Headlines: Deaths, Major Morbidity and ABO-Incompatible Transfusions 3

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Key SHOT messages

The four most serious adverse reactions:

- **Haemolysis** contributed to death in 5 cases, including one caused by anti-Wr^a, one ABO-incompatible transfusion, and an infant died related to exchange transfusion for D-related haemolytic disease of the fetus and newborn
- **Transfusion-associated circulatory overload** contributed to death in 7 cases, and major morbidity in 34
- **Delayed transfusion** contributed to death in 6 cases and major morbidity in 5
- **Acute transfusion reactions** were associated with severe reactions (major morbidity) in 86 patients

Deaths related to transfusion reported in 2015 n=26

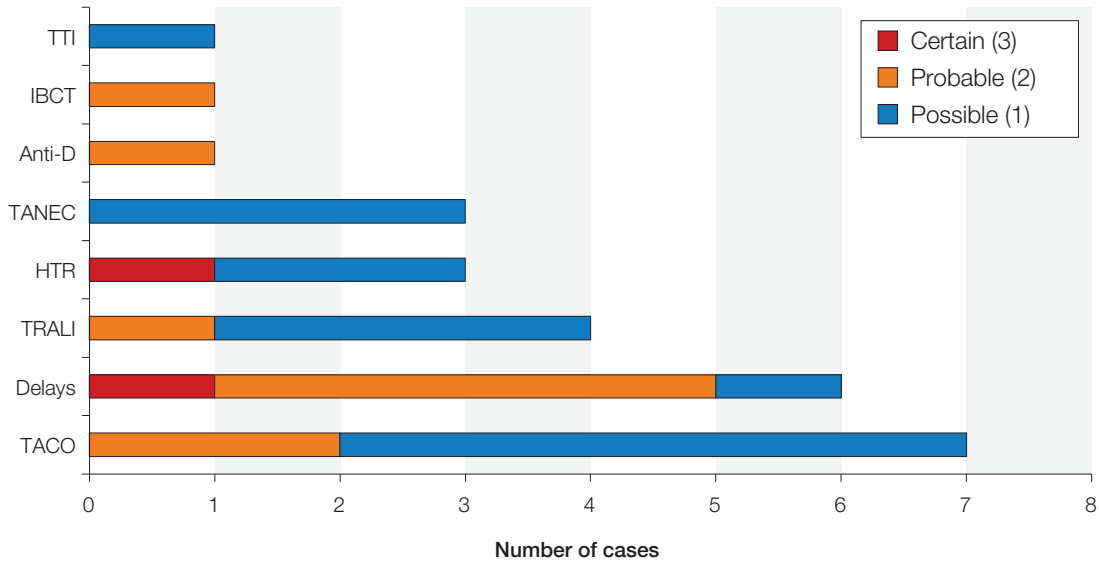
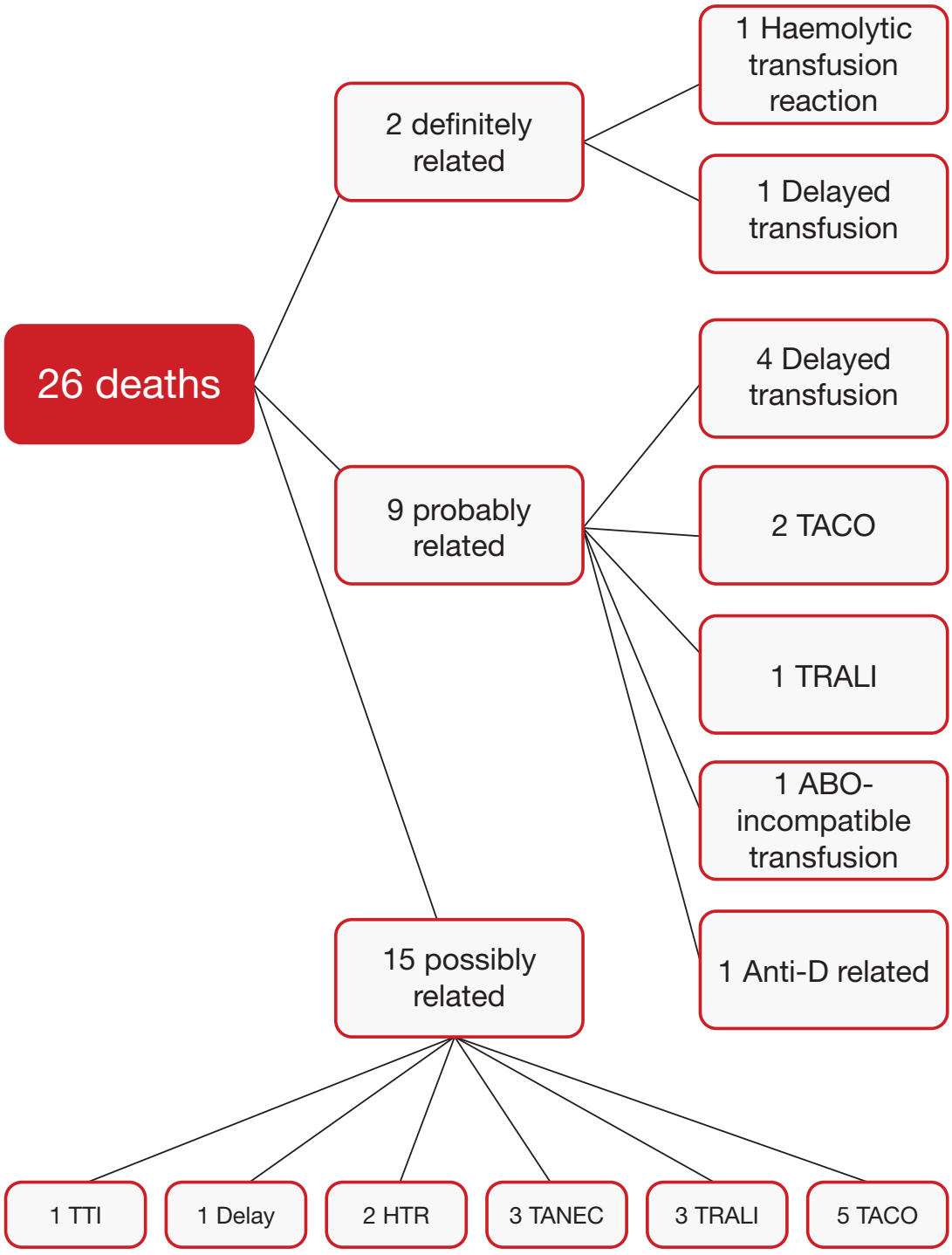


Figure 3.1: All deaths (imputability 1-3) by category

TTI: transfusion-transmitted infection; IBCT: incorrect blood component transfused (ABO-incompatible transfusion); Anti-D: anti-D immunoglobulin error; TANEC: transfusion-associated necrotising enterocolitis; HTR: haemolytic transfusion reaction; TRALI: transfusion-related acute lung injury; TACO: transfusion-associated circulatory overload

Figure 3.2: Transfusion-related deaths reported in 2015 by imputability



Imputabilities: definite=3; probable=2; possible=1

Review of transfusion-related deaths, imputability 1-3, for 6 years 2010 to 2015 shows that pulmonary complications and delayed transfusion are the most prevalent causes, Figure 3.3.

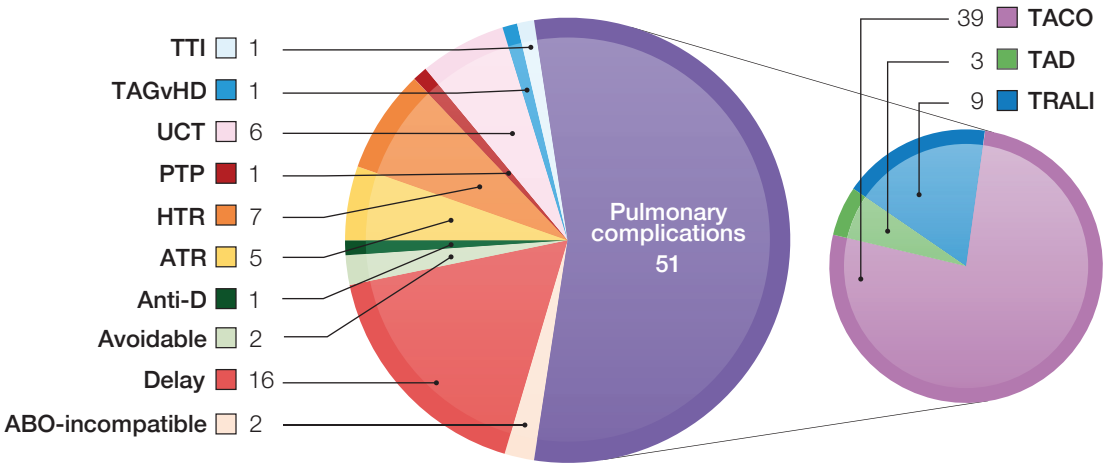


Figure 3.3: Transfusion-related deaths 2010 to 2015 n=93

For key to abbreviations please see Figure 3.5

Headline: Laboratory errors have increased from 334 in 2014 to 455 in 2015

It should be noted that the number is disproportionately increased by 12 reports affecting multiple patients (n=88), receiving components that had been out of temperature control.

A United Kingdom Transfusion Laboratory Collaborative (UKTLC) survey in March 2015 in partnership with the National Blood Transfusion Committee provided evidence of several issues including reorganisations in 100/178 (56.2%) laboratories, inability to fill vacancies, reduced resources both financial and in personnel for training and 35.7% of the workforce aged 50 years or more (UKTLC Bark et al. 2015) whose serological expertise will be lost on retirement.

Summary of main findings and cumulative results

Errors account for 78% of all reports and some of these contributed to patient deaths.

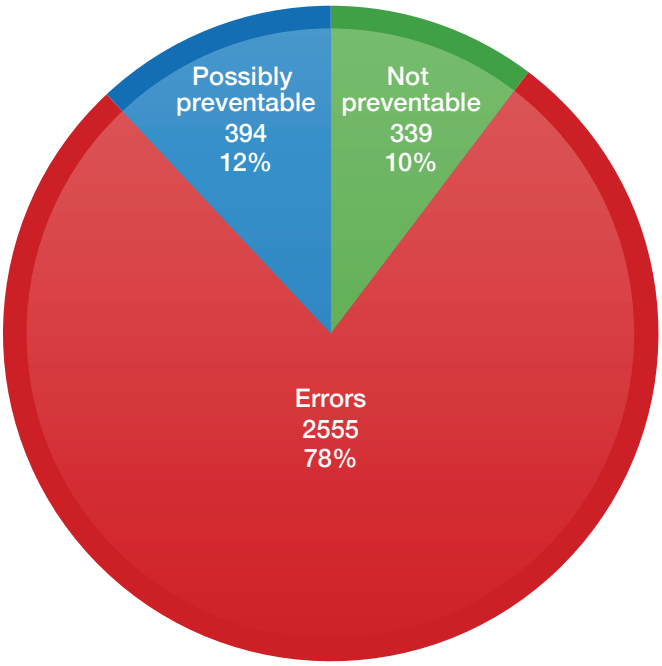


Figure 3.4: Errors account for the majority of reports

Figure 3.5: Summary data for 2015, all categories n=3288 (including near miss n=1243 and right blood right patient n=187)

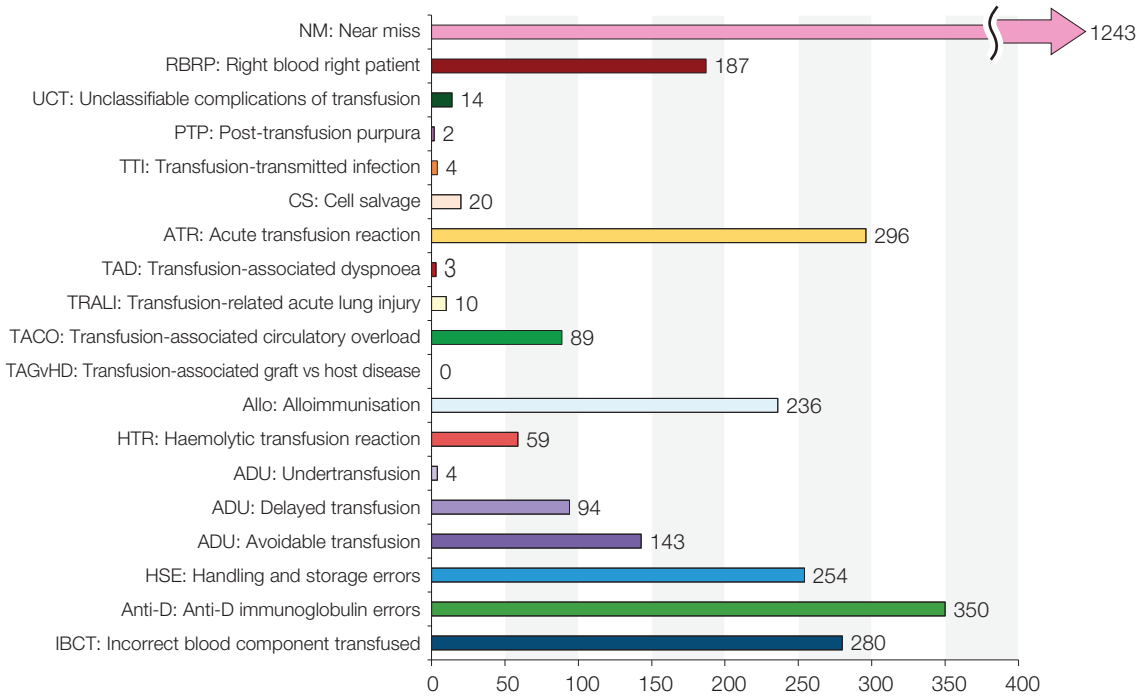
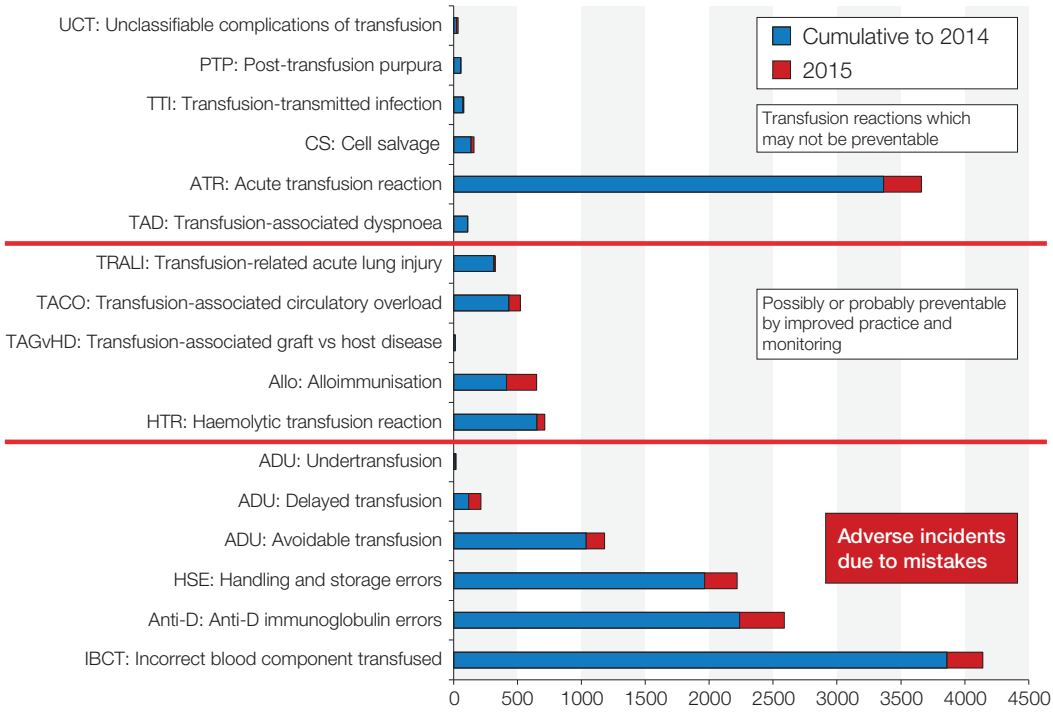


Figure 3.6: Cumulative data for SHOT categories 1996 to 2015 n=16677



Major morbidity (serious harm) reported in 2015 n=166

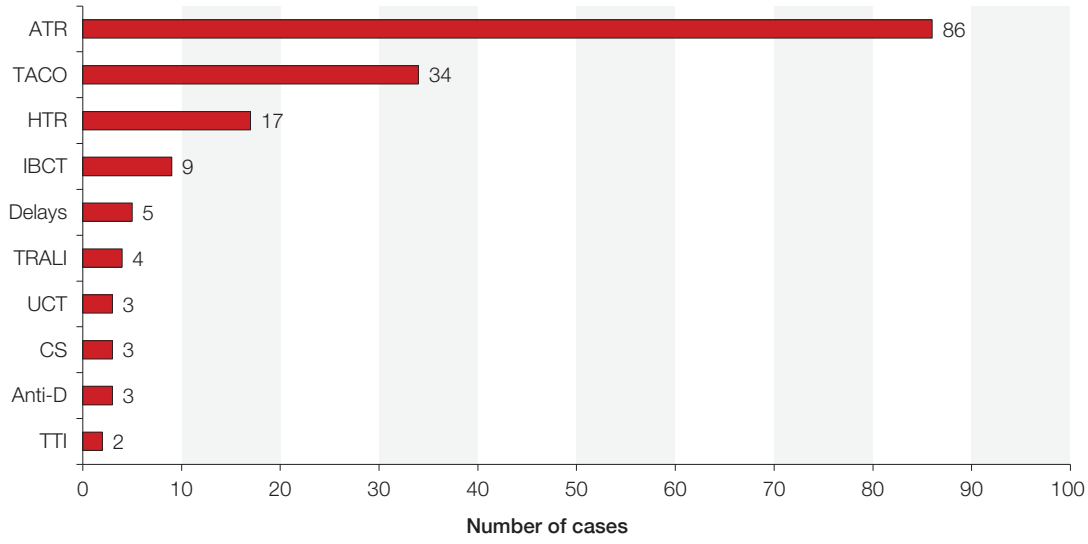


Figure 3.7: Ranking of categories to show number of serious incidents in 2015

ABO-incompatible red cell transfusions n=7

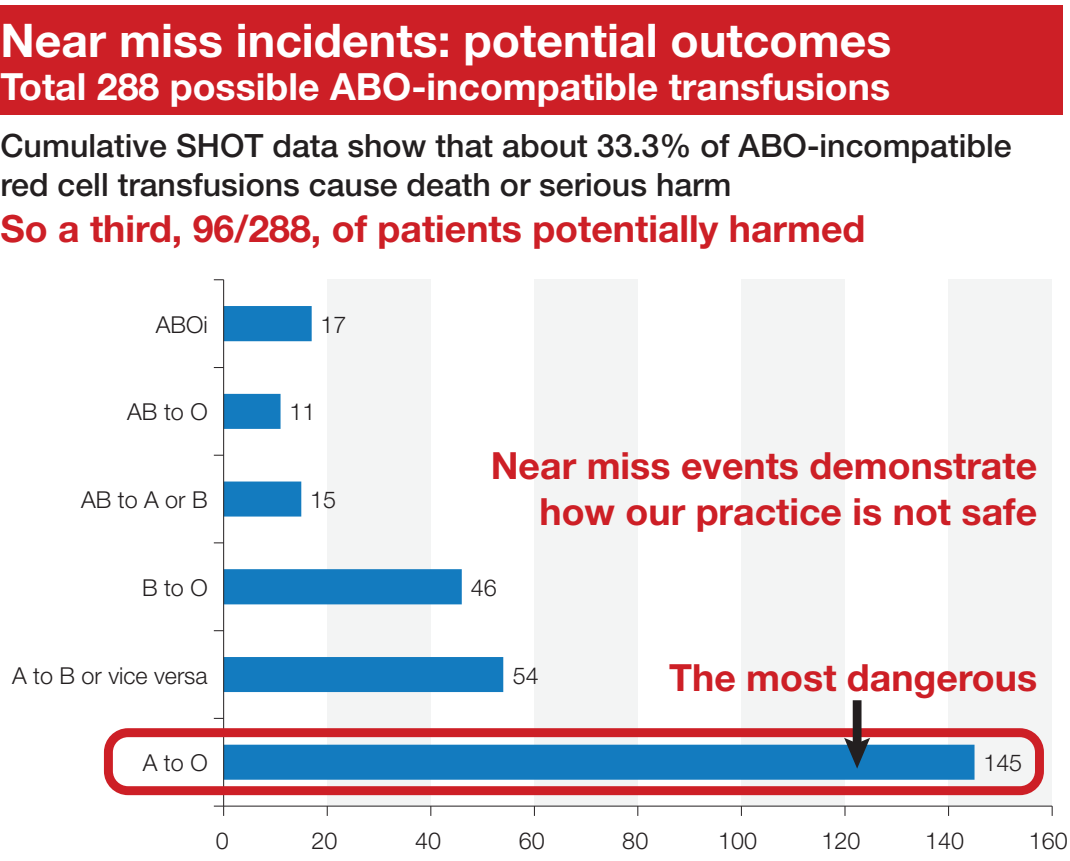
These are 'never events' in England; in Scotland these would be reported as 'red incidents' through the Scottish National Blood Transfusion Service clinical governance system and/or those of the Health Board. ABO-incompatible red cell transfusions were associated with one death and one serious reaction in a patient with sickle cell disease. Further details can be found in Chapter 6, Incorrect Blood Components Transfused (IBCT).

There were also **6 ABO-incompatible red cell transfusions administered to patients who had undergone allogeneic haemopoietic stem cell transplants** (discussed in Chapter 23, Summary of Incidents Related to Transplant Cases).

Although these are small numbers, near miss reporting shows that 288 additional patients were put at risk since the blood sample was either taken from the wrong patient (wrong blood in tube), or the wrong unit was collected but these errors were detected before an ABO-incompatible transfusion took place.

Such errors are serious whether or not they result in a clinically important outcome, for example 'if catnapping while administering anaesthesia is negligent and wrongful, it is so whether harm results or not' (quoted in Dekker 2012). The possible outcome for these near miss incidents where the blood groups would have been incompatible are shown in Figure 3.8.

Figure 3.8: Possible impact if 288 near miss events (detected) had led to red cell transfusions



(ABOi=report stated the blood groups would be ABO-incompatible but did not specify. A to O=donor unit group A to recipient of group O etc.)

Total number of errors n=2555

Errors with no harm to patients n=1430 (near miss, and right blood to right patient reports).

Other errors with actual or potential harm n=1125 (handling and storage errors, avoidable and delayed transfusions, anti-D immunoglobulin errors and incorrect blood components transfused).

Irradiation of cellular components was missed in 101 cases, and in 88/101 (87.1%) the clinical areas were responsible. The cumulative number of reports of missed irradiation since 1999 is now 1215.

Risks of transfusion UK 2015

Total major morbidity	**6.44**
Total mortality	**1.01**

Table 3.1: Risks 2015 per 100,000* components issued 2015

	Mortality	Major morbidity	Total cases
All errors	0.31	0.66	**436.5**
ATR	0.0	3.34	**114.8**
HTR	0.12	0.66	**22.9**
TRALI	0.116	0.16	**3.9**
TACO	0.27	1.2	**34.5**
TAD	0.0	0.0	**1.2**
TAGvHD	0.0	0.0	**0.0**
PTP	0.0	0.0	**0.8**
CS	0.0	1.2	**7.8**
TTI	0.04	0.08	**1.6**
UCT	0.12	0.12	**5.4**
Paediatric cases	0.23	0.85	**62.5**

**Note this is a change from per million components issued used in previous years*

This equates to a risk of serious harm of 1 in 15,528 components issued and an overall risk of death where transfusion was contributory is 1 in 99,010 components issued, but the risk of death from an error is 1 in 322,581.

Haemovigilance data from the European Union for 2013 demonstrate 9.8 serious adverse reactions per 100,000 units transfused based on data from 22 countries, and there were 22 deaths (imputability 2 and 3), 11 (50.0%) from pulmonary complications (6 TACO and 5 TRALI) (European Commission 2014). The report notes that about 55% of all serious adverse events are a result of human error.

A recent report from the International Surveillance of Transfusion-Associated Reactions and Events database (ISTARE) notes 409 transfusion-related deaths (imputabilities 1-3) reported from 28 countries 2006 to 2013, an estimated rate of 0.3 per 100,000 issues (Politis 2016). Note that ISTARE does not incorporate all the categories which are included in SHOT, e.g. delayed transfusions.

References

European Commission (2014) **Summary of the 2014 annual reporting of serious adverse events and reactions (SARE) for blood and blood components (01/01/2013 to 31/12/2013)**. http://ec.europa.eu/health/blood_tissues_organs/docs/blood_sare_2014_en.pdf [accessed April 10 2016]

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Politis C, Sandid I et al. (2016) **Fatal Adverse Reactions Associated with Transfusion of Blood Components ISTARE 2006–2013**. http://ihs-seminar.org/content/uploads/4-Politis-Fatal-AR-Paris-CR.pdf [accessed 10 April 2016]

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