SHOT Reporting 2015
What have we learnt?

Paula Bolton-Maggs
Medical Director
An important year

Three national treasures reach 90 years of age

SHOT reaches 20 years and our 19th Annual Report

Both turned 90: Pooh meets the Queen
The headlines 2015

New from 2015 – inclusion of DONOR HAEMOVIGILANCE DATA
Chapter 29
SHOT reports for 2015 n=3299

- Not preventable: 10%
- Possibly preventable: 12%
- Errors: 78%
SHOT reports 2015
n=3965
by country of origin
Multiple errors

1,000 deaths blamed on errors by A&E staff

More than 1,000 hospital patients have died after mistakes by overstretched A&E staff in the past five years. A further 2,539 suffered “serious harm” from poor care. People have been told to stay away from A&E unless “absolutely necessary”. The NHS National Patient Safety Agency found that 1,089 patients have died after errors linked to poor care since 2010. Last year there were 247 deaths, up from 218 the year before. In 2012-13 there were 201, compared with 206 in 2011-12 and 217 in 2010-11. Critics said that the loss of dozens of A&E departments had increased the strain on the remaining 164 units.

Death from septicaemia
Multiple errors

1,000 deaths a year on error

More than 1,000 people have died as a result of medical errors or poor care since 2010. Last year there were 247 deaths, up from 218 the year before. In 2012-13 there were 201, compared with 206 in 2011-12 and 217 in 2010-11. Critics said that the loss of dozens of A&E departments had increased the strain on the remaining 164 units.

Death from septicaemia
DOCTORS’ WELLBEING

Rising workload and falling morale

Doctors have been placed in a “critical situation” by the government’s failures in running the health service, Mark Porter, the BMA’s chair of council, told delegates at a meeting this month.

The special representatives’ meeting, held in London on Tuesday 3 May, was organised to allow delegates to discuss doctors’ workload and morale. Speaking to the meeting, Porter said, “We’re here because we want to restore some hope to the National Health Service. That’s not easy when we are surrounded by failure.

The pressure on the health service led the BMA to convene a special meeting on morale earlier this month. Abi Rimmer reports

“The strike was simply a more organised version of a depressingly familiar situation”
Jane Dacre

“While much was made in the media last week of consultants taking on the role of juniors during the strike, for many of my colleagues this was nothing new—it was simply a more organised version of a depressingly familiar situation,” she said.
We all do daft stuff
Transfusion reactions which may not be preventable

Possibly or probably preventable by improved practice and monitoring

Adverse incidents due to mistakes

IBCT: Incorrect blood component transfused
Anti-D: Anti-D immunoglobulin errors
HSE: Handling and storage errors
ADU: Avoidable transfusion
Anti-D: Anti-D immunoglobulin errors
IBCT: Incorrect blood component transfused

NM: Near miss
RBRP: Right blood right patient
UC: Unclassifiable complications of transfusion
PTP: Post-transfusion purpura
TTI: Transfusion-transmitted infection
CS: Cell salvage
ATR: Acute transfusion reaction
TAD: Transfusion-associated dyspnoea
TRALI: Transfusion-related acute lung injury
TACO: Transfusion-associated circulatory overload
TAGvHD: Transfusion-associated graft vs host disease
HTR: Haemolytic transfusion reaction
ADU: Undertransfusion
ADU: Delayed transfusion

SHOT Reports 2015 n=3288

1243
ABO-incompatible red cell transfusions $n=7$

- **Patient Group O+**
  - **Donor Group B-**
  - Laboratory error
  - EI failure
  - Case 6.1

- **Patient Group O+**
  - **Donor Group AB-**
  - Collection and administration error
  - Case 6.2

- **Patient Group B+**
  - **Donor Group A+**
  - Wrong blood in tube
  - Case 6.4

1 WBIT

5 administration errors

Use a bedside checklist
Transplant patients – communication failures
ABO-incompatible red cell transfusions to HSCT allograft recipients n=6

<table>
<thead>
<tr>
<th>ABO/D</th>
<th>Component</th>
<th>Gender</th>
<th>Patient original group</th>
<th>HSCT Donor group</th>
<th>Group transfused</th>
<th>Error</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>clinical error</strong></td>
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<tr>
<td>ABO+D</td>
<td>Mixed</td>
<td>Unknown</td>
<td>B</td>
<td>A</td>
<td>B pos RBC B neg PLT A pos PLT</td>
<td>ABO-incompatible &amp; D mismatch</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>D-positive</td>
<td>D-negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>laboratory error</strong></td>
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<tr>
<td>ABO</td>
<td>Red cells</td>
<td>Male</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>ABO-incompatible</td>
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<tr>
<td>ABO</td>
<td>Red cells</td>
<td>Male</td>
<td>A</td>
<td>O</td>
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<td>ABO-incompatible</td>
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<td>Red cells</td>
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<td>B</td>
<td>A</td>
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<tr>
<td>ABO</td>
<td>Red cells</td>
<td>Male</td>
<td>A</td>
<td>O</td>
<td>A</td>
<td>ABO-incompatible</td>
</tr>
</tbody>
</table>
Systems failures in a transplant centre

- A patient was incidentally noted at a laboratory meeting to have had an allogeneic haemopoietic stem cell transplant (HSCT) 10 days earlier: no information had been supplied to the laboratory about the change in ABO group or specific requirements (irradiation)
- A second case was identified a week later
- As a result, the transfusion laboratory manager undertook a retrospective review (8 month period) and found 17 HSCT had taken place that were not known to the laboratory of which 6/17 were allografts.
- Four had received incorrect blood components selected by electronic issue which should have been serologically crossmatched
- One patient received incompatible red cells. Fortunately no patients were harmed
What went wrong?

- Co-ordinating team - a clinical nurse specialist, an administrator and a middle-grade doctor
- 3 disruptive factors
  - the transplant unit had been relocated
  - 5 temporary administrators
  - 4 different doctors
- Several different errors were identified
  - admission checklists not completed
  - filing of transplant documentation not done
  - medical and nursing staff not sufficiently competent to identify the specific requirements for transplant patients
Death and serious harm
Deaths related to transfusion reported in 2015

Number of cases

<table>
<thead>
<tr>
<th>Condition</th>
<th>Certain (3)</th>
<th>Probable (2)</th>
<th>Possible (1)</th>
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<tbody>
<tr>
<td>TTI-HEV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBCT-ABOi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-D</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>TANEC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HTR</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRALI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delays</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TACO</td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Total n=26

TANEC: transfusion-associated necrotising enterocolitis
ABOi: ABO-incompatible transfusion
(numbers in parentheses refer to level of imputability, not number of cases)
Child aged 15 months in Africa with malaria and Hb 20g/L

Elderly person in UK with evidence of heart failure and Hb 100g/L
Ranking of serious incidents 2015

<table>
<thead>
<tr>
<th>Condition</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATR</td>
<td>86</td>
</tr>
<tr>
<td>TACO</td>
<td>34</td>
</tr>
<tr>
<td>HTR</td>
<td>17</td>
</tr>
<tr>
<td>IBCT</td>
<td>9</td>
</tr>
<tr>
<td>Delays</td>
<td>5</td>
</tr>
<tr>
<td>TRALI</td>
<td>4</td>
</tr>
<tr>
<td>UCT</td>
<td>3</td>
</tr>
<tr>
<td>CS</td>
<td>3</td>
</tr>
<tr>
<td>Anti-D</td>
<td>3</td>
</tr>
<tr>
<td>TTI</td>
<td>2</td>
</tr>
</tbody>
</table>

- **9 cases in patients with sickle cell disease**
- **Women who developed anti-D as a result of delay or missed anti-D Ig**
Failure to recognise a complication of pregnancy, with poor communication and followed by neonatal death

- A baby was born with unexpected jaundice and haemolytic disease due to anti-D antibodies which had not been anticipated
- The baby required urgent red cell exchange transfusion during which cardiac arrest occurred, and the baby subsequently died
- This was the second pregnancy in a D-negative woman.
- There were at least 10 different errors and missed opportunities across two pregnancies
- The incident review noted task factors, individual staff and several communication factors (wrong assumptions, failure to pass on messages, shift changes, misinterpretations)
- It concluded ‘the lack of a robust system led to the mother and baby not being managed appropriately’
Fluff about anti-D interpretation

Owl, said rabbit shortly, you and I have brains. The others have fluff. If there is any thinking to be done in this forest..you and I must do it

The midwives

The biomedical scientists
Fluff about anti-D interpretation

Owl, said rabbit shortly, you and I have brains. The others have fluff. If Laboratory staff and midwives have responsibility and need to understand anti-D forest . . . you and I must do it
Update on D-immunisation study

Cumulative total 33 NPP and 84 PP

13/41 found to be immunised at booking had apparently ‘ideal care’ in the previous pregnancy
Transfusion-related deaths 2010 to 2015
n=93

- Pulmonary complications: 51
- TACO: 39
- TAD: 3
- TRALI: 9

Other causes:
- TTI: 1
- TAGvHD: 1
- UCT: 6
- PTP: 1
- HTR: 7
- ATR: 5
- Anti-D: 1
- Avoidable: 2
- Delay: 16
- ABO-incompatible: 2
Changing pattern of pulmonary complications 2008-2015
Comparison of outcomes 2015

MM=Major morbidity e.g. admission to intensive care/ventilation

Pulmonary complication

- TACO: 7 MM, 7 Deaths
- TRALI: 4 MM, 4 Deaths
Recommendation

• A formal pre-transfusion risk assessment for transfusion-associated circulatory overload (TACO) should be performed whenever possible as TACO is the most commonly reported cause of death and major morbidity
Other complications of transfusion
Allergic (but not febrile) reactions are reduced by suspension in PAS.
Allergic (but not febrile) reactions are reduced by suspension in PAS.

• SHOT data and published studies indicate that the use of platelets suspended in platelet additive solution (PAS) is associated with a reduction in allergic response. Hospitals should consider preferential use of platelets suspended in PAS in patients with a history of this type of reaction. If reactions continue then platelets resuspended in 100% PAS can be supplied.
Death due to anti-Wr\textsuperscript{a} following electronic issue

- Elderly man with MDS, comorbidities
- Back and abdominal pain after 160mL red cells
- Admitted and died within 12 h
- Wr\textsuperscript{a} positive unit (1 in 1000): patient had anti-Wr\textsuperscript{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
Haemoglobin disorders
Cumulative data 2010-2015

Sickle cell disease: n=136

- TTI: 1%
- TAD: 1%
- Wrong transfusion: 2%
- TACO: 1%
- Delayed transfusions: 6%
- Near miss: 9%
- Acute transfusion reactions: 12%
- Specific requirements not met: 28%
- Haemolytic transfusion reactions: 40%
Learn from near miss incidents
Near Misses 2015 n=1243

Wrong blood in tube (WBIT) is the most common near miss incident, 62.8%

Doctors take 35.0% WBIT samples

Identify your patient properly 69.6% misidentification near misses

The wrong blood group can kill 23.3% near misses ABO-incompatible 33.3% WBIT ABO-incompatible

Information technology (IT) can occasionally fail 7 near misses were unexpected failures of previously working IT systems
WBIT: who takes the sample?

Midwives and doctors
Near miss vs actual incidents

- 780 near miss wrong blood in tubes detected
- 2 incidents
  - 44y old man for vascular surgery - correct group was B pos received A pos blood; the FY1 did not complete patient ID correctly
  - Compatible transfusion, A neg to A pos
Near miss vs actual incidents

The absence of patient harm does not mean the error was not serious.

- 780 near miss wrong blood in tubes detected

- 2 incidents
  - 44y old man for vascular surgery - correct group was B pos received A pos blood; the FY1 did not complete patient ID correctly
  - Compatible transfusion, A neg to A pos
Near miss incidents: potential outcomes

Total 288 possible ABO-incompatible transfusions
Cumulative SHOT data show that about 33.3% of ABO-incompatible red cell transfusions cause death or serious harm

So a third, 96/288, of patients potentially harmed

Near miss events demonstrate how our practice is not safe

The most dangerous
### Risks associated with transfusion

#### Risk of potentially infected donation entering the blood supply 2012-2014

<table>
<thead>
<tr>
<th>Condition</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>1 in 1.6 million</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>1 in 26 million</td>
</tr>
<tr>
<td>Human immunodeficiency virus</td>
<td>1 in 6 million</td>
</tr>
</tbody>
</table>

#### Risk of death or serious harm from transfusion per components issued (imputability 1-3) 2015

<table>
<thead>
<tr>
<th>Event</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>1 in 100,000</td>
</tr>
<tr>
<td>Death from error</td>
<td>1 in 320,000</td>
</tr>
<tr>
<td>Major morbidity</td>
<td>1 in 15,500</td>
</tr>
</tbody>
</table>
Concerns from laboratories

The UKTLC survey confirms that the transfusion laboratory is a difficult environment.
Laboratory errors by year 2007 to 2015

UKTLC published
Recommendations and standards
Receipt and registration errors 2015 n=150

**WARM – work accurately and reduce mistakes**

Sample receipt and registration errors

- Demographic data entry error: 61 reports
- Available historic information: 42 reports
- Missed information on request form: 8 reports

Legend:
- ADU
- Anti-D
- RBRP
- SRNM
- IBCT

Number of reports
Human errors - SABRE n=740

- Lapsed/no training
- Incorrect procedure
- Inadequate training
- Ineffective training

Procedural steps omitted/wrong procedure performed
- Procedure steps not performed correctly
- Inadequate process

563/740 (76.1%)
Human errors - SABRE $n=740$

Don't improvise  
Follow the procedure

Can't follow the procedure?
Review and change the procedure

Procedure steps not performed correctly
Procedural steps omitted/wrong procedure performed
Ineffective training
Inadequate training
Incorrect procedure
Lapsed/no training

$\frac{563}{740} = 76.1\%$
Workforce planning

Has the laboratory undergone re-organisation since 2013

Number of respondents

Recently undergone | Currently undergoing | Will undergo in near future | No | Unknown
--- | --- | --- | --- | ---
43 | 27 | 30 | 78 | 26

100/178 laboratories
Staff vacancies and their duration
UKTLC Survey 2015

- Band 2 Healthcare support worker
- Band 3 Healthcare support worker
- Band 4 Associate practitioner
- Band 4 Trainee
- Band 5 BMS
- Band 6 BMS
- Band 7 BMS
- Blood transfusion technical lead

Legend:
- < 6 months
- > 6 < 12 months
- > 12 months
- 1
- 2
- 3
- > 3
Why have staff left your organisation in the last 2 years?

- Left the profession for employment elsewhere
- Left an non NHS job for an NHS post
- Left an NHS job for a non NHS post
- Left for a new organisation at same grade
- Promotion
- Redundancy
- Early retirement
- Retired
67% affected urgent or emergency transfusions
‘Owl’ said Pooh, ‘I have thought of something’

‘Astute and Helpful Bear’, said Owl. Pooh looked proud at being called a Stout and Helpful Bear.
Machine lookalikes

Errors in theatre with point-of-care testing
The Transfusion Steps (as used by SHOT to analyse the data)

Critical points:
Positive patient identification is essential

Note: once a decision to transfuse is made, the authorisation or prescription may be written at variable times during this sequence, but **must be checked at the final stage**
Multiple errors 2013-2015

Number of reports

Number of steps

2013 | 2014 | 2015
---|---|---
1 | 38 | 55 | 53
2 | 55 | 65 | 33
3 | 113 | | 117
4 | 17 | | 8
5 | 14 | | 29
6 | | | 9
ICE

Identification
Communication
Education
A WOMAN died after a successful operation because a spelling mistake meant that emergency blood supplies were unavailable.

Irmgard Cooper had just had surgery at Northwick Park hospital, in Harrow, to repair a life-threatening bulge in the main artery to her heart when her blood pressure dropped.

As a surgeon began unclamping the artery to allow blood to recirculate, he found a weak pulse and called for extra blood. The anaesthetist told him there was no cross-matched blood and although all-purpose O-negative blood was obtained within an hour, Mrs Cooper died shortly before midnight.

It was discovered that there was no blood on standby because it had been returned to the blood bank because the German-born grandmother’s name had been wrongly spelled as Irmgard on the supplies.

After the operation, her daughter Lorraine Booker was told by the surgeon that the operation had gone as planned, despite a “little problem” with her blood clotting.

However, when Mrs Booker was taken to intensive care, she found her mother “lying in a pool of blood, which was running off the bed” and the “floor was drenched in blood.”

Barnet coroner Andrew Walker found Mrs Cooper died from neglect and said her death was avoidable. He found gross failings in the failure to provide blood at a critical time when it was known supplies would be needed.

Mrs Cooper, 85, who had two children and three grandchildren and had been married to Raymond for 62 years, was admitted to hospital in May last year for an aortic aneurysm repair.

Mrs Booker, from Chesham, Buckinghamshire, who was at the hospital during the operation, said: “I phoned home and told my father and the rest of the family that she had come through the operation, which devastates me now. I went to intensive care to see her, I took one look at all her readings and felt her body, which was ice cold, and I knew she was going to die. She was lying in a pool of blood, which was running off the bed. The floor was drenched in blood.

“My father has suffered from nightmares over my mother’s death ever since. We just feel very let down and betrayed by the hospital for a death that should never have occurred.”

A serious incident investigation by the hospital found that Mrs Cooper, from Hayling Island, Hampshire, died from serious blood clotting difficulties, cardiovascular collapse, haemorrhage and the delay in giving blood.

Renu Daly, of medical negligence firm Hudgell Solicitors, said: “Mrs Cooper was effectively dead from the time she arrived in intensive care. She was already suffering from catastrophic internal bleeding, which meant death was inevitable. This catalogue of errors demonstrates an enormous breach of care.”

London North West Healthcare, which runs Northwick Park, has admitted liability. Chief executive Jacqueline Docherty said: “I would like to offer my sincere condolences to the family of Irmgard Cooper.”

We feel let down and betrayed by the hospital for a death that should never have occurred. Lorraine Booker, daughter.

@RossLydall
Error made in a stressed environment results in staff blame

• A patient had been ‘identified’ by two registered nurses against the transfusion chart at the nurses’ station

• The registered nurse on the night shift offered to start the transfusion because the ward was very busy and other patients were requiring attention. She was interrupted and distracted on her way to the patient

• The final bedside check was not done so the wrong patient was transfused with part of an ABO-incompatible red cell unit

• A nurse practitioner quickly realised blood was being given to the wrong patient and stopped the transfusion. The patient recovered
Information Technology – Caution

- A wristband was scanned when not on the patient (no PP id, labelled away from patient)
- A LIMS was updated but not properly validated so permitted ABO-incompatible units to be released by EI
- A hospital set up an end-to-end system in a way it was not intended, allowing staff to bypass the compatibility check
- An electronic prescribing system in ITU defaulted to single adult units for any paediatric transfusion resulting in overtransfusion
Paediatrics

- Use of adult emergency O D-negative units for neonates
- Exchange transfusion with wrong anticoagulant (SAGM adult unit instead of CPD exchange unit) due to misunderstanding by BMS and Blood Service
What’s special about red cell units prepared for neonates?

They are selected to be:

- Free from clinically significant red cell antibodies and high titre negative
- CMV negative
- HbS screen negative
- Prepared from blood donated by donors who have given at least one previous donation within the past 2 years
Retrospective review can change the story

Beware of changing the explanation, it may be more comfortable for the organisation to blame the individual than review the system.
WARM

Work Accurately and Reduce Mistakes
Recommendation

• Use a pretransfusion checklist at the patient’s side immediately prior to transfusion
• Never do this away from the patient
• Audit practice before and after introduction
SHOT recommendation 2014

Human factors in hospital practice
Be safe! Use the bedside checklist

- Positive patient identification
  - ask the patient to state name and date of birth
- Check identification of component against patient wristband
- Check the prescription
  - has this component been prescribed?
- Check the prescription
  - is this the correct component?
- Check for specific requirements
  - does the patient need irradiated components or specially selected units?
• Hello, please tell me your name
• And your date of birth
• Is there consent, correct component?
• Are there any special requirements?
Key SHOT messages

- There is no substitute for **correct patient identification** at all stages in the transfusion process.

- The severity of the outcome is not the determinant of the seriousness of the error. Near miss reporting demonstrated 889 errors which could have resulted in incorrect blood component transfusions, of which 288 were known to be potentially ABO-incompatible.

- **Delay** in appropriate transfusion contributes to death in sick patients.

- **Risk assessment** before transfusion. Transfusion-associated circulatory overload (TACO) is the most common cause of death and of major morbidity and may be preventable. Patients should be properly assessed prior to transfusion to identify those at particular risk and to ensure the transfusion is required.

- **Information technology (IT) systems** depend on correct set up and validation to ensure they are fit for purpose and contribute to patient safety rather than impede it.

- **Errors in the administration of anti-D immunoglobulin** remain disappointingly high; clear local guidelines and thorough training of all staff involved is essential.

- **Checking means checking** with no short cuts.

- **Laboratory error reports** to SHOT have increased and human error accounts for 96.7% of serious adverse events reported to the Medicines and Healthcare Products Regulatory Agency.
Report by the Commission on Education and Training for Patient Safety

www.hee.nhs.uk/the-commission-on-education-and-training-for-patient-safety
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