

## 'Lessons for Clinical Staff' from the 2009 SHOT Annual Report

The Serious Hazards of Transfusion Scheme (SHOT) is a UK-wide confidential enquiry that collects and collates data on adverse reactions and events related to the transfusion of blood and blood components: red cells (including autologous and salvaged red cells), platelets, granulocytes and fresh frozen plasma (FFP). Adverse reactions and events related to virus inactivated fresh frozen plasma (FFP) (solvent detergent (SD-FFP) and methylene-blue treated (MB-FFP)) and cryoprecipitate (MB-cryoprecipitate) and adverse events (errors) related to administration (or failure of administration) of anti-D Ig (immunoglobulin) are also included.

### SHOT findings are used to:

- Aid the production of national clinical and laboratory guidelines for the use of blood
- Improve standards of hospital transfusion practice
- Educate users on the hazards of transfusion and their prevention
- Inform policy within the four UK transfusion services
- Identify new trends in adverse events and stimulate research

An annual report and a separate summary have been published by SHOT each year since 1998 and general and specific recommendations made to improve patient safety. Recommendations are aimed at all levels from Chief Medical Officers, through professional bodies, Trust Chief Executive Officers, and to each and every member of hospital staff involved in transfusion, as everyone has the opportunity to influence safe practice.

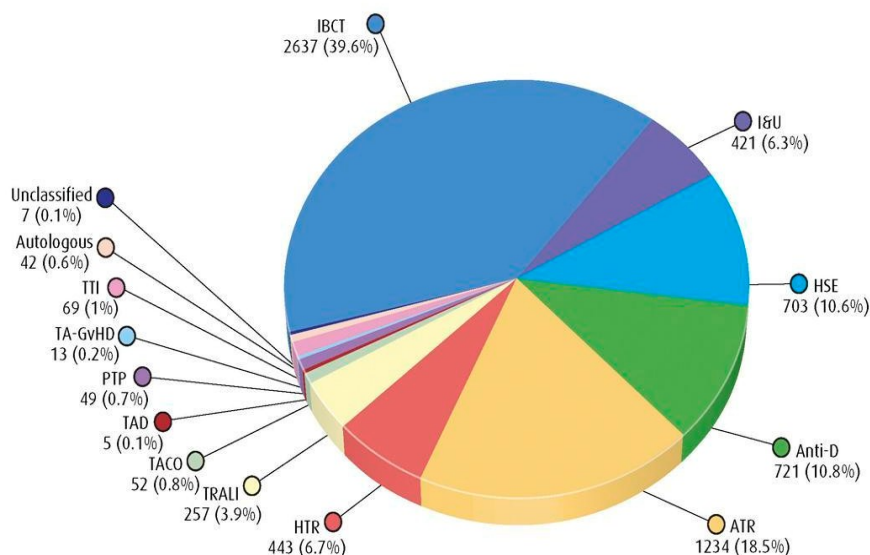
### What sort of incidents does SHOT collect data on?

In 2009 the scheme captured data on the major complications of transfusion and categorised them into the following:

- Incorrect Blood Component Transfused (IBCT) ('wrong blood')
- Inappropriate and Unnecessary Transfusion (I&U)
- Handling and Storage Errors (HSE)
- Administration of anti-D Immunoglobulin
- Acute Transfusion Reaction (ATR)
- Immune Transfusion Reactions:
  - Haemolytic Transfusion Reaction (HTR), both acute and delayed
  - Transfusion-Related Acute Lung Injury (TRALI)
  - Post-Transfusion Purpura (PTP)
  - Transfusion-Associated Graft-versus-Host Disease (TA-GVHD)
- Transfusion-Transmitted Infection (TTI)
- Transfusion-Associated Circulatory Overload (TACO)
- Transfusion-Associated Dyspnoea (TAD)
- Incidents associated with autologous transfusion (mainly cell salvage)

The range of reports that we receive increases every year, so please keep checking the SHOT website <http://www.shotuk.org> to see the latest reporting categories for 2011

Cumulative SHOT data 1996 - 2009



Over a 13-year period, from 1996 to the end of 2009, almost 42 million components have been issued from the 4 UK Blood Services, and there have been 6653 incidents analysed.

## What are the figures for transfusion related mortality?

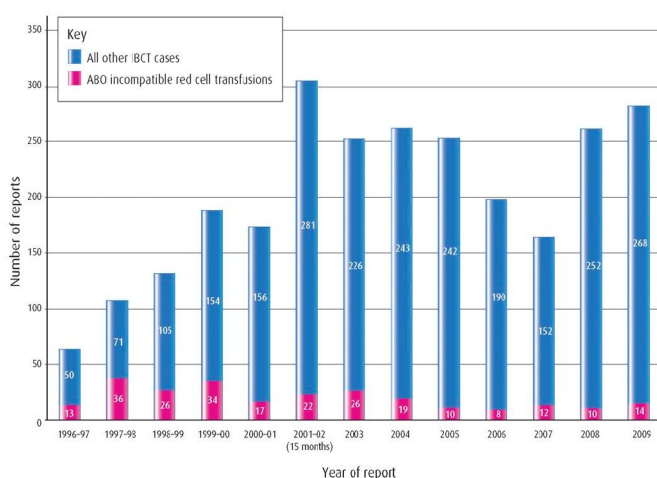
There was 1 death reported in 2009 which was considered to be directly due to a transfusion - a proven case of transfusion-transmitted *Pseudomonas koreensis* infection in an elderly man undergoing palliative care for rectal carcinoma

There were 12 further deaths in which the transfusion contributed to a varying extent to the outcome. These consisted of 3 ABO-incompatible transfusions (IBCT), 2 cases of over-transfusion (I&U), 1 acute transfusion reaction (ATR), 2 transfusion-related acute lung injury (TRALI) and 4 transfusion-associated circulatory overload (TACO)

## So what are the key learning points for clinical staff ?

### Correct patient identification is crucial to prevent 'wrong blood' (IBCT) incidents

ABO-incompatible transfusions vs IBCT cases 1996 - 2009



There were 40 cases in 2009 where the wrong blood component was administered, including 14 that happened to be ABO-incompatible.

Bedside patient ID checking could have prevented 28/40 of these cases if properly carried out using the ID wristband against the blood component.

In 21 cases there was no evidence of a bedside check at all, and in 7 others a check was carried out using the accompanying paperwork, but not involving the patient at all.

### ALL 'wrong blood' incidents have the potential to be ABO-incompatible, and to result in patient morbidity and mortality.

- Every patient must have an ID wristband or equivalent containing at least their last name, first name, date of birth and unique ID number. For unidentified patients there must be a policy in place stating the minimum acceptable identification data set.
- The patient must be asked to state their name and date of birth (if able) at all stages of the process, including at sample taking and at administration.
- The final identity check when taking a blood sample or administering blood **MUST** be done at the patient's (bed)side against a wristband or equivalent form of identification. No other form of checking is acceptable under any circumstances, and all documentation such as prescription, pack details and patient identification details **MUST** match exactly.

The bedside check is THE essential step to ensure that the correct blood component is given to the patient and to detect errors that may have occurred earlier in the transfusion process

### SHOT Main Recommendation 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?'

### Appropriate patient assessment and prescribing

92 patients received inappropriate and unnecessary transfusions, which in 2 cases contributed to their deaths. 45 transfusions were given on the basis of erroneous blood count results and the remainder were due to lack of knowledge and inappropriate prescribing. A further 34 patients suffered from TACO which was implicated in 4 further deaths. In many cases, this condition could have been avoided by taking into account the patient co-morbidities and fluid balance.

**In every case, the rationale for the transfusion must be clear and the likely benefits of giving blood to the patient must be weighed against the risks**

- Laboratories must not transmit potentially erroneous results when they request a repeat patient sample.
- Blood gas machines must not be used for haemoglobin estimations on which to base a transfusion request. All point of care testing devices for haemoglobin estimation must be fully validated and internal quality control and participation in external quality assurance schemes must be ensured.
- Decisions related to transfusion episodes should be made by experienced medical staff.

### Monitoring for transfusion reactions

All staff caring for patients receiving a transfusion must make sure they know how to recognise the signs and symptoms of a transfusion reaction and be aware that they may occur after only 5-10 mL of the component has been transfused. In an unconscious patient only the signs will be evident.

- **Signs** include fever, hypotension, generalised oozing from wounds or puncture sites, haemoglobinaemia and haemoglobinuria.
- **Symptoms** include: a feeling of apprehension or 'something wrong', agitation, flushing, breathlessness, pain at venepuncture site and pain in abdomen, flank, or chest.

**Transfusion reactions should be immediately reported to the local hospital transfusion team, so that appropriate investigations can be undertaken**

**Fresh Frozen Plasma** continues to be associated with a threefold increased risk of acute reaction compared with red cells and should only be used when clinically indicated in accordance with the British Committee for Standards in Haematology (BCSH) national guidelines. <http://www.bcsghguidelines.com>

7 case reports in 2009 were associated with inappropriate use of FFP for warfarin reversal, and this is also highlighted by the National Comparative Audit in 2009 in which 14% of all FFP transfusions were given for warfarin reversal, and where more than half of these patients had no evidence of bleeding. <https://www.nhsbtaudits.co.uk>

BCSH guidelines for the management of bleeding and excessive oral anticoagulation (warfarin) should be followed. <http://www.bcsghguidelines.com>



- Every effort must be made to avoid unnecessary transfusion of plasma rich blood components including FFP and platelets
- Prothrombin complex concentrate (PCC) rather than FFP is the product of choice for the reversal of oral anticoagulation (warfarin) in patients with major bleeding



**Platelets** are issued as 'Adult Therapeutic Doses' and BCSH guidelines advocate the use of 1 ATD as a standard treatment. <http://www.bcsghguidelines.com>

Platelets are associated with a sevenfold increased risk of acute reaction compared with red cells.

There were 11 cases in the 2009 report where platelets were administered inappropriately.

**Group O platelets can cause acute haemolytic reactions even when tested and labelled negative for 'high-titre haemolysins'. Paediatric patients are particularly vulnerable, and group O platelets should only be used for non-group O children as a last resort.**

## Transfusion-Transmitted Infection (TTI)

There have been no confirmed cases of transfusion-transmitted viral infections since 2005. Transmission of viruses through transfusion may make the headlines, however, risk estimates for the UK from the Health Protection Agency <http://www.hpa.org.uk> (Aug 2010) are very low:

- Hepatitis B 1 in 670,000
- HIV 1 in 5 million
- Hepatitis C 1 in 82 million
- HTLV 1 in 17 million

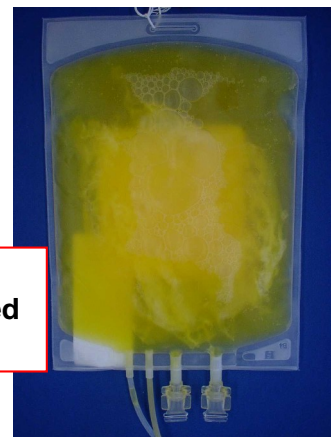
Although the risk of getting vCJD is probably very low with a single blood transfusion, the risk of any infection will increase with additional blood transfusions. Within the UK there have been just a handful of cases where patients are known to have become infected with vCJD from a blood transfusion.

There were three confirmed reports of bacterial infection by transfused components in 2009; all from platelets.

**Efforts to prevent bacterial contamination of blood components should continue including a visual inspection of all blood components for any irregular appearance immediately prior to transfusion. However, remember that infected components MAY NOT ALWAYS look abnormal and regular observations during the transfusion are essential to identify a patient who may be experiencing an adverse reaction. If in doubt about a blood component, ask your hospital blood transfusion laboratory for advice**



**Clotted  
Red Cells**



**Bacterially  
Contaminated  
Platelets**

## Learning from our mistakes

When reporting to SHOT, reporters are asked to identify whether a root cause analysis (RCA) was carried out, whether the event was reviewed locally, and what the outcomes of that review were.

There are a range of tools available on the SHOT website (below), and the NPSA website [www.npsa.nhs.uk](http://www.npsa.nhs.uk) to assist practitioners undertake RCA, develop risk assessment processes, and implement corrective actions.

**It is important when reviewing any incident that investigators examine the events leading to the error to determine if improvements to the process, procedure or system can be made**

Reporting of serious adverse reactions (SARs) and serious adverse events (SAEs) to the MHRA is mandatory under the terms of the Blood Safety and Quality Regulations 2005. SABRE, the on-line reporting system, can be accessed via the SHOT website <http://www.shotuk.org> or via the MHRA website <http://www.mhra.gov.uk>.

If you would like more information on SHOT please contact:  
SHOT Office, Manchester Blood Centre, Plymouth Grove, Manchester M13 9LL  
Tel: 0161 423 4208 Fax: 0161 423 4395  
Email: [shot@nhsbt.nhs.uk](mailto:shot@nhsbt.nhs.uk) Website: <http://www.shotuk.org>