Pulmonary complications in the Elderly

Paula Bolton-Maggs

Medical Director

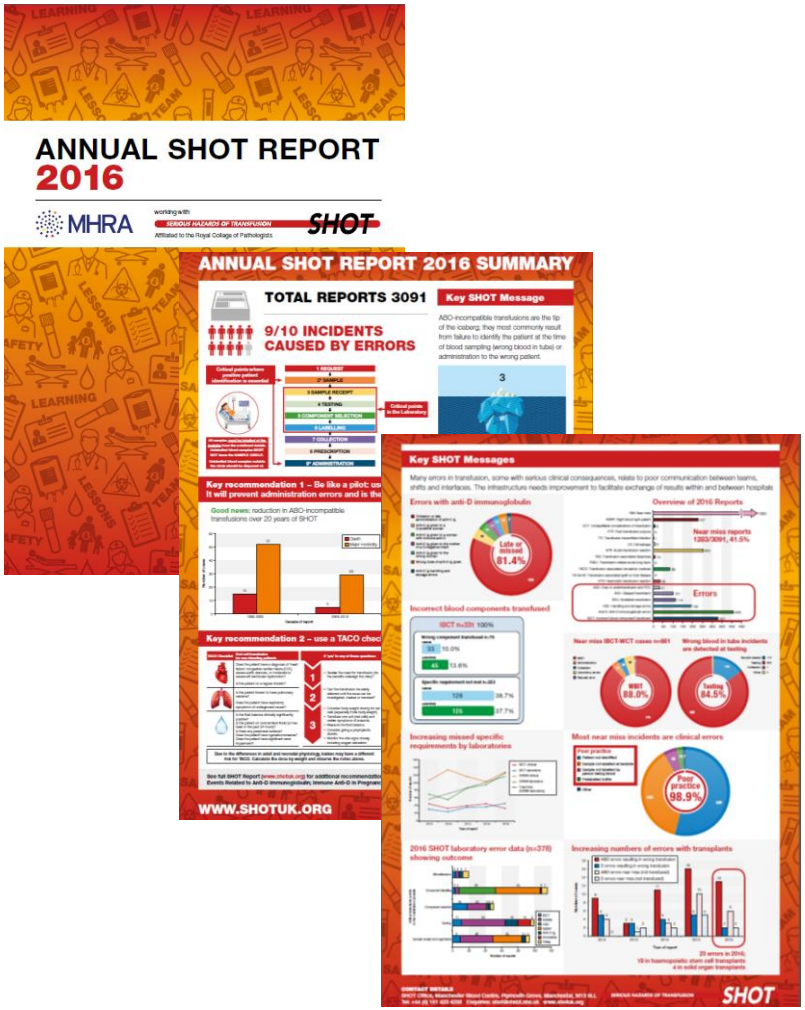
What does SHOT do?

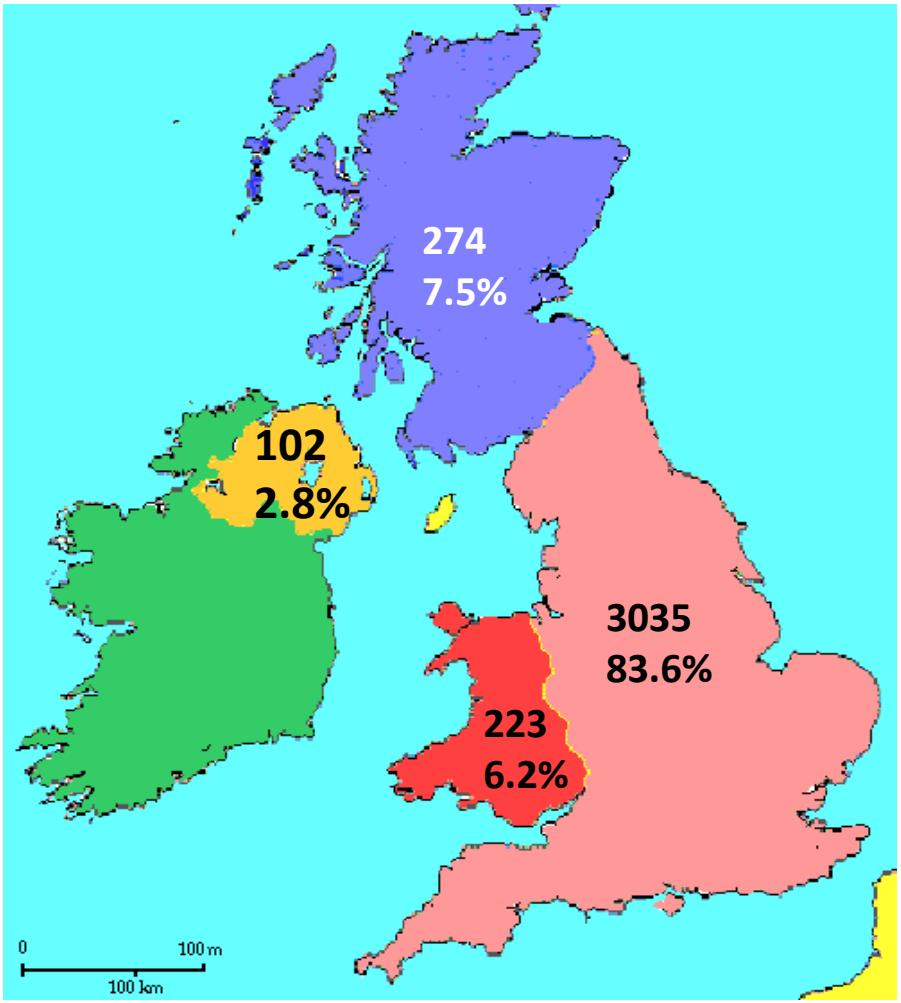
- Serious Hazards of Transfusion
- Collect data on serious adverse reactions and events related to transfusion
- Data reviewed by transfusion experts to produce Annual SHOT Report
- Participation is professionally mandated

  - a requirement of quality, inspection and accreditation organisations

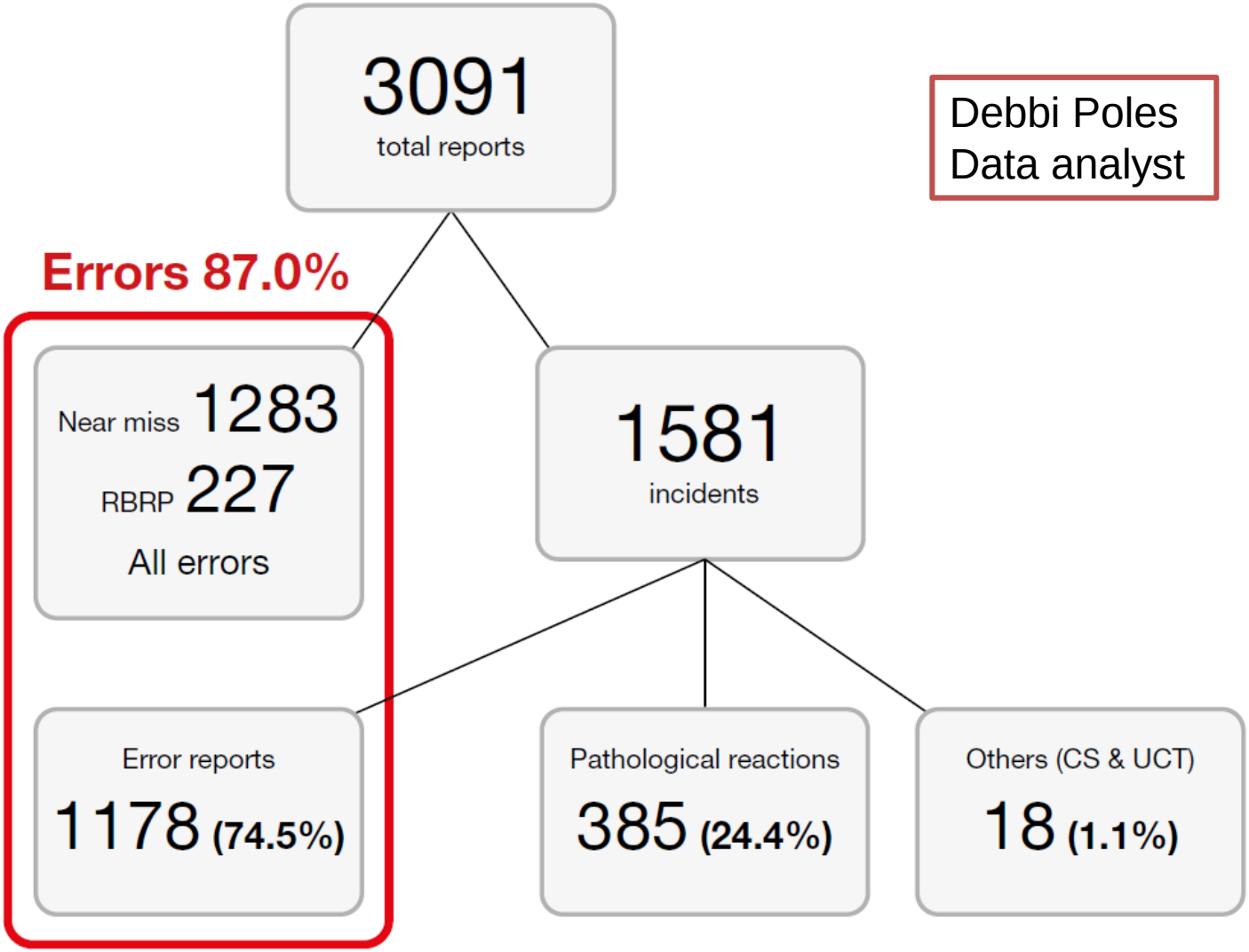
- Small core team based in Manchester

SHOT Cases 2016 (n=3634 total reports made)



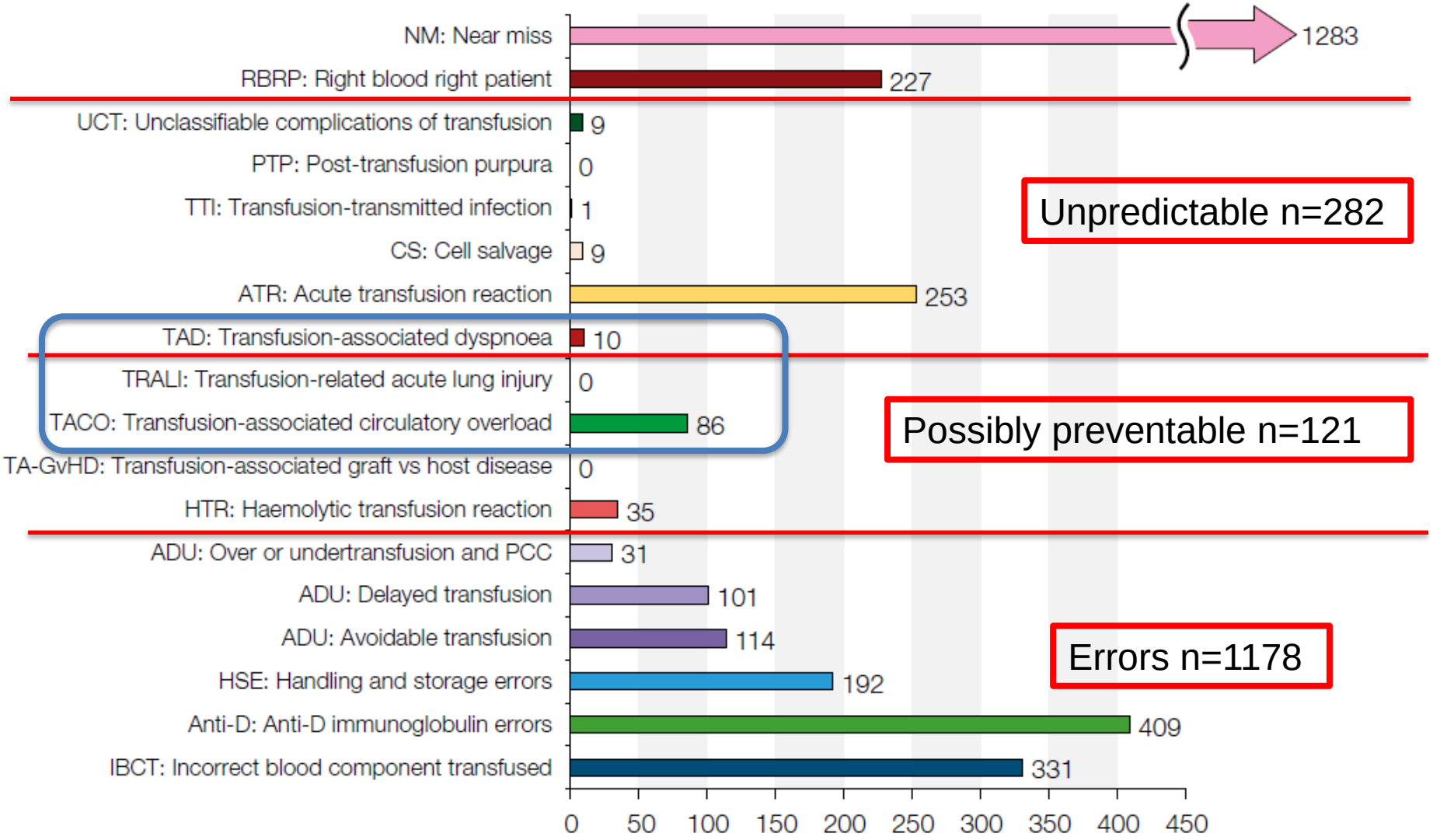


Overview

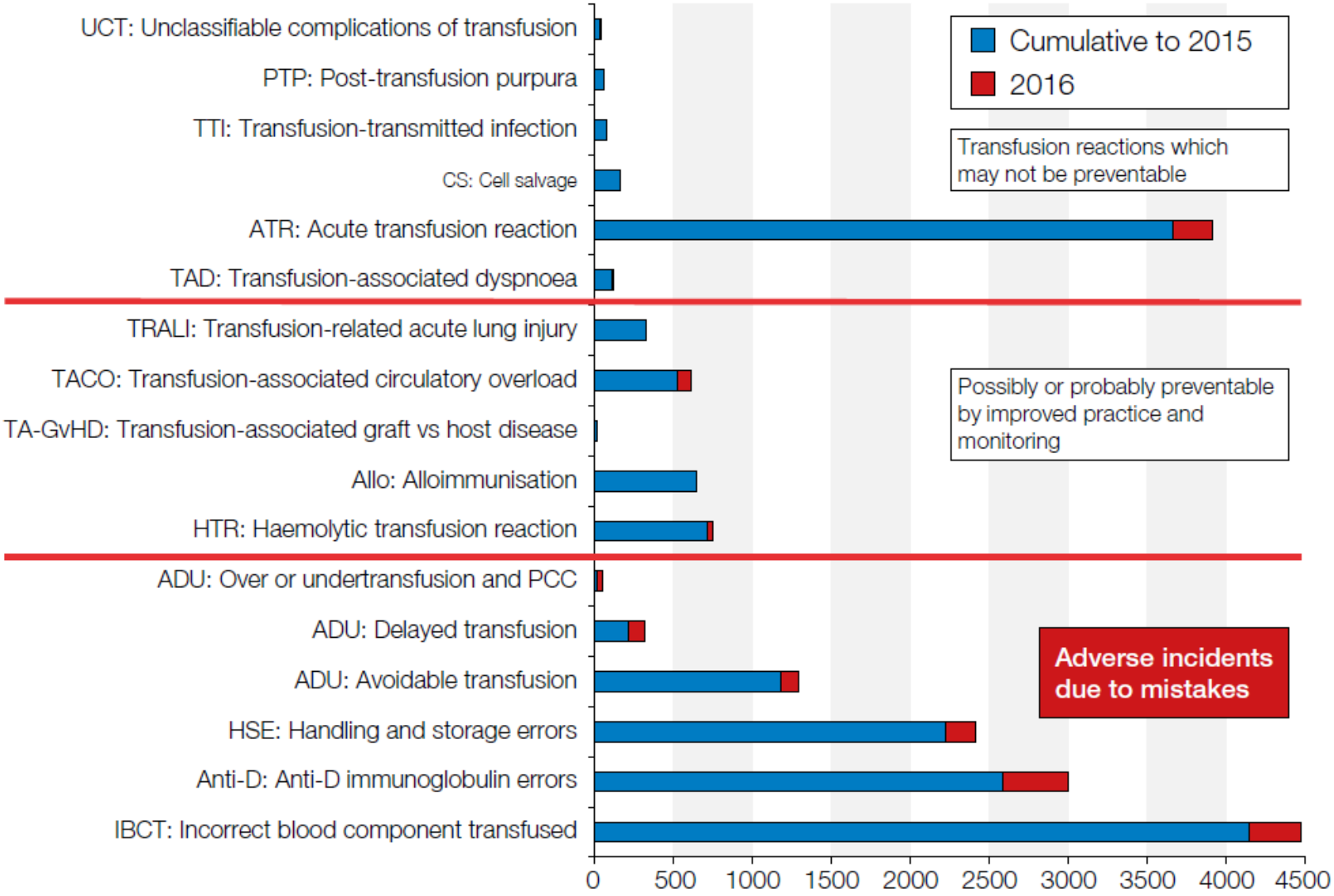


Debbi Poles
Data analyst

All incidents reported in 2016 n=3091



Cumulative data for SHOT categories 1996-2016 n=18258



Serious Adverse Reactions – WHEN?

- Immediate and life-threatening: ABO-incompatibility; anaphylaxis
- Hours: pulmonary complications, bacterial infections, transfusion reactions
- Days: haemolytic reactions
- Late (months or years): viral infections; iron overload

What clinical features suggest a patient is reacting adversely to a transfusion?

Symptoms

- Fever, chills, rigors
- Dyspnoea, stridor
- Itch, rash, swelling of lips
- Shock, collapse
- Nausea, general malaise
- Pain
- Feeling of impending doom

Signs

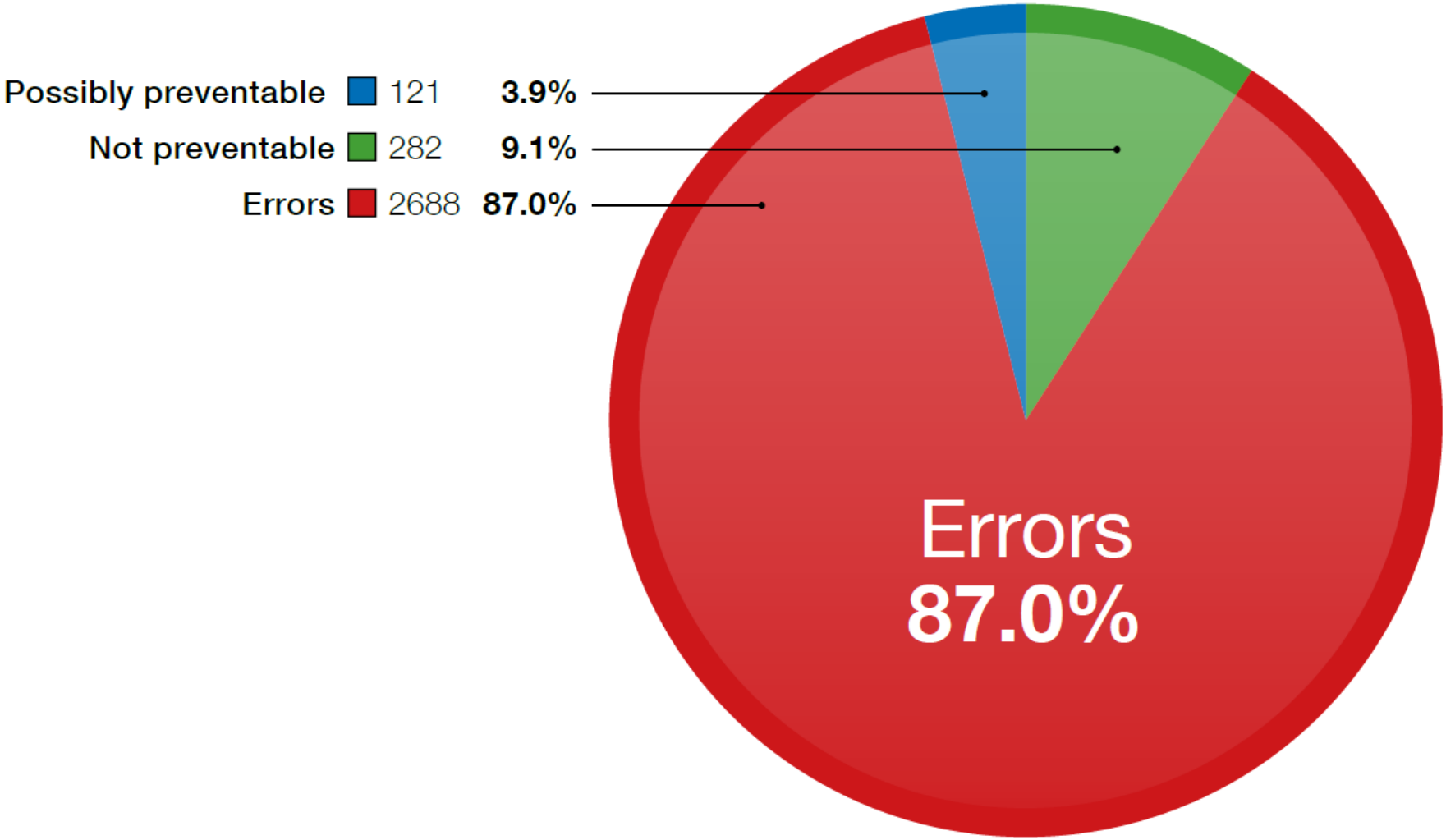
- Change in temperature
- Hypoxia
- Change in BP, pulse
- Raised venous pressure, pulmonary signs
- Reduced urine output, change in urine colour
- Change in conscious level

What have we learnt from review of acute allergic and febrile reactions?

- Adrenaline is the treatment of anaphylaxis and should be available wherever transfusions are given
- Widespread use of steroids and antihistamines without literature evidence of benefit
- Febrile reactions are uncommon with FFP
- Severe allergic or anaphylactic reactions more likely with FFP than other components

Reactions to platelets

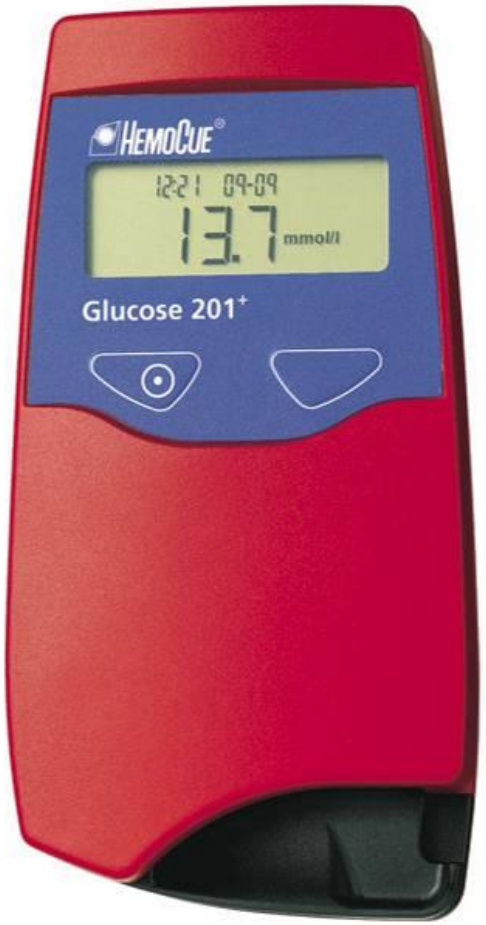
- 25% of women, and at least 10% of multitransfused male patients have HLA antibodies
- No evidence that reactions are reduced with HLA-matched platelets
- Washed platelets do reduce reactions
- IV hydrocortisone takes 8 hours to act
- Little evidence for antihistamine but if washed platelets do not work, worth trying
- Appropriate use underpins everything we do


Possibly preventable 121 3.9%
Not preventable 282 9.1%
Errors 2688 87.0%
Errors
87.0%

Being set up to fail...

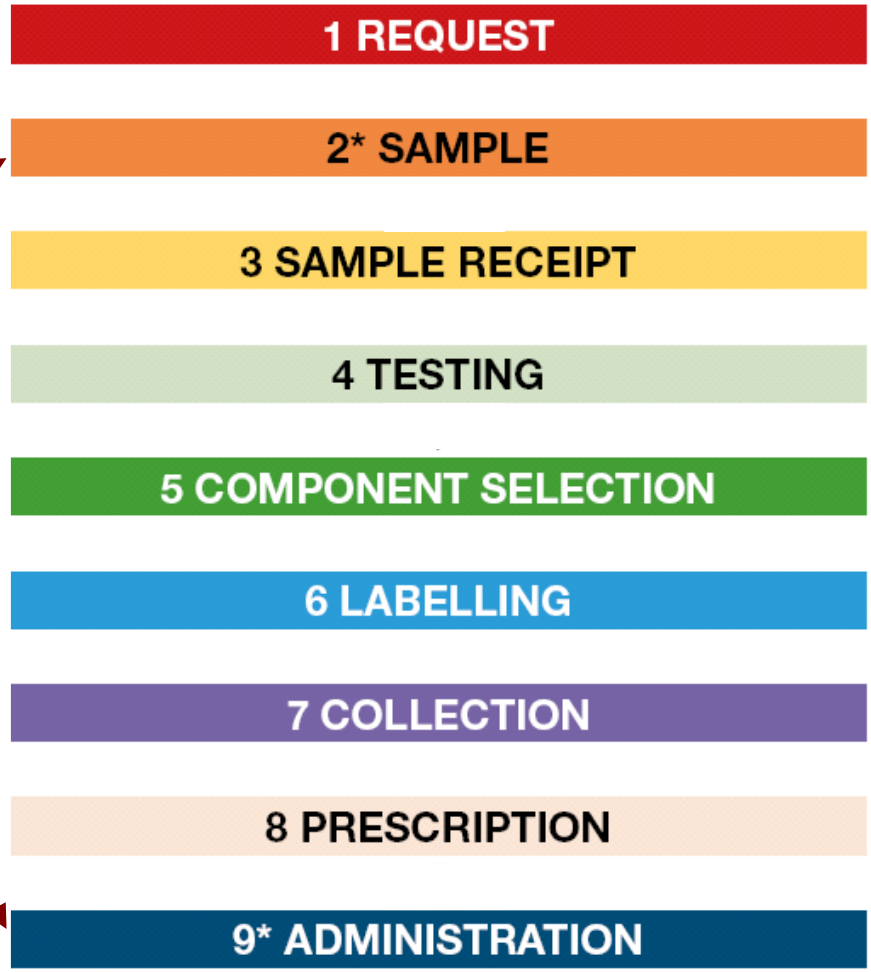
...an accident waiting to happen

Errors have been made in theatre with point-of-care testing



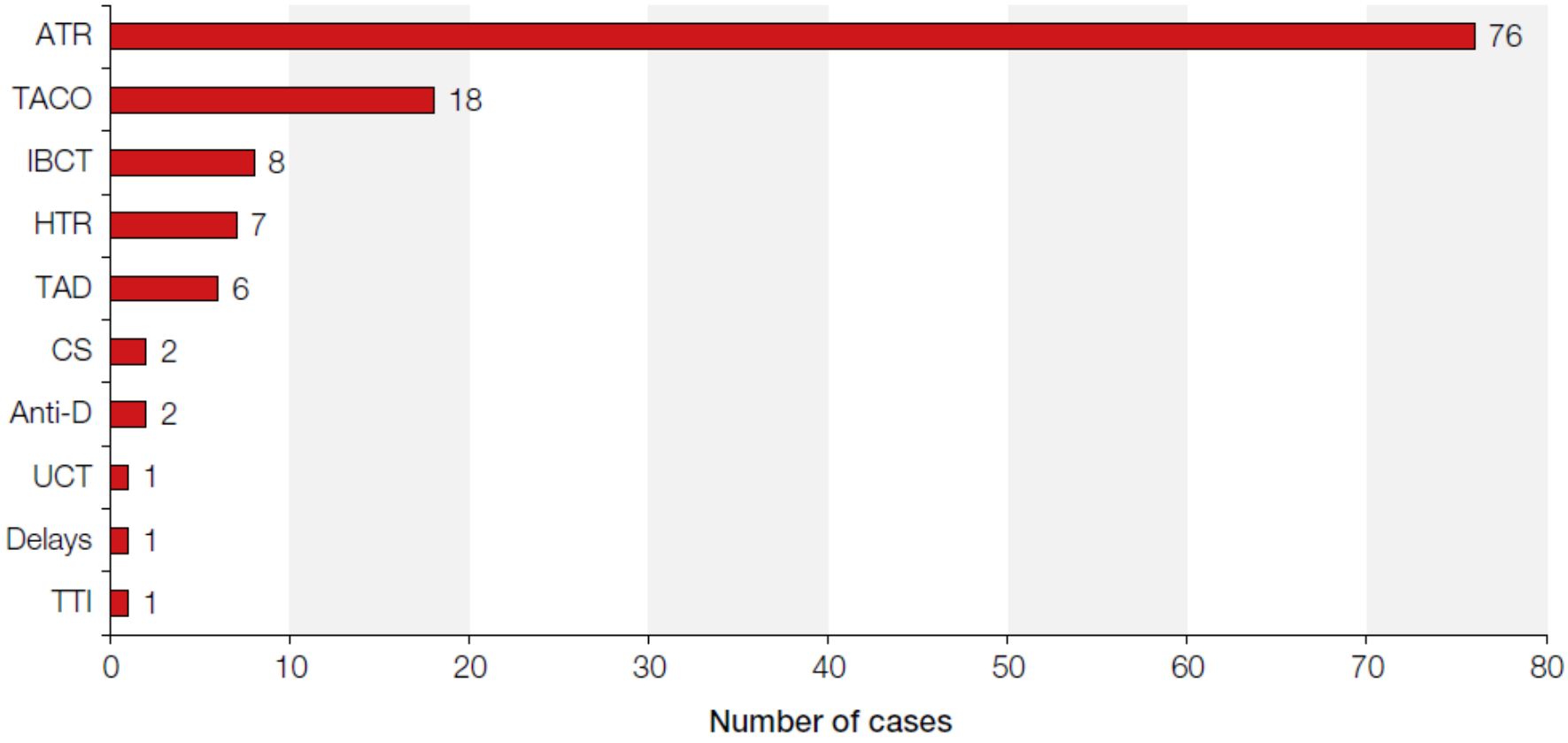
Critical points in the transfusion process

Critical points: Positive patient identification essential

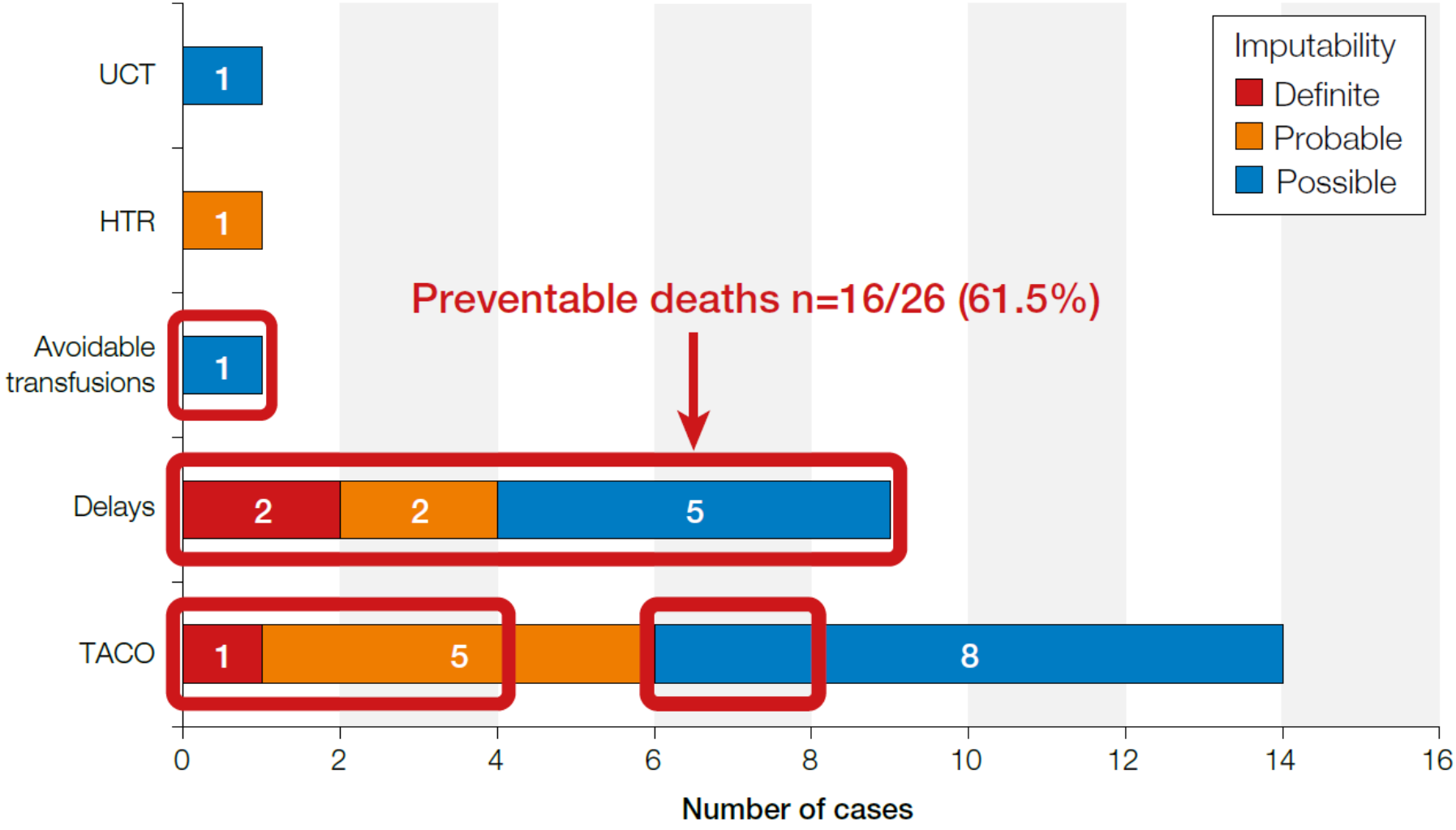


Deaths and major morbidity 2016

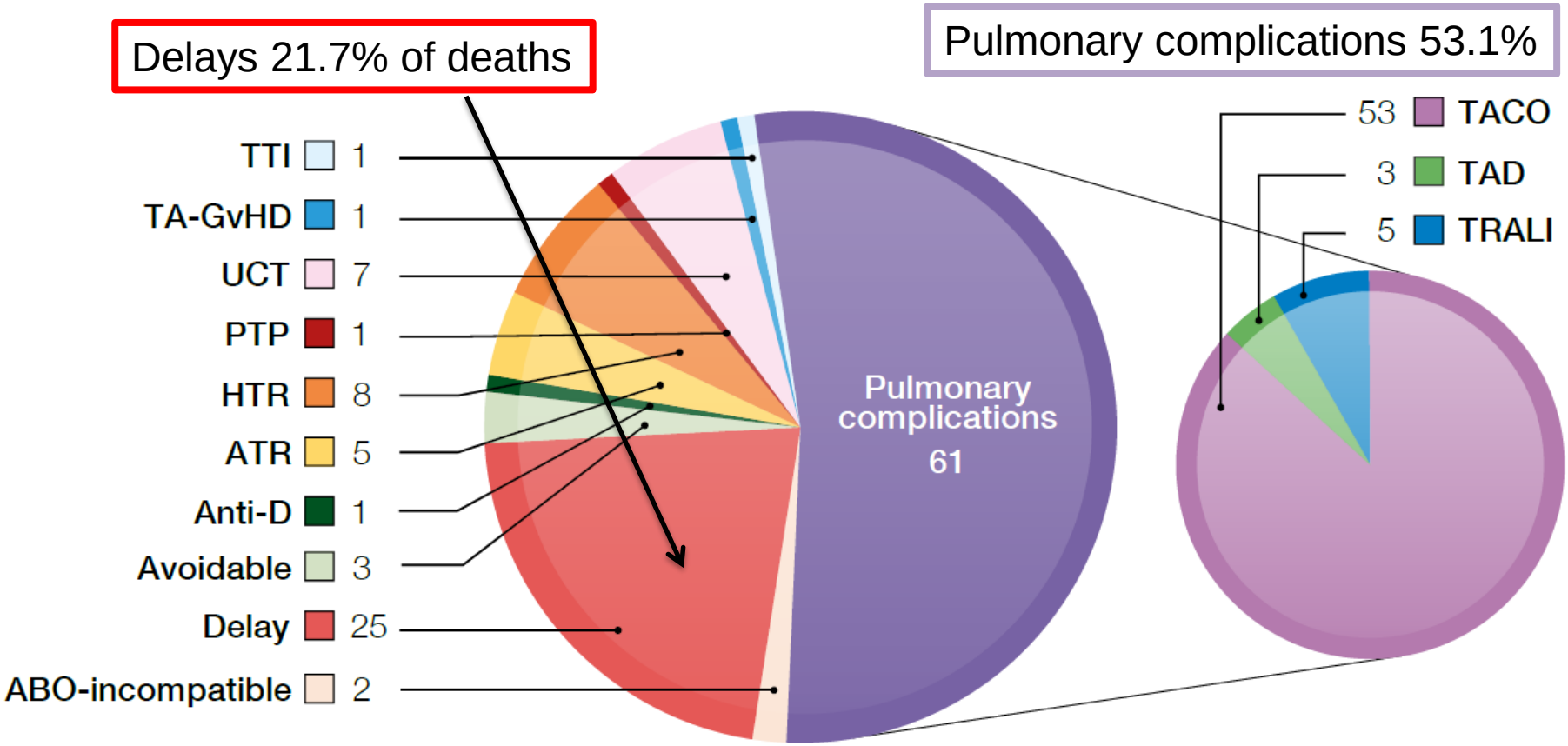
Major morbidity for incidents reported in 2016



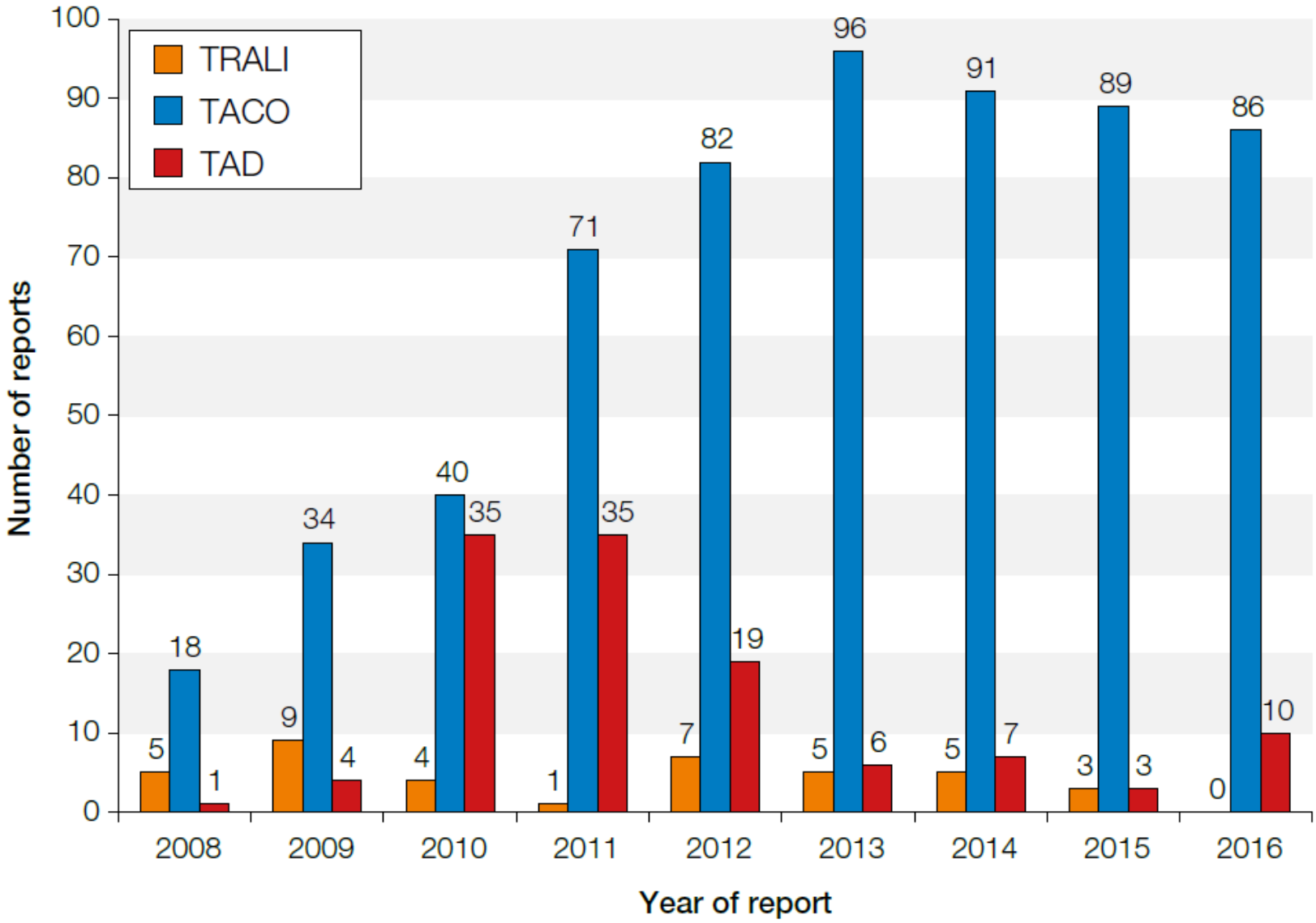
Bad news: 26 patients died where transfusion was implicated



Transfusion-related deaths 2010 to 2016 n=115

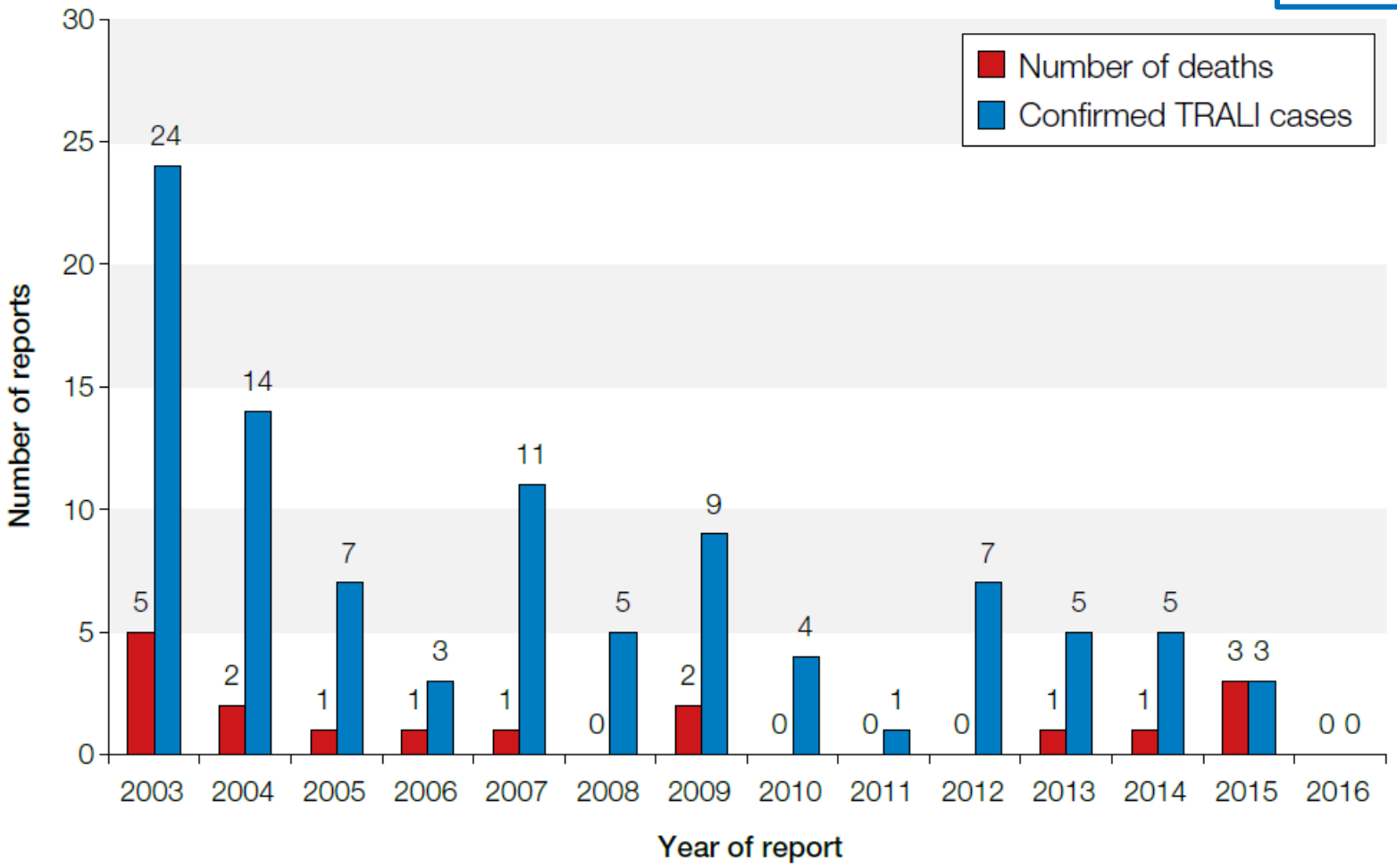


The changing pattern of respiratory complications



Number of suspected TRALI cases and deaths at least possibly related to TRALI using revised criteria

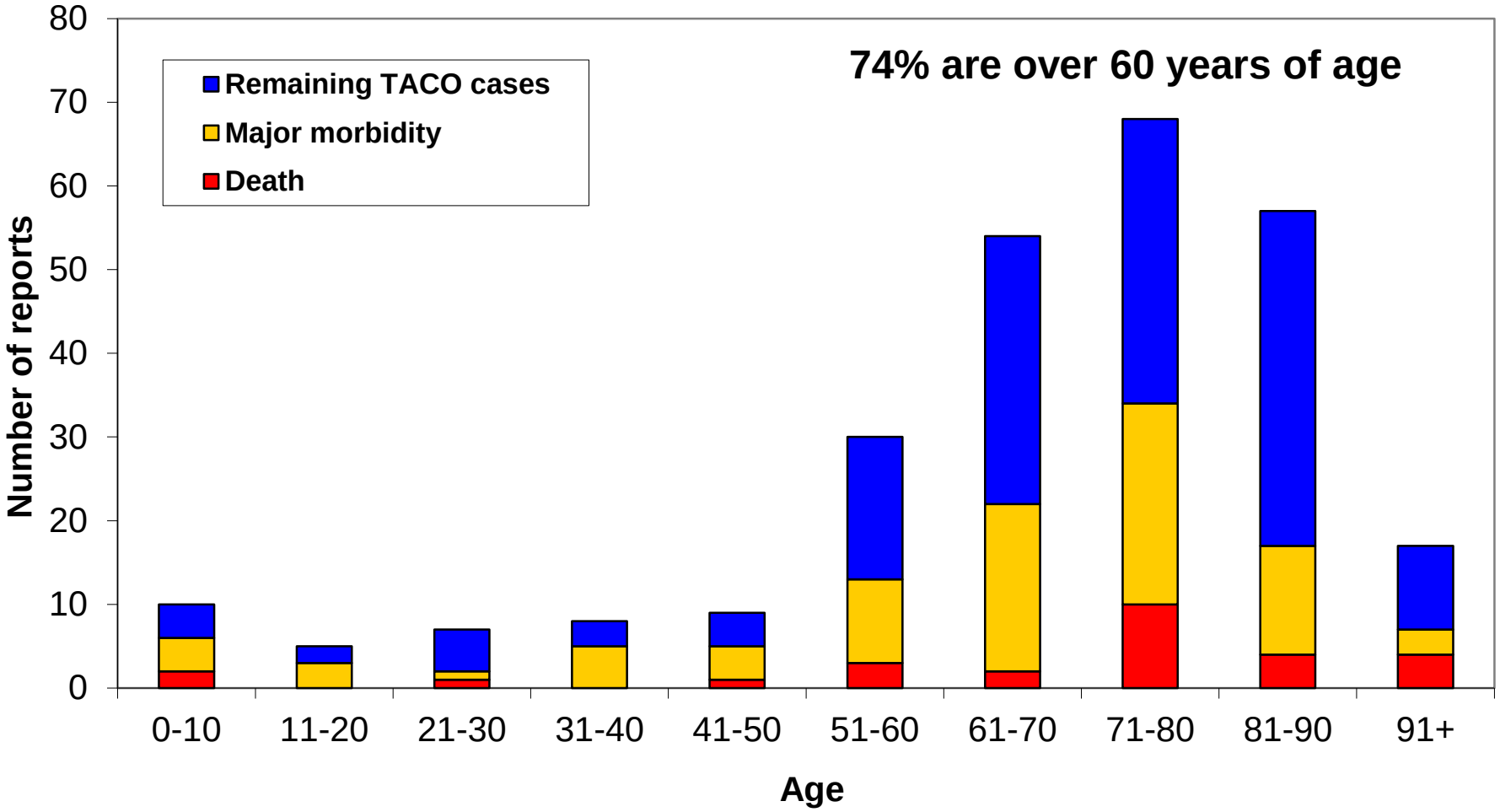
Tom Latham



Transfusion-associated dyspnoea

- Does not fit criteria for TRALI or TACO
- Often very unwell with complicating pathology
- Patients with severe sepsis may be at increased risk perhaps triggered by increased levels of biological response modifiers, particularly with platelets
- Make sure every transfusion is indicated

TACO data 2014-2016 n=265



Cases

Multiple positive features on the TACO checklist where TACO could probably have been prevented

- An elderly patient weighing 51kg with pre-existing congestive cardiac failure (CCF) (ejection fraction 30%) and aortic stenosis received regular transfusions due to non-Hodgkin lymphoma
- She was admitted with worsening dyspnoea and epigastric/chest pain
- Two hours into the transfusion of a red cell unit she developed tachypnoea
- The chest X-ray was suggestive of some infective consolidation but also pulmonary oedema/progressive heart failure compared to the previous image
- She improved after diuretic treatment
- The post-transfusion Hb was 98g/L

What should have happened?

- 96 year old woman admitted with a GI bleed
- FBC sample sent to the laboratory underfilled and gave Hb result of 50 g/L
- Result telephoned to ward and authorised in the computer with a text comment “sample underfilled, result subject to error”

What would you do next?

- No repeat sample was sent but a 6 unit crossmatch was ordered
- Three units were transfused and the post-transfusion Hb was 200 g/L
- Patient developed TACO and an emergency venesection was requested but she died the following day

Over-transfusion due to lack of monitoring of response to transfusion

- Elderly patient admitted to the Medical Admissions Unit with haematemesis and initial Hb 106 g/L
- No details provided of her observations or the findings on endoscopy but she had further episodes of vomiting blood
- Five units of red cells were transfused before a repeat Hb was performed which was 204 g/L
- The patient was recognised to have circulatory overload and died shortly afterwards

How should iron deficiency be managed?

- 82 yr old woman with chronic iron deficiency, Hb 45 g/L

What else would you like to know? How will you manage this patient?

- Transfused 4 units, each over 2.5h
- Developed TACO with tachycardia, hypertension, short of breath etc.
- Intubation, ventilation 2d
- Full recovery

Day case transfusion – what are the risks?

- A 78 year old woman with myeloma, wt 56 kg, was transfused 3 units of red cells as a day case

What are risk factors for TACO?

- Renal impairment, hypoalbuminaemia, age ≥70 years, low bodyweight
- She developed fluid overload and pulmonary oedema with hypertension and hypoxia before the end of the third unit. She initially responded to diuretic and was sent home by a junior doctor

Comments?

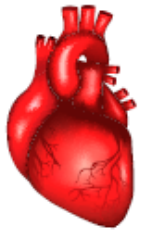
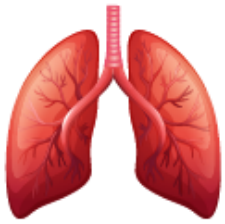
- She was unable to lie flat all night because of shortness of breath
- She was readmitted, to the HDU, within 24 hours with pulmonary oedema and myocardial infarction

Key recommendation 2

use a TACO checklist as standard of care.

This has been revised from last year

Sharran Grey

TACO Checklist	Red cell transfusion for non-bleeding patients
	Does the patient have a 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?
	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 on concomitant fluids (or has been in the past 24 hours)? Is there any peripheral oedema? Does the patient have hypoalbuminaemia? Does the patient have significant renal impairment?

If 'yes' to any of these questions

1

- Review the need for transfusion (do the benefits outweigh the risks)?

2

- Can the transfusion be safely deferred until the issue can be investigated, treated or resolved?

3

- Consider body weight dosing for red cells (especially if low body weight)
- Transfuse one unit (red cells) and review symptoms of anaemia
- Measure the fluid balance
- Consider giving a prophylactic diuretic
- Monitor the vital signs closely, including oxygen saturation

Due to the differences in adult and neonatal physiology, babies may have a different risk for TACO. Calculate the dose by weight and observe the notes above.

Key SHOT message

- TACO must be suspected when there is respiratory distress with other signs including
  - pulmonary oedema
  - unanticipated CV system changes
  - evidence of fluid overload (including improvement after diuretic, morphine or nitrate treatment), during or up to 24h after transfusion
- Many patients do not have CXR or fluid balance recorded
- International review of diagnostic criteria

Other transfusion issues

Death due to anti-Wr^a following electronic issue

- Elderly man with MDS, comorbidities
- Back and abdo pain after 160mL red cells
- Admitted and died within 12 h
- Wr^a positive unit (1 in 1000): patient had anti-Wr^a
- Recognised cause of HTR and HDFN
- 10 cases SHOT 2012-2015, none 2008-2011
- Increasing use of EI: 42% in 2008, 67% in 2015

Impact of pressures on the NHS

- Increasing number of errors:
  - 87.0% SHOT reports
  - 98.1% of MHRA serious adverse event reports
- Human factors noted in 83 SHOT error reports
  - 27 (32.5%) staffing issues
  - 18 (21.7%) workload
- Human factors noted in 10% MHRA reports

Information technology

Information technology issues

75,000 passengers
170 airports
70 countries

May 26, 2017

Power surge, no backup
? Human error

- Global IT disruption May 2017 affecting 43 NHS sites
- Other incidents in Trusts November 2016
  - Leeds pathology IT system failure – 8 days
  - Ransomware attack in another region

IT incidents in SHOT

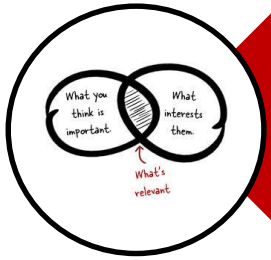
Megan Rowley

- IT is not error-proof
- 297/1405 (21.1%) error-related incidents were IT-related
- Recommendation:
  - Clinicians, laboratory scientists, IT professionals and IT providers should work together **to develop an industry standard** for flags, alerts and warnings that prevent harm from wrong blood but still ensure timely and accurate availability of blood components for clinical use

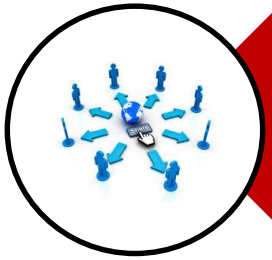
IT incidents

Knowledge and training

Personal responsibility



Fit for purpose



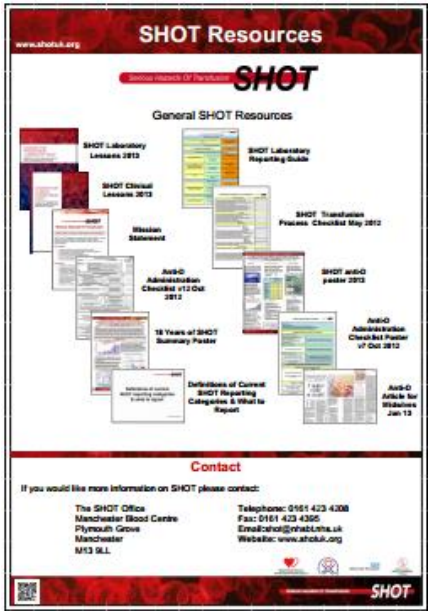
Sharing information

Additional Information

Following documents available on website **www.shotuk.org**

- Teaching slide set
- SHOT cases
- SHOT reporting definitions
- Clinical lessons
- Laboratory lessons
- SHOT Bites

Also available:
Previous SHOT reports
SHOT summaries



Acknowledgements

- SHOT Team in Manchester
- SHOT Working and Writing Expert Group
- SHOT Steering Group
- UK NHS Organisations for reporting

SHOT Symposium 2018

The Lowry Centre, Salford Quays

Thursday 12th July 2018

Best practice submission deadline Nov 15, 2017
Standard abstract submission deadline April 27, 2018