How good are we at giving blood?
SHOT data and case studies

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Key Message

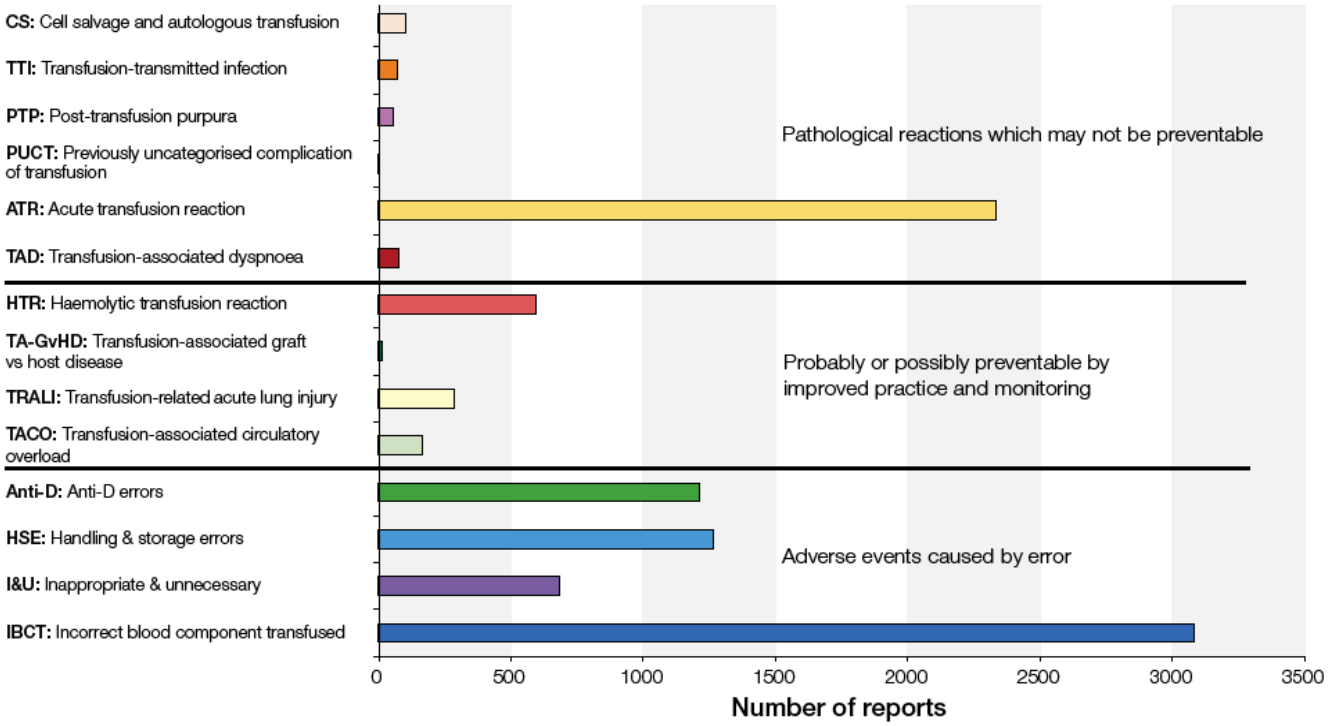
- Overall transfusion is very safe. Just under 3 million blood components were issued across the UK in 2011. There were 8 deaths in which transfusion, or lack of it, played a role and 117 instances of major morbidity:
  - the risk of death is 0.0027 per 1000 components issued
  - the risk of major morbidity 0.0399 per 1000 components issued

However, preventable errors do occur:

Figure 4.2

Cumulative data for SHOT categories 1996/7-2011

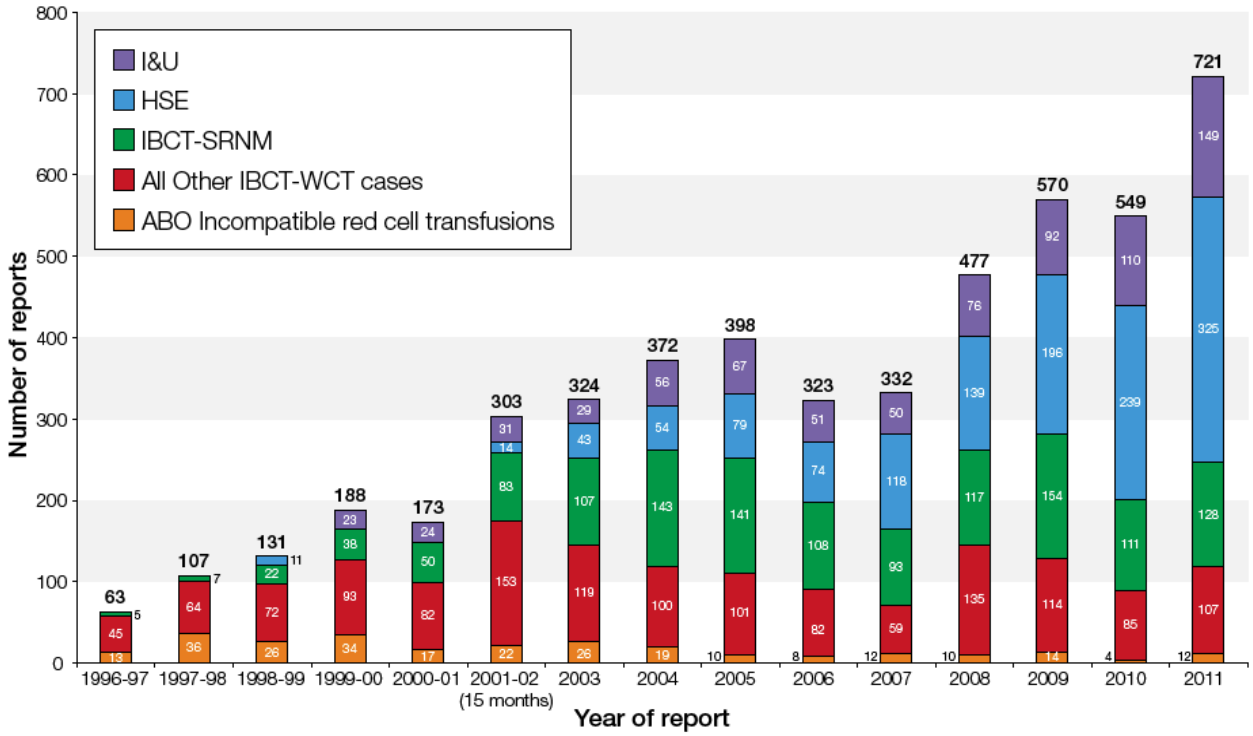
n=9925



Haemovigilance

Figure 4.3

Incorrect blood components transfused (IBCT) either due to wrong component (WCT) or where special requirements were not met (SRNM), handling and storage errors (HSE), showing the number that resulted in ABO-incompatible transfusions

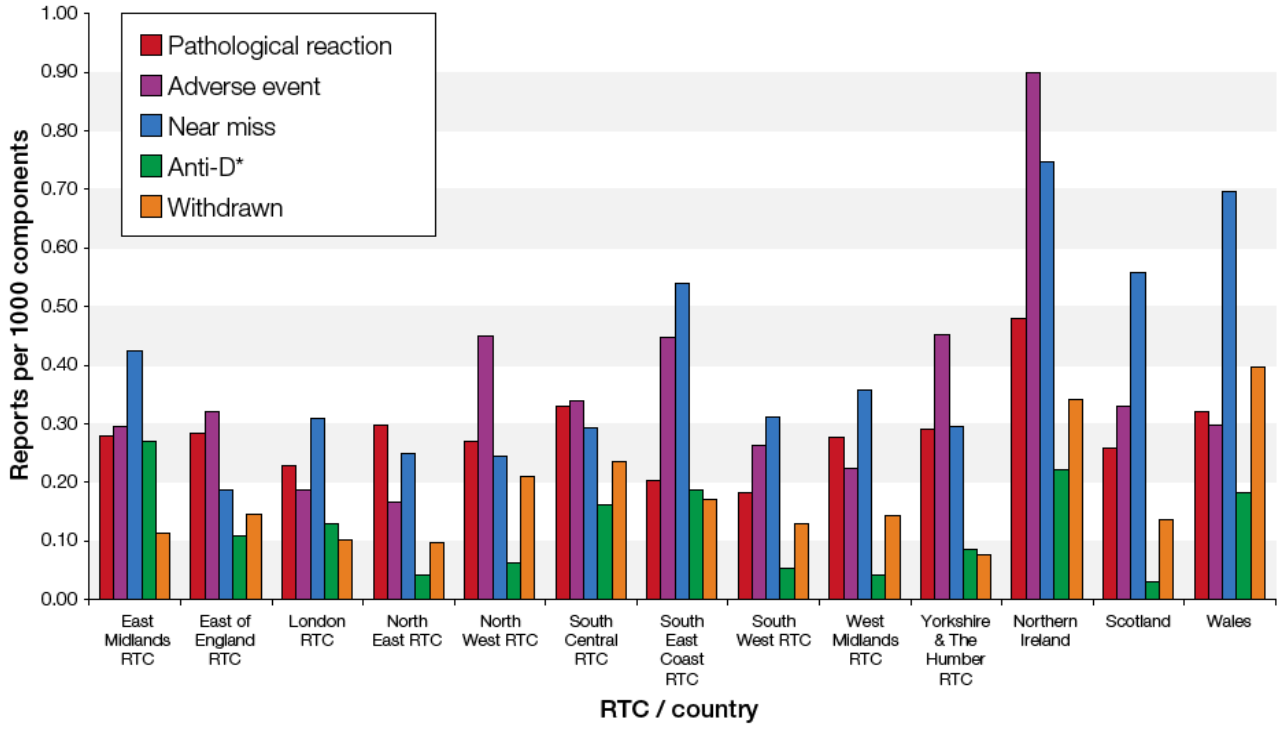


Participation

Figure 2.1

RTCs & countries reports per 1000 components issued by category

***Anti-D reports per 100 doses issued**

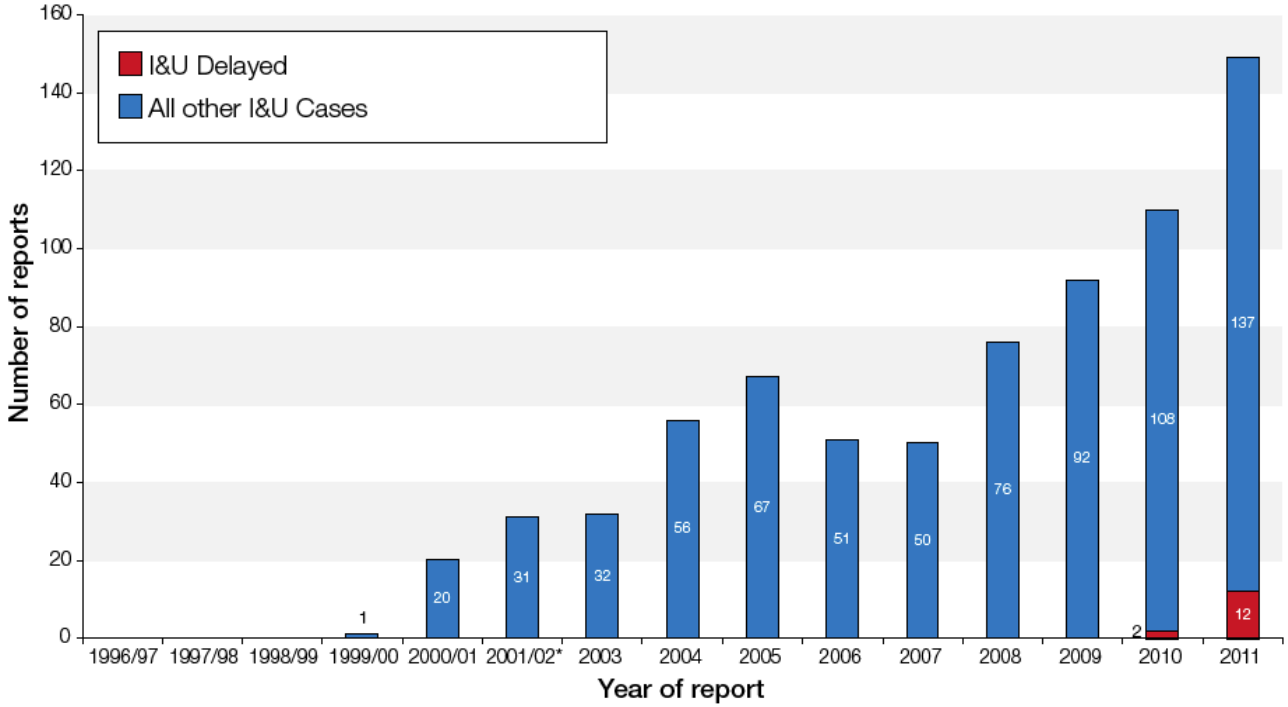


Inappropriate Transfusion
(unnecessary, delayed or under-transfused)

Figure 9.1

Total Cases of inappropriate and unnecessary, and delayed or under-transfusion 1996-2011

(Note: reports of delayed transfusions have only been collected for 2010 onwards)



Incorrect Blood Component Transfused (IBCT)

Definition:

Includes all reported episodes where a patient was transfused with a blood component that was intended for another patient or which was of inappropriate specification and did not meet the particular requirements of the patient.

ABO incompatible unit of blood transfused after a failure in all blood collection and administration checks

- *Two patients had been crossmatched. These patients had the same surname but different date of birth, hospital numbers, forenames and blood groups.*
- *A Health Care Assistant (HCA) collected the blood for patient A, only checking the surname and no other demographics.*
- *The bedside checks, involving two registered midwives, were incorrectly carried out.*
- *The error was detected by a staff nurse from different ward when she went to return a wrong blood unit that she had collected; she found no units available for her patient B and queried where they were. Patient A was O RhD positive and the donor unit was A RhD positive. Fortunately, less than 50mL was transfused before the error was discovered and the patient suffered no adverse effects.*

Patient received red cells instead of platelets

- *A 66 year old female patient was scheduled for hemi-arthroplasty.*
- *She had been prescribed platelets on haematological advice because she had a low platelet count of 86x109/L.*
- *The patient received red cells instead of platelets pre-operatively which were checked by two staff members.*
- *She arrived in theatre with red cells in progress.*
- *The patient was already anaesthetised when this was noted. Surgery went ahead.*
- *The patient bled during the operation and the Hb dropped by 5 g/dL which required further transfusion.*

Multiple unknown patients result in identity confusion

- *A member of staff was called to A&E to assist with multiple unknown patients following a major road traffic accident (RTA).*
- *The member of staff was attending to a 2 year old unknown female child who had received O RhD negative blood followed by a unit of blood labelled 'unknown female 2'.*
- *Subsequently, it was realised that 'unknown female 2' was the baby's mother and the baby was identified as 'unknown female 1'.*
- *The blood was discontinued. The baby was group A RhD positive and the blood given was fortunately compatible as it was O RhD positive but it was not intended or labelled for that child who was not wearing a wristband.*

Recommendations

2011

- Every person involved in the transfusion process must perform rigorous identity checks at each point and ensure that the component collected is the one prescribed

2009

- A patient education campaign should empower recipients of blood transfusion, and all patients undergoing tests, procedures and surgery, or receiving drugs and therapies, to ask the staff, before they carry out the intervention:

’Do you know who I am?’

Inappropriate Transfusion
(unnecessary, delayed or under-transfused)

Definition

- Transfusions given on the basis of erroneous, spurious or incorrectly documented laboratory results for Hb, platelets and coagulation tests
- Transfusions given as a result of poor understanding and knowledge of transfusion medicine such that the decision to transfuse either puts the patient at significant risk, or was actually harmful
- Under-transfusion or delayed transfusion resulting in morbidity

Failure to monitor the transfusion requirements during a GI haemorrhage

An elderly patient was admitted to the MAU with a haematemesis and an initial Hb of 10.6 g/dL. No details are 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 20.4 g/dL. The patient was recognised to have circulatory overload and died shortly thereafter.

Learning point

- Patients with GI bleeding not meeting the criteria for massive haemorrhage must have frequent monitoring of their Hb

Haematemesis with excessive transfusion and TACO

- *A middle-aged woman with known alcoholic liver disease presented with haematemesis estimated to be more than 500 mL and was urgently transfused 7 units of red cells without monitoring of the Hb.*
- *The Hb on the previous day was 11.3 g/dL.*
- *The patient was not reviewed regularly during transfusion.*
- *Her Hb rose to 16.4 g/dL post-transfusion requiring venesection of 2 units and admission to high dependency unit (HDU) for ventilation because of pulmonary oedema.*
- *She later died of multi-organ failure. It was felt that death was related to the excessive transfusion.*

Consultant continues to sign regular prescription for transfusion without checking any Hb levels

- An elderly male patient with myelodysplastic syndrome attended the outpatient department for monthly transfusion.
- A post-transfusion Hb was eventually found to be 17.4 g/dL.
- The consultant had continued to sign a regular prescription for 2 units of red cells at each visit without reference to Hb results.
- The last Hb result available was prior to treatment being commenced 8 months previously.
- The patient received 16 units during this period without any repeat Hb measurements despite samples being taken regularly for grouping

Learning point

- All patients receiving regular transfusions should have regular clinical review and assessment of their needs. Every clinician who signs a transfusion prescription should satisfy him/herself that the reason for every transfusion is known, evidence based, and documented in the case notes.

Over-transfusion leading to polycythaemia and a cerebral infarct

An elderly female patient of low body weight (29 kg) was admitted with an initial Hb of 7 g/dL. Three units of red cells were prescribed and the post-transfusion Hb was 17 g/dL, confirmed with a repeat sample the following day. She sustained a cerebral infarct 48 hours following the transfusion, which resulted in long-term morbidity. The reporters were apparently very confident of the initial Hb and felt that an inappropriate volume had been prescribed.

How much blood?

Empirical paediatric formula:

- Desired Hb g/dl – actual Hb g/dl x wght in kg x 3

- 10g/dl – 7g/dl x 29kg x 3 = 261mls
- Prescribed 3 units ie approx 750 - 900mls

- Notion that 1 unit of red cells gives an increment in Hb of 1g/dl is flawed in low body weight adults

Failure to replace blood volume after post partum haemorrhage

- *A woman in her mid-thirties had a ventouse-assisted vaginal delivery for fetal distress at term.*
- *It was then complicated by massive haemorrhage from cervical lacerations.*
- *The major haemorrhage protocol was activated, six units of blood were delivered within 5 minutes and one was started immediately.*
- *She was transferred from the delivery room to theatre and the bleeding was controlled within 30 min.*
- *The blood loss was unclear with losses recorded in both the delivery suite and theatre. A second unit was commenced.*
- *About 2 hours later, she suffered cardiac arrest from which she could not be resuscitated despite transfusion of 12 units of blood and 3 units of Fresh Frozen Plasma (FFP).*
- *Coagulation tests done about 30 minutes prior to arrest were abnormal. This may be a result of the massive haemorrhage but analysis suggested she may have had a previously unrecognised coagulation factor XI deficiency. (She had a previous birth by caesarean section without excessive bleeding).*
- *The coroner confirmed cause of death to be cerebral hypoxia secondary to haemorrhage.*

Learning points

- Estimated blood loss not fully appreciated because managed first in the delivery suite then in theatre
- POCT provided Hb results which led to a false sense of security
- Two teams involved in her care not clear who was the leader
- Changes in shift during the episode so that the full picture was perhaps not appreciated
- Haemorrhage was controlled but red cell and fluid replacement was inadequate

Handling and Storage Errors

Definition

- All reported episodes in which a patient was transfused with a blood component intended for the patient, but in which, during the transfusion process, the handling and storage may have rendered the component less safe for transfusion

Transfusion of a clotted unit

- *When attempting to transfuse a unit of red cells through a rapid infuser the anaesthetist observed the blood had clotted.*
- *When the unit was examined by the Blood Establishment they found a mix of the patient's and the donor's blood in the pack.*
- *This can occur when a unit is lowered below the arm of the patient; in this instance the infusion bags (including the blood component) were positioned on the patient's bed during transfer.*

Failed handover results in excessive time to transfuse

- *A patient was transferred from the intensive therapy unit (ITU) to the haematology ward with a red cell transfusion in progress (started at 05:41).*
- *The transfusion was not discussed during the patient handover and was not noticed until 10:55 when the transfusion was discontinued with 60mL still in the pack.*

Learning point

- The use of a transfusion record or checklist can improve the documentation and handover processes

Paediatric Transfusion

Slow transfusion due to incorrect administration set

- *Two hours after commencing a transfusion for a baby it was noted that only 2mL had been administered via the pump instead of the expected 14mL.*
- *The pump was replaced and the transfusion was recommenced.*
- *The transfusion finally finished after a total of 6.25 hrs.*
- *Later it was discovered that the pump malfunction was caused by using the wrong administration set.*

Transfusion given too fast

- *A 15 day old neonate on PICU was erroneously transfused with 53 mL red cells over 15 minutes rather than 4 hrs due to setting the infusion pump at an incorrect rate following an incorrect prescription.*
- *The baby required furosemide for mild circulatory overload.*

Learning points

- Equipment used for paediatric transfusions must be appropriate for purpose and set up correctly
- The volume delivered should be monitored regularly throughout the transfusion

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