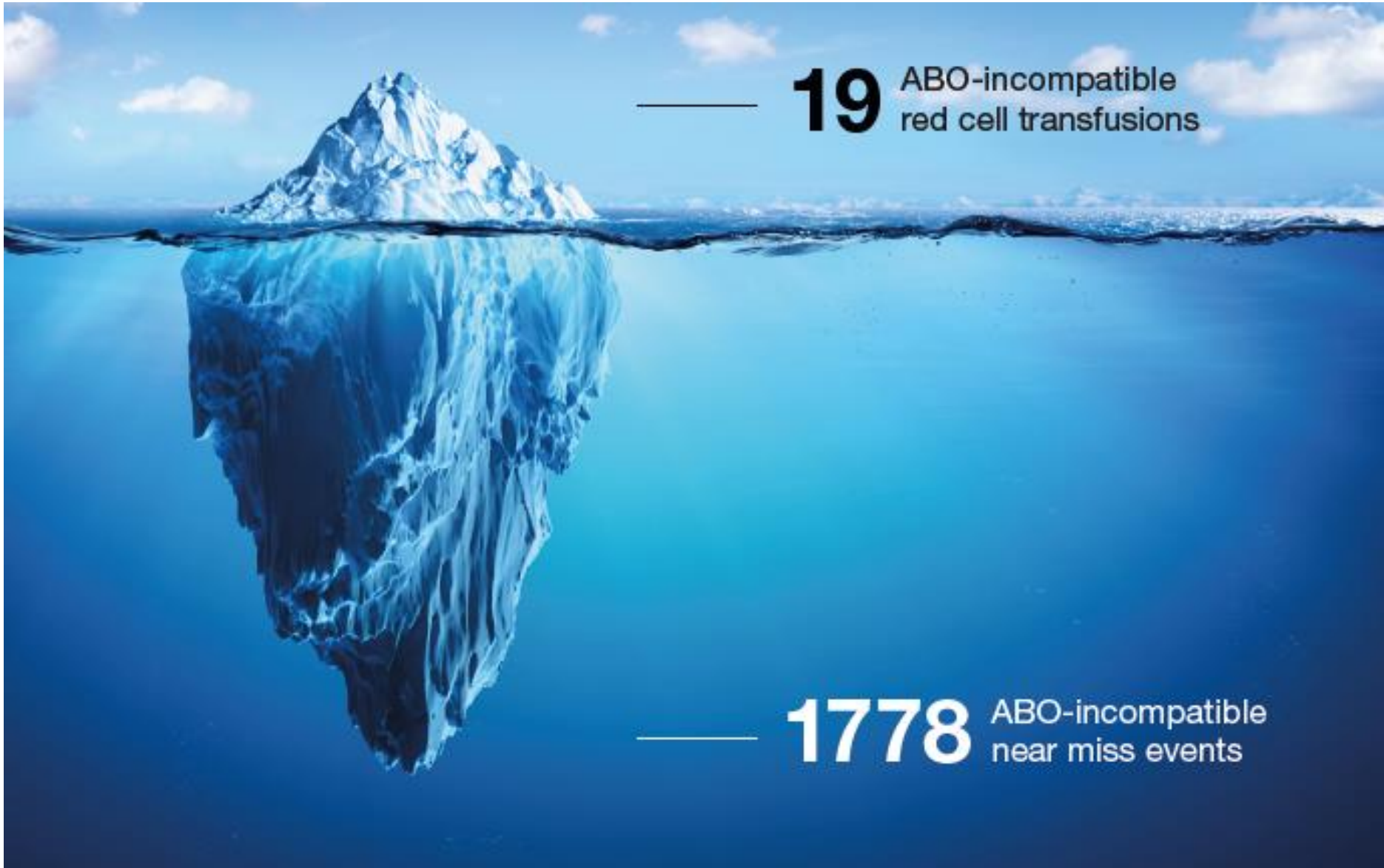
What is the main factor contributing to delays in major haemorrhage?

- 1. **Poor knowledge of the process**
- 2. **Staff shortages**
- 3. **Blood sample errors**
- ✓ 4. **Communication failure**



Outcome of ABO-incompatible red cell transfusions in 25 years of SHOT reporting



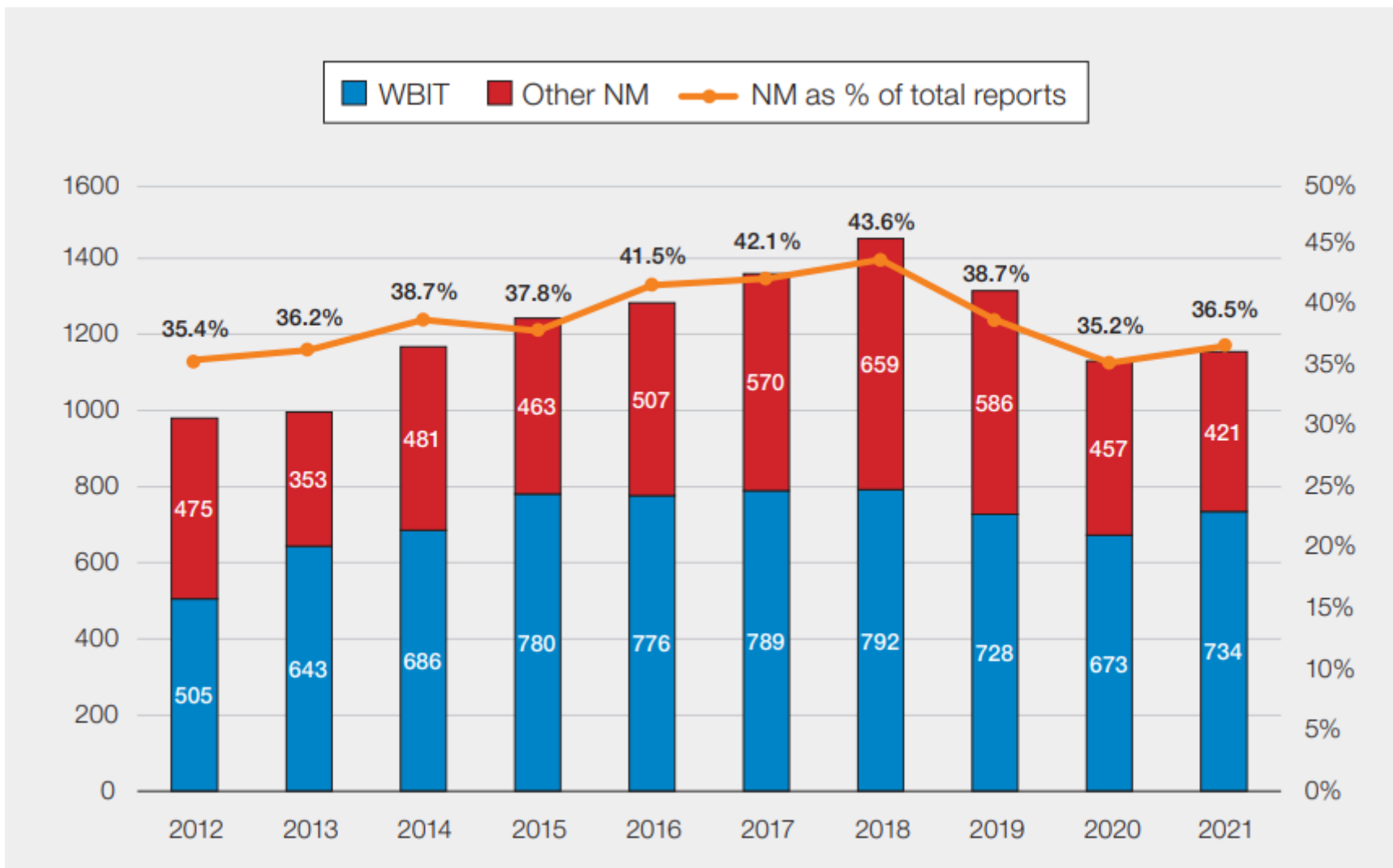


— **19** ABO-incompatible
red cell transfusions

— **1778** ABO-incompatible
near miss events



Wrong Blood in Tube errors



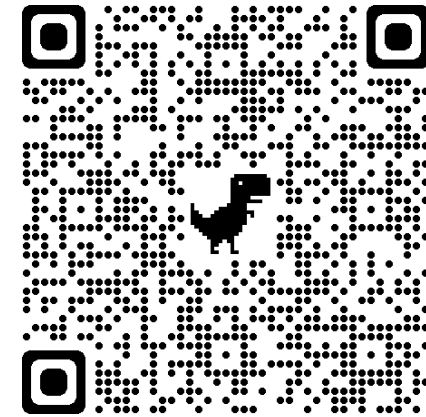
Which of the following can be the cause of a wrong blood in tube error?

- 1 **Identifying the right patient at venepuncture**
- 2 **Blood sample being labelled at the nurses station**
- 3 **Blood sample labelled at the patient's side**
- 4 **Checking the patient's identity band**

Transfusion Checklist

Covers all aspects of the transfusion process

- Request
- Pre-transfusion checks
- Collection
- Administration
- Post-transfusion



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 <i>(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)</i>			

Do you use a pre-transfusion checklist?

1. **YES**
2. **NO**

Case 3 Pre-administration 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, pretransfusion haemoglobin was 68g/L



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



A unit of red cells 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



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



One nurse then took the unit of red cells and the associated paperwork to the patient's bedside (the other nurse was called away to deal with something else)



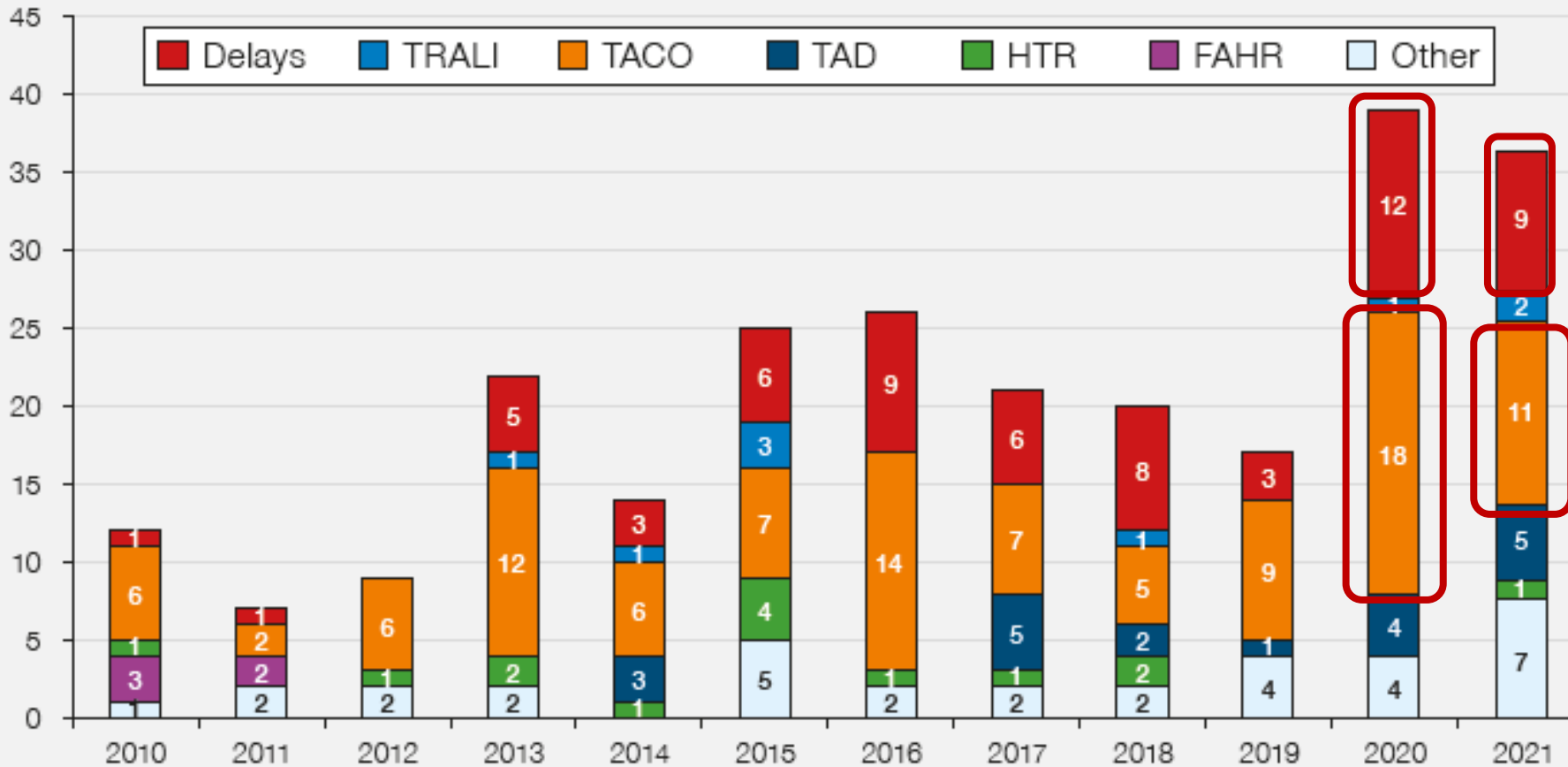
The patient was admitted to high dependency unit overnight for observations due to the reaction to the wrong blood administration

What is the most common cause of transfusion-related deaths in the UK?

1. **Transfusion-Transmitted Infection**
- ✓ 2. **Transfusion-Associated Circulatory Overload**
3. **Haemolytic Transfusion Reaction**
4. **Allergic Reaction**




Transfusion-related deaths 2010-2021 n=247

TACO and delays are the most prevalent causes of transfusion-related deaths year on year.



Important to note:

TACO and delays are the most common causes of transfusion-related deaths in the UK year on year.

TACO Checklist	Patient Risk Assessment	YES	NO
	Does the patient have any of the following: diagnosis of 'heart failure', congestive cardiac failure (CCF), severe aortic stenosis, or moderate to severe left ventricular dysfunction?		
	Is the patient on a regular diuretic?		
	Does the patient have severe anaemia?		
	Is the patient known to have pulmonary oedema?		
	Does the patient have respiratory symptoms of undiagnosed cause?		
	Is the fluid balance clinically significantly positive?		
	Is the patient receiving intravenous fluids (or received them in the previous 24 hours)?		
	Is there any peripheral oedema?		
	Does the patient have hypoalbuminaemia?		
	Does the patient have significant renal impairment?		

If Risks Identified	YES	NO
Review the need for transfusion (do the benefits outweigh the risks)?		
Can the transfusion be safely deferred until the issue is investigated, treated or resolved?		
If Proceeding with Transfusion: Assign Actions		TICK
Body weight dosing for red cells		
Transfuse a single unit (red cells) and review symptoms		
Measure fluid balance		
Prophylactic diuretic prescribed		
Monitor vital signs closely, including oxygen saturation		

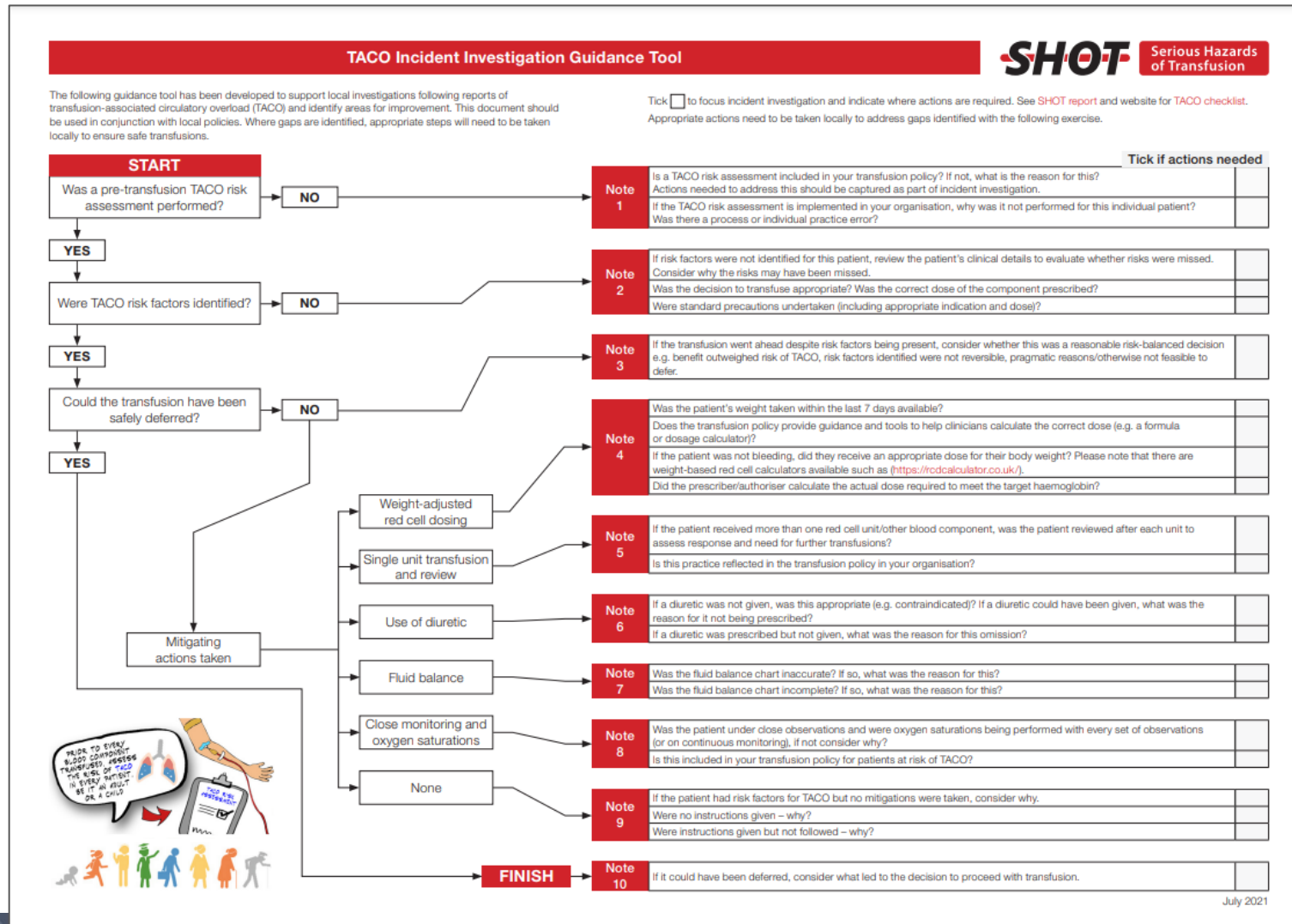
Name (PRINT):	
Role:	
Date:	Time (24hr):
Signature:	

A **TACO checklist** should be utilised whenever possible prior to every transfusion, especially in vulnerable patients



Due to the differences in adult and neonatal physiology, babies may have a different

A TACO investigation guidance tool has been developed and can be accessed from 'Current resources' on the SHOT website



Is the TACO checklist used at your hospital?

1. **YES**
2. **NO**

What are the risk factors for TACO?

Case study 4

- Female patient in her 80s with iron deficiency anaemia, cardiac and renal impairment and pre-transfusion peripheral oedema
- Hb result was 48g/L
- Weight 50kg
- Received 2 units of red blood cells and during 2nd unit became breathless and O2 sat dropped to 91%
- Post-transfusion chest X-ray showed fluid overload
- Administered oxygen and IV diuretic with improvement
- Patient fully recovered



Does this patient have risk factors for TACO?

1. **YES**
2. **NO**

What could have been done to reduce risk of TACO?

1. Single unit transfusion
2. Pre-transfusion diuretic
3. IV iron
- ✓ 4. All of the above

Febrile, Allergic (FAHR) reactions

CURRENT IHN/SHOT/B(C)SH CLASSIFICATION OF ACUTE TRANSFUSION REACTIONS				SABRE classification
	1=Mild	2=Moderate	3=Severe	
Febrile type reaction	A temperature > 38°C and a rise between 1°C and 2°C from pre-transfusion values, but no other symptoms/signs	A rise in temperature of 2°C or more, or fever 39°C or over and/or rigors, chills, other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion	A rise in temperature of 2°C or more, and/or rigors, chills, or fever 39°C or over, or other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion, prompt medical review AND/OR directly results in, or prolongs hospital stay	Other/febrile FAHR
Allergic type reaction	Transient flushing urticaria or rash	Wheeze or angioedema with or without flushing/urticaria/rash but without respiratory compromise or hypotension	Bronchospasm, stridor, angioedema or circulatory problems which require urgent medical intervention AND/OR, directly result in or prolong hospital stay, or Anaphylaxis (severe, life-threatening, generalised or systemic hypersensitivity reaction with rapidly developing airway AND/OR breathing AND/OR circulation problems, usually associated with skin and mucosal changes)	Anaphylaxis/hypersensitivity/allergic/FAHR
Reaction with both allergic and febrile features	Features of mild febrile and mild allergic reactions	Features of both allergic and febrile reactions, at least one of which is in the moderate category	Features of both allergic and febrile reactions, at least one of which is in the severe category.	*Other/mixed febrile/allergic FAHR
Hypotensive reaction		Isolated fall in systolic blood pressure of 30 mm Hg or more occurring during or within one hour of completing transfusion and a systolic blood pressure 80 mm or less in the absence of allergic or anaphylactic systems. No/minor intervention required	Hypotension, as previously defined, leading to shock (e.g., acidaemia, impairment of vital organ function) without allergic or inflammatory symptoms. Urgent medical intervention required	Other/hypotensive FAHR

*This category may include mild symptoms/signs of one reaction type providing the other category is either moderate or severe

Reactions

1

Febrile reactions account for 10% of the reports in this category

Errors in accurately reporting events continue

4

Red cells usually associated with febrile reactions

Widespread use of antihistamines without steroids seen

Background: Febrile and allergic reactions are among the commonest reactions to transfusion. Around 300 moderate-severe reactions are reported to SHOT each year (~15 per 100,000 components transfused) and mild reactions occur even more frequently. Challenges in management include **classifying** the type of reaction, judging its **severity** and if necessary, **investigating to exclude an alternative cause** (such as a haemolytic reaction or bacterial infection). It is vital that the patient is treated appropriately, both to manage their symptoms and enable transfusion to continue where reactions are mild.

SHOT data consistently show that 40% of these reactions are misclassified by the reporter, and 40-50% of patients with febrile reactions are inappropriately treated with an antihistamine and steroid.

“Reaction to transfusion” is not a single diagnosis requiring a uniform standard treatment!



This SHOT Bite includes:

- A guide to help frontline staff use the patient's symptoms and signs to correctly classify and manage febrile and allergic reactions
- An illustrative case

Illustrative case



A 50 year old female with acute myeloid leukaemia on the haematology ward received a unit of platelets. At the end of the transfusion she developed rigors, nausea, tachycardia and chest pain.

Baseline observations: Temp 36.8, BP 117/70, Pulse 68, RR 18, SpO2 98%.
Post transfusion observations: Temp 37.4, BP 161/53, Pulse 115, RR 20, SpO2 100%.

She was treated with hydrocortisone and chlorphenamine and repeat group and screen was sent. This was reported as a mixed reaction.



Commentary:

This patient's small temperature rise was not sufficient to be considered a fever, but her symptoms were overwhelmingly inflammatory.

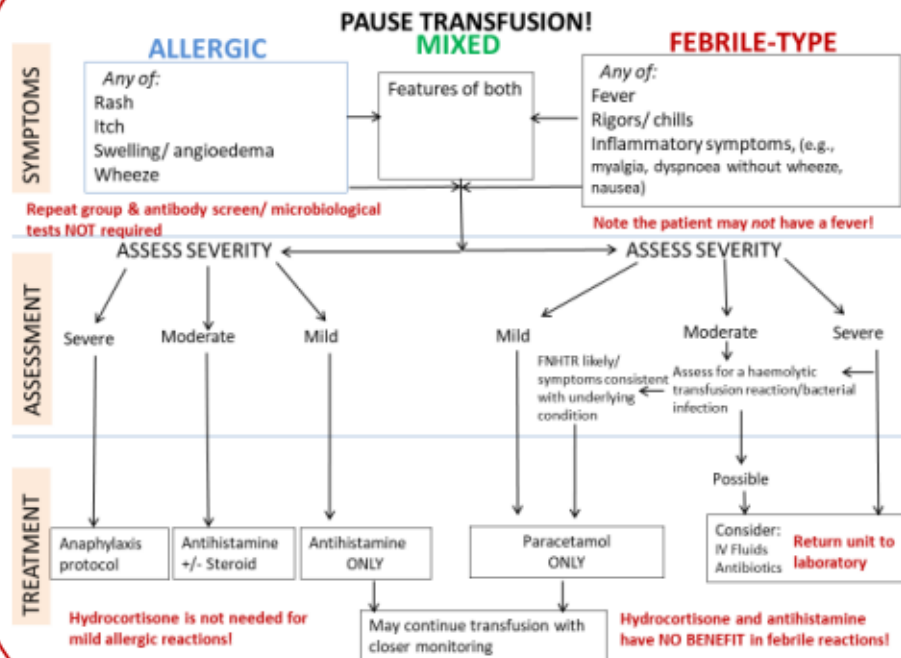
There were no allergic features and the SHOT expert reclassified this as a febrile-type reaction.

The use of chlorphenamine and hydrocortisone was inappropriate. In an immunocompromised patient, assessing for infection (both related to and unrelated to transfusion) would be important.

Any reaction that is moderate or severe should be reported to SHOT

Grading of severity of febrile, allergic, and hypotensive reactions and SHOT reporting criteria can be found in the SHOT definitions document which is reviewed and updated annually and can be accessed from this link <https://www.shotuk.org/resources/current-resources/>

Algorithm to help identify type of FAHR reaction and management



Key Messages

- Important:** It is important to try to classify the type of reaction to be able to correctly investigate and treat. Follow local policy for transfusion reaction investigation, including returning the unit to the laboratory
- Warning:** In a febrile non-haemolytic transfusion reaction, laboratory investigations are expected to be normal. These are done to exclude alternative causes
- Plus:** Treat febrile reactions with paracetamol. Antihistamines and steroids are of no benefit, and could potentially cause harm
- No:** Pure allergic reactions are not associated with febrile type symptoms

See the BSH guidelines on Investigation and Management of Acute Transfusion Reactions for more detail on assessing severity and choice of investigations: <https://b-s-h.org.uk/guidelines/guidelines/investigation-and-management-of-acute-transfusion-reactions/>

SHOT FAHR cumulative data <https://www.shotuk.org/resources/current-resources/data-drawers/fahr-data-drawer-2/>



SHOT Bite
Febrile,
allergic and
hypotensive
reactions
(FAHR) –
Getting the
diagnosis right

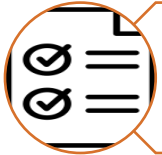
Paediatric Haemovigilance highlights



Paediatric cases accounted for **7.7% (137/1790)** of total cases analysed excluding near miss and right blood right patient reports



There were **2 deaths** possibly related to transfusion, one was related to transfusion-associated necrotising enterocolitis and the other was due to transfusion delay



Protocols must be in place for the management of massive haemorrhage in infants and children and should include guidance on the appropriate component volumes to be used in resuscitation. Staff involved in paediatric transfusions must be trained and aware of the content of this protocol



Hyperkalaemia is a recognised complication of large volume transfusion in neonates and infants, and 'fresh' red cells are recommended for this situation to reduce risk



Hospitals should ensure the correct use of the paediatric red cell transfusion formula, with the Hb units in g/L



Paediatric medical and nursing education must include specific transfusion requirements for patients with haemoglobinopathies and processes must be in place to ensure these are communicated effectively to the hospital transfusion laboratories to ensure safe transfusions

Main SHOT recommendations from the 2021 Annual SHOT Report



Partnering with patients to enhance safety

Staff must ensure that they involve, engage and listen to patients as ‘partners’ in their own care, including transfusion support. Engaging patients, their families, and carers as ‘safety partners’ helps co-create safer systems, identify, and rectify preventable adverse events



Investing in safety - well-resourced systems with safe staffing levels

Healthcare leaders must ensure that systems are designed to support safe transfusion practice and allocate adequate resources in clinical and laboratory areas to ensure safe staffing levels, staff training in technical and non-technical skills and appropriate equipment, including IT systems



Just and learning safety culture

All healthcare leaders must promote a just, learning safety culture with a collective, inclusive, and compassionate leadership. Effective leaders must ensure staff access to adequate training, mentorship, and support. All staff in clinical and laboratory areas have a responsibility to speak up in case of any concerns and help embed the safety culture in teams

SHOT Acknowledging Continuing Excellence in Transfusion

- Learning from all events and experiences including excellence
- Appreciative enquiry
- Making visible the hidden work people do to successfully navigate problems
- Build resilient teams and systems



**SHOT
ACE**

Suggested future activities



Spend some time with a haemovigilance reporter when they are completing a SHOT report



Attend a hospital transfusion committee meeting



Attend an investigation meeting



Review your hospital transfusion policies



Carry out a consent audit / audit of use of checklist / SRNM

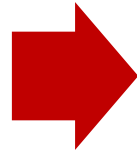


Carry out an audit of your Trust's SHOT reports



You should now be able to:

Discuss the role of SHOT and the haemovigilance process in UK

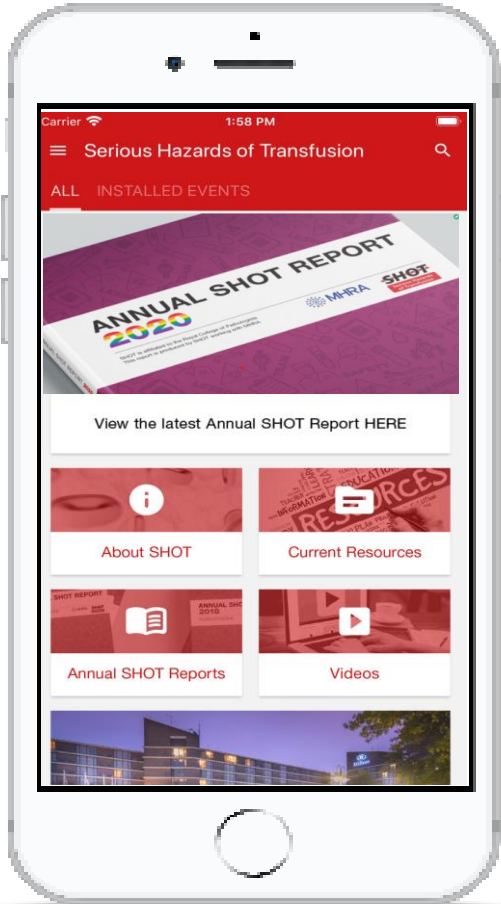


Understand the role of haemovigilance in improving transfusion safety



Apply knowledge to a SHOT case-based discussion

SHOT App



Acknowledgements

- The SHOT team
- The Steering Group and Working Expert Group members
- The vigilant reporters and hospital staff who share their incidents

For further information visit: www.shotuk.org



**Please feel free to provide feedback about this presentation either directly
to the SHOT team or via PBM team**