SHOT 2014
What’s new?

Paula Bolton-Maggs
Medical Director
SHOT
Includes 233 started in 2013
Excludes 253 incomplete
633 withdrawn

Total reports: 3017

Errors 77.8%

- 1167 near misses
- 169 RBRP
- 1010 error reports (60.1%)

Incidents: 1681

- 650 pathological reactions (38.7%)
- 21 others (CS & UCT) (1.2%)
Cases reviewed in 2014

- Unclassifiable complications of transfusion: 5
- Post-transfusion purpura: 1
- Transfusion-transmitted infection: 2
- Transfusion-associated dyspnoea: 7
- Cell salvage: 16
- Acute transfusion reaction: 343
- Transfusion-associated graft vs host disease: 0
- Alloimmunisation: 151
- Transfusion-associated circulatory overload: 91
- Transfusion-related acute lung injury: 9
- Haemolytic transfusion reaction: 46
- Avoidable, delayed or undertransfusion: 185
- Anti-D immunoglobulin: 359
- Handling and storage errors: 188
- Incorrect blood component transfused: 278

2 cases HEV, 1 donor
No bacterial transmissions

ERRORS 78%
Cases reviewed in 2014

- 2 cases HEV, 1 donor
- No bacterial transmissions

Errors 78%
Total deaths by category
5 years - 2010-2014
n=67
Imputability 1-3

- ADU: 32
- ATR: 5
- HTR: 12
- IBCT: 4
- PTP: 3
- TAD: 1
- TACO: 1
- TAGVHD: 1
- TRALI: 1
- UCT: 1
Cases reviewed in 2014

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TRALI

- 9 cases, 2 deaths probably/possibly related
  - Most cases are complex, assessed by expert panel
- Concordant antibodies found in 3/7 fully investigated cases
- One young woman, PPH, massive transfusion received cryo: 3 female donors with concordant antibodies
TRALI

- 9 cases, 2 deaths probably/possibly related

**Recommendation:**

UK Blood Services should avoid the use of female donor plasma in the production of cryoprecipitate whenever possible

- One young woman, PPH, massive transfusion received cryo: 3 female donors with concordant antibodies
Transfusion-associated circulatory overload

- Reports to SHOT since 2008 increasing each year
- 91 cases reported in 2014
- ‘Goodbye TRALI, Hello TACO’
  P. Renaudier, Tuesday morning 8.30
TACO can occur at any age
Current ISBT definition

Any 4 of the following within 6 hours of transfusion

- Acute respiratory distress
- Tachycardia
- Increased blood pressure
- Acute or worsening pulmonary oedema
- Evidence of positive fluid balance
Draft revised ISBT definition (DRISBT) (January 2015)

Up to 12 hours post transfusion with:

• Primary features
  – Bilateral infiltrates on imaging
  – Enlarged cardiac silhouette on chest imaging
  – Evidence of fluid overload

• Supportive features
  – Elevated BNP or NT-pro BNP. Increased mean arterial pressure or increased pulmonary wedge pressure
‘Key features’ definition from 2013 SHOT report (KF)

- Acute respiratory distress (in the absence of other specific causes)
- Acute or worsening pulmonary oedema
- Evidence of a positive fluid balance
- Evidence of volume intolerance

(Hannah Cohen)
Prioritisation of key features

- **Highly likely** $\geq 3$ features or imaging/post-mortem evidence or pulmonary oedema
- **Probable** – clinical features of pulmonary oedema and response to treatment for circulatory overload (volume intolerance)
- **Possible** – clinical features of pulmonary oedema and positive fluid balance.

(Harriet Lucero)
Number of TACO cases by 4 different definitions

- Highly likely/probable: 85%
- Possible: 52%
- Unlikely: 13%
Reports of delayed transfusions

Year of report:
- 2010: 2 reports
- 2011: 12 reports
- 2012: 21 reports
- 2013: 34 reports
- 2014: 50 reports
Revised recommendation: Transfusion at night

- Transfusions should be given with the same attention paid to observations whatever the time of day or night
- Transfusions at night must proceed where there is a clear clinical indication
- Decisions to transfuse should not be made on the basis of Hb alone but after full assessment
Cumulative errors

<table>
<thead>
<tr>
<th>Year of report</th>
<th>Avoidable, delayed or undertransfusion</th>
<th>Handling and storage errors</th>
<th>Specific requirements not met</th>
<th>All other cases of wrong component transfused</th>
<th>ABO-incompatible red cell transfusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>56</td>
<td>54</td>
<td>143</td>
<td>100</td>
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<td>651</td>
<td>651</td>
<td>202</td>
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What level of incident investigation?

Why did it happen?
Can a recurrence be prevented?
Emergency Transfusion

Two choices

A
To give cross-matched unit of red cells, platelets, FFP or cryoprecipitate in an Emergency SCAN the compatibility Tag attached to the unit

B
ONLY TAP here to administer Emergency O negative red cells (EMO)
273 units compatibility label not scanned by 105 members of staff (2014)
Multidisciplinary steps in the transfusion process

* Critical points where positive patient identification is essential
Transfusion safety – 3 critical factors in patient safety

- Identification
- Documentation
- Communication

But these apply in all areas of medical practice.
Thousands of patients killed by drug and equipment errors

Safe as Planes

The NHS has a lot to learn from airlines about avoiding unnecessary risk

‘Official figures show that at least 8000 patients a year are killed or severely harmed needlessly by drug errors’ - a report by Jane Reid

‘We should design errors out of the system by making them much harder or impossible to commit’ - Leading article
Human factors

• The science of optimising human performance through better understanding of human behaviour and interactions

• Clinical Human Factors Group – see (www.chfg.org)

• The Human Factors Concordat

• Human factors training is essential

• ‘Sign up to safety’
Sign up to Safety

Harnessing the commitment of staff across the NHS in England to make care safer

Sign up to Safety is harnessing the commitment of staff across the NHS in England to make care safer. A patient safety campaign, it is one of a set of national initiatives (http://www.england.nhs.uk/ourwork/patientsafety/) to help the NHS improve the safety of patient care. Collectively and cumulatively these initiatives aim to reduce avoidable harm by 50% and support the ambition to save 6,000.
Human factors

Sample taken from wrong patient

Death of patient
## Ten ABO incompatible red cell transfusions (cumulative SHOT data show 33% cause death or major morbidity)

<table>
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<tr>
<th>Error</th>
<th>Patient group</th>
<th>Group of red cell unit</th>
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<tr>
<td><strong>Collection and administration</strong></td>
<td>O+</td>
<td>A+</td>
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**Outcome:**
No deaths
One patient required renal dialysis
ABO and D errors in solid organ and haemopoietic stem cell transplants
Patients A and B were in adjacent beds
FBC sample from A was labelled with B’s details
Patient B received an unnecessary platelet transfusion
Transfusion to patient A was delayed until the error was discovered on review of the biochemistry results
‘Near Miss’ incidents demonstrate that there is a problem
Wrong transfusions, where are the mistakes made?

Near miss – 686 detected

Clinical

Laboratory errors

<table>
<thead>
<tr>
<th>Process step</th>
<th>Number of errors</th>
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<td>Request</td>
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<td>Sample taking</td>
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<tr>
<td>Sample receipt</td>
<td>76</td>
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<tr>
<td>Testing</td>
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<td>Component selection</td>
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<td>Labelling</td>
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<tr>
<td>Collection</td>
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<tr>
<td>Prescription</td>
<td>140</td>
</tr>
<tr>
<td>Administration</td>
<td>162</td>
</tr>
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</table>
Multiple errors are common – incorrect blood components transfused 2013 and 2014.

- 69% failure to provide irradiated components
- 485 reports
- 1239 errors

Bar chart showing the number of reports with errors for each number of steps with errors:
- 1 step: 108 reports
- 2 steps: 98 reports
- 3 steps: 221 reports
- 4 steps: 19 reports
- 5 steps: 38 reports
- 6 steps: 1 report
Laboratory errors 3-year trend

Number of reports:
- Sample receipt and registration: 31, 84, 94
- Testing: 63, 51, 88
- Component selection: 81, 36, 39
- Component labelling, availability & HSE: 104, 109
- Miscellaneous: 4, 9, 4

Critical laboratory point in the transfusion process
New anti-D detected in pregnancy

- Previous pregnancy
- No previous pregnancy

<table>
<thead>
<tr>
<th>Year reported</th>
<th>Number of reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>4</td>
</tr>
<tr>
<td>2013</td>
<td>13</td>
</tr>
<tr>
<td>2014</td>
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SOPs and protocols may work in the lab and for the bedside check.

They do not work so well in the busy complex clinical environment:
- Multitasking is common
- Distraction is everywhere
- Assumptions…
Mismatch with historical group

- A crossmatch sample was taken by the community team
- The group was different from historical sample
- The sample had been taken from the person living next door
- This person was expecting a nurse for an injection....
Elderly man with ICH
Porter told lab that MHP had been activated; patient name but no number
Lab unable to contact ward
Created emergency number to issue O negs and FFP
Ward then phoned and explained that PCC was required, not blood components
Are we looking from the wrong end?

• Most of the time, it goes right
• 2.7 million blood components issued 2014
• Risk of death 1 in 180,000 \( (n=15 \text{ in } 2014) \)
  – Death from error 1 in a million
  – Death from TACO 1 in 450,000
  – Accidental drowning 1 in 84,000
  – Medical complications in the next year 1 in 100,000
• Risk of major morbidity 1 in 16,000 \( (n=169 \text{ in } 2014) \)
Emergencies happen....

‘Pull out! Pull out, you’ve hit an artery!’
Resilience, managing the unexpected
Remarkably, both men, who have completed more than 2800 jumps between them, were unhurt and within 10 minutes were enjoying a pie and a pint together

Sunday Times
June 21, 2015
A different approach

- **Safety-I** situations where nothing goes wrong and responses are reactive – responding to adverse events when they happen: fire-fighting
- **Safety-II** Working environment where things go right. It is **Proactive** – adjustments to performance so that risky situations do not occur
Resilience

- The intrinsic ability of a system to adjust its functioning before, during or after changes and disturbances, so that it can sustain required operations under both expected and unexpected conditions
- Requires the abilities to anticipate, to monitor and respond, and to learn
The National Theatre production

THE CURIOUS INCIDENT OF THE DOG IN THE NIGHT-TIME

A play by SIMON STEPHENS
Based on the novel by MARK HADDON
Resilience

• The curious incident of the dog in the night time
• Noticing when things do not go as anticipated
• A nurse noticed that the irradiation sticker on a bag of platelets did not look quite right and queried it…it had been signed and dated as irradiated, but missed…
• Learning from what works
Haemovigilance feedback loop

Participation (incident reports)

Education and resources on web

Data & Analysis → the SHOT Report

Recommendations and learning points
Haemovigilance feedback loop

Participation
(incident reports)

Reporting reminders:
- Hyperhaemolysis
- Transfusion-associated necrotising enterocolitis
- New anti-D detected in pregnancy

Recommendations
and learning points
1110 reports
Patient Blood Management
Putting the patient at the centre of everything we do
MHRA
1110 reports
Detailed analysis
Trending
Clinical feedback
Feedback to individual laboratories
SHOT 3668 reports
Patient Blood Management
Putting the patient at the centre of everything we do.

From blood safety to transfusion safety.

SHOT 3668 reports

Detailed analysis, Trending, Clinical feedback

Feedback to individual laboratories

1110 reports

MHRA

Patient Blood Management

Serious Hazards of Transfusion
BSH Guidelines now available on the BSH App

Provide your patients with rigorous, evidence-based, excellent patient care

Download the BSH App free from ITunes and Google play or via the BCSH/BSH website homepages
Acknowledgements

• The SHOT team
• Our working expert group
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