7 Human Factors and Ergonomics (HFE) in SHOT Error Incidents n=3322

Authors: Emma Milser and Alison Watt

Key findings:

- An increase in cases investigated using HFE frameworks
- A more even spread of contributory factors shows broad consideration of the all the categories
- A decrease in attribution to situational factors, and a corresponding increase to organisational factors

Gaps identified:

- Organisational pressures played a role in the event in 16.8% of cases
- Gaps or issues with staff knowledge were reported in 28.4% of cases
- Mismatches between workload and staff provision occurred in 23.8% of cases
- Suboptimal system design resulted in unsafe workarounds

Good practice:

- HFE principles or frameworks/models to investigate events continue to be embedded
- Improved appreciation of system and organisational factors is evident due to a more even allocation of contributory factors
- Some cases included corrective and preventive action (CAPA) that showed organisational-wide learning

Next steps:

- Familiarisation with the updated Human Factors Investigation Tool (HFIT) questions for 2025
- Considering CAPA for action effectiveness utilising the hierarchy of intervention effectiveness
- Considering design HFE principles when implementing new systems

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SHOT
Serious Hazards of Transfusion

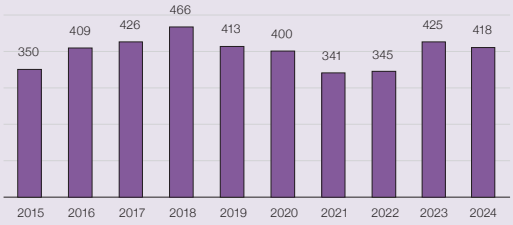
8 Adverse Events Related to Anti-D Immunoglobulin (Ig) n=418

Authors: Jennifer Davies, Clare Cook and Vera Rosa

Headline data 2024

Number of reports n=418
Deaths n=0
Major morbidity n=3

Anti-D Ig reports by year



Demographic data

Male n=0
Female n=418
Adults n=409
Paediatric n=8
Unknown n=1

Potential for major morbidity n=286

Late/omitted RAADP n=91
Late/omitted anti-D Ig following a PSE (including delivery) n=195

Key findings:

- Errors related to anti-D Ig continue to account for a large proportion of SHOT cases
- The majority of errors resulted in omission or late administration. These often occur as anti-D Ig is not administered prior to discharge
- The United Kingdom and Ireland Blood Transfusion Network (UKIBTN) information leaflet Anti-D Immunoglobulin During Pregnancy, provides information to support the decision-making process

Gaps identified:

- Under-reporting of discrepancies between D-type predicted from high-throughput non-invasive prenatal testing (NIPT) for fetal *RHD* genotype and cord sample testing
- Gaps in staff knowledge about appropriate administration of anti-D Ig
- Issues with communication among staff involved in the care pathway
- Information technology (IT) issues with lack of functionality, inappropriate algorithms to support safe practice and poor interoperability

Good practice:

- Effective investigation of events and consideration of human factors enable identification of effective improvement actions
- Investigation of discrepancies between D-type predicted from cell free fetal deoxyribonucleic acid (cffDNA) screening and cord sample testing can identify wrong blood in tube (WBIT) and ensure that anti-D Ig is administered where appropriate

Next steps:

- A national comparative audit is being scheduled to identify gaps in current practice and inform improvements
- Effective use of checklists to facilitate timely administration of anti-D Ig

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Incorrect Blood Component Transfused (IBCT) n=359

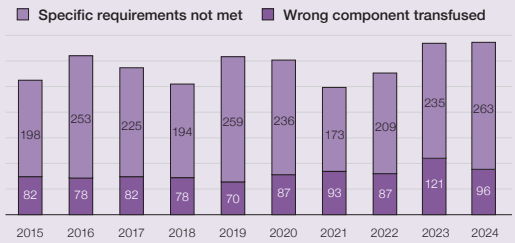
9

Authors: Nicola Swarbrick and Victoria Tuckley

Headline data 2024

Number of reports n=359
Deaths n=0
Major morbidity n=2

IBCT reports by year



Demographic data

Male n=170
Female n=186
Unknown n=3

Adults n=309
Paediatric n=48
Unknown n=2

Blood component data

Red cells n=290
Platelets n=42
Fresh frozen plasma (FFP) n=8
Solvent-detergent FFP n=4
Cryoprecipitate=2
Multiple components n=13

Key findings:

- Clinical errors at the request step have led to an increased number of missed specific requirements
- ABO-incompatible (ABOi) plasma component transfusions continue to be reported
- ABOi red cell transfusions have reduced
- Errors where transfusions are administered to the wrong patient persist
- Laboratories issuing D-positive blood components to D-negative patients in error, and not meeting transplant grouping requirements, continue to be of concern

Gaps identified:

- Transfusion request, collection and administration steps in the clinical area
- Testing and component selection steps in transfusion laboratories
- Issues with communication, staffing, skills, training, recruitment, lone working
- Overriding information technology (IT) alerts inappropriately and lack of IT functionality
- Deficiencies in and lack of effective use of checklists

Good practice:

- Pre-administration checklists, when used appropriately, have prevented many transfusion errors and potential patient harm
- Implementation of a laboratory exit check is increasing

Next steps:

- Review IT system alerts – they must be current, clear and actionable
- Ensure staffing numbers and skill mix are accurately reflected in capacity plans to allow safe completion of tasks
- Include the consequences of not meeting specific requirements in staff training
- Review and improve communication processes between teams to enhance safety

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Handling and Storage Errors (HSE) n=311

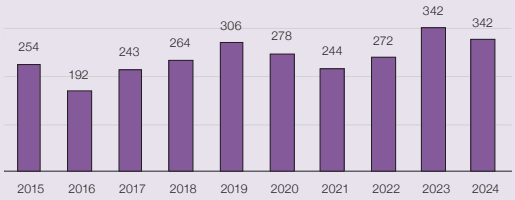
10

Authors: Heather Clarke, Nicola Swarbrick and Victoria Tuckley

Headline data 2024

Number of reports n=311
Deaths n=0
Major morbidity n=0

HSE reports by year



Demographic data

Male n=154
Female n=152
Unknown n=5

Adults n=289
Paediatric n=20
Unknown n=2

Blood component data

Red cells n=247
Platelets n=31
Fresh frozen plasma (FFP) n=18
Cryoprecipitate n=7
Multiple components n=8

Key findings:

- Recurring error patterns in clinical and laboratory areas remain consistent with those observed in previous years
- Most clinical errors were technical administration errors and excessive time to transfuse
- Cold chain errors accounted for most of the laboratory HSE

Gaps identified:

- Mismatch between workload and staffing in the clinical area and the laboratory
- Inadequate training and gaps in competency assessments resulting in deficiencies in staff knowledge
- Inadequate equipment monitoring during transfusion with staff failing to notice or respond effectively to alerts within electronic blood management systems

Good practice:

- Near miss errors showed that cold chain errors and expired blood components are being identified in the pre-administration stage

Next steps:

- Review policies and procedures to ensure a check for transfusion administration rate is included
- The transfusion end time must be communicated during handover to staff caring for the patient
- Use of pumps for transfusions should be included in transfusion training programmes
- Blood giving sets should be clearly distinguishable from all other giving sets

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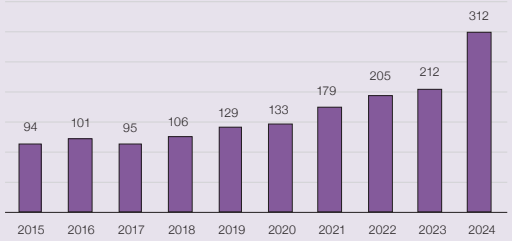
11 Delayed Transfusions n=312

Authors: Josephine McCullagh, Paula Bolton-Maggs and Vera Rosa

Headline data 2024

Number of reports n=312
Deaths n=18
Major morbidity n=12

Delayed transfusion reports by year



Demographic data

Male n=132
Female n=179
Unknown n=1
Adults n=282
Paediatric n=30

Blood component data

Red cells n=214
Platelets n=47
Fresh frozen plasma (FFP) n=9
Cryoprecipitate n=2
Solvent-detergent FFP n=1
Granulocytes n=1
Multiple components n=38

Key findings:

- There was a striking increase in the number of delays particularly in the laboratory
- There was an increase in the number of serious adverse patient outcomes
- Transfusion delays in major haemorrhage (MH) continue to rise

Gaps identified:

- Communication failures were the most frequently cited issue, affecting decision-making, blood component requests, and sample processing
- Lack of training, understaffing, and unfamiliarity with emergency protocols significantly impacted transfusion response times in both clinical and laboratory areas
- Failure to effectively implement major haemorrhage protocols (MHP)
- Many delays resulted from failure to identify and escalate cases early, leading to late transfusion initiation

Good practice:

- Increased levels of recognition of delays and reporting of such events
- Improved staff awareness
- Increasing recognition of causal and contributory factors that can help improve safety

Next steps:

- Ensure recommendations from the Central Alerting System (CAS) patient safety alert: Preventing transfusion delays in bleeding and critically anaemic patients (SHOT/2022/001) are fully implemented

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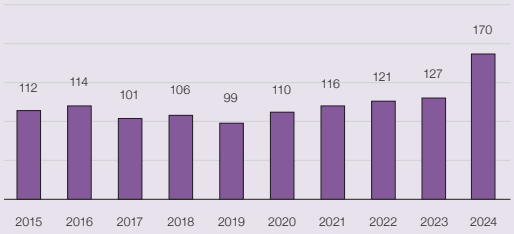
12 Avoidable Transfusions n=170

Authors: Catherine Booth, Paula Bolton-Maggs and Vera Rosa

Headline data 2024

Number of reports n=170
Deaths n=0
Major morbidity n=0

Avoidable transfusion reports by year



Demographic data

Male n=76
Female n=93
Unknown n=1
Adults n=158
Paediatric n=12

Blood component data

Red cells n=128
Platelets n=33
Fresh frozen plasma (FFP) n=3
Cryoprecipitate n=1
Multiple components n=5

Key findings:

- Reports of avoidable transfusions increased by 33.9% compared to 2023
- There was an increase in reports related to avoidable platelet transfusions
- There were 124 completely avoidable transfusions and 46 involving avoidable use of emergency group O red cells

Gaps identified:

- Lack of knowledge of transfusion indications
- Failure to question unexpected results
- Inadequate or inaccurate handover, both within and between teams (medical, nursing, laboratory)
- Multiple systems, steps and staff involved in the switch to group-specific blood during major bleeding

Good practice:

- Reports reflect some detailed investigations with good insight into multiple human and systems factors involved
- Incorporation of a prompt for consent built into the prescription chart

Next steps:

- Review local policies and processes to ensure timely switch to group-specific blood components in major bleeding

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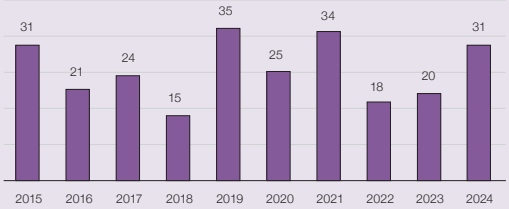
Under or Overtransfusion n=31

Authors: Paula Bolton-Maggs, Catherine Booth and Vera Rosa

Headline data 2024

Number of reports n=31
Deaths n=1
Major morbidity n=3

Under or overtransfusion reports by year



Demographic data

Male n=19
Female n=12
Adults n=11
Paediatric n=20

Blood component data

Red cells n=27
Platelets n=2
Plasma n=0
Cryoprecipitate n=2
Multiple components n=0

Key findings:

- An increase in numbers reported compared with previous 2 years
- Paediatric cases predominate (64.5%)
- Several haemoglobinopathy patients over or undertransfused

Gaps identified:

- Calculation and infusion rates for transfusion
- Communication issues and knowledge gaps

Good practice:

- Local investigations were carried out and relevant improvement actions were undertaken
- Vigilant laboratory staff querying appropriateness of requests for transfusion

Next steps:

- Patients with haemoglobinopathies should be managed under discussion with specialists and following national guidelines
- Practitioners who authorise transfusions for paediatric patients should be adequately trained to ensure calculations of volume are correct, and the correct infusion equipment is used

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Incidents Related to Prothrombin Complex Concentrates (PCC) n=35

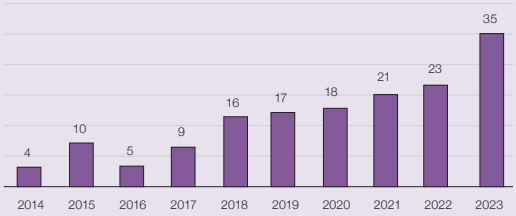
14

Authors: Paula Bolton-Maggs and Vera Rosa

Headline data 2024

Number of reports n=35
Deaths n=1
Major morbidity n=1

PCC reports by year



Demographic data

Male n=15
Female n=20
Adults n=35
Paediatric n=0

Blood product data

Prothrombin complex concentrates (PCC) n=35

Key findings:

- PCC administration in emergencies, particularly with intracranial haemorrhage (ICH), is often delayed
- Patients are often elderly with multiple pathologies
- Most patients presented in the emergency department (ED) and needed urgent treatment
- Use of trade names can cause confusion resulting in incorrect treatment

Gaps identified:

- Lack of knowledge of PCC and how it is administered
- Communication problems between clinicians and haematologists
- PCC not easily accessible near the ED resulting in delays
- Contributory human factors, particularly very busy ED

Good practice:

- PCC is used infrequently; in one hospital difficulty locating the standard operating procedure (SOP) on the computer system resulted in revision of the title making it easier to find using key words – 'PCC SOP' instead of 'Management of Bleeding and Management of Anticoagulation'

Next steps:

- Introduce fixed dose PCC in ED with audit of use
- Where possible, automated dispensing with appropriate SOP should be set up
- Instructions about using PCC should be clear and easy to locate; the product should be easily accessible

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15 Near Miss (NM) Reporting n=1408

This overview page covers all NM cases – including 899 wrong blood in tube, and 509 reports in other NM categories.

Author: Vera Rosa

Key findings:

- NM events continue to be the largest category reported to SHOT even though there was a slight decrease from 2023
- A substantial increase (>25%) of NM events in the incorrect blood component transfused (IBCT) and right blood right patient (RBRP) categories
- There were 203 potential ABO-incompatible (ABOi) red cell transfusions if the error had not been identified prior to transfusion

Gaps identified:

- Failure to follow a standard operating procedure (SOP) or policy were seen in many cases
- Lack of sustained changes in practice
- Patients not identified at phlebotomy and samples labelled away from the patient continue to be the most common reasons reported for WBIT
- Interruptions during sample taking and labelling resulted in errors
- Gaps in knowledge, ineffective training, mismatch between staff and workload, high-pressured work environments, and team function issues were the most common contributory factors

Good practice:

- More than half of NM events were detected during pre-administration checks
- Evidence of increased review of cases by hospital transfusion teams
- Most WBIT (84.2%) were identified during the laboratory testing or at authorisation of results, showing the importance of a sample check for confirmation of the blood group
- Most cases were, or were planned to be, reviewed at transfusion team meetings including, hospital transfusion team meeting or equivalent (95.4%)
- In 95 WBIT cases the error was identified in the clinical area, and laboratory staff were promptly informed

Next steps:

- Ensure that documentation and policies are clear and simple to follow to avoid confusion, misinterpretation and/or incorrect practice
- Where human factors and/or systemic errors are identified, an action plan with achievable measures and deadlines should be agreed
- Sample taking and labelling should be a single continuous process carried out beside the patient

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Right Blood Right Patient (RBRP) n=278

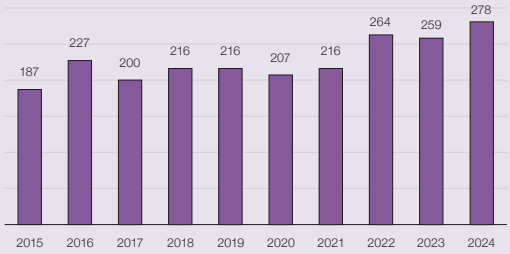
16

Authors: Caryn Hughes, Nicola Swarbrick, and Victoria Tuckley

Headline data 2024

Number of reports n=278
Deaths n=0
Major morbidity n=0

RBRP reports by year



Demographic data

Male n=144
Female n=128
Unknown n=6

Adults n=261
Paediatric n=16
Unknown n=1

Blood component data

Red cells n=237
Platelets n=14
Fresh frozen plasma (FFP) n=4
Cryoprecipitate n=2
Multiple components n=21

Key findings:

- The number of RBRP events have increased in 2024
- Errors with patient demographic details, in the laboratory and clinical settings, accounted for 62.6% of all RBRP errors
- Sample taking accounted for 46.6% of the errors in the clinical areas and component labelling errors made up 56.9% in the laboratory
- The number of laboratory near miss (NM) RBRP errors increased considerably in 2024, with the majority being component labelling errors

Gaps identified:

- Positive patient identification (PPID) processes not being undertaken at critical steps in the transfusion process
- Pre-transfusion checklists being used as a 'tick box' exercise rather that the last opportunity to detect errors
- Errors may have been detected in 97.2% of laboratory cases with the effective use of a laboratory exit check

Good practice:

- Human factors principles were applied during incident investigations in 80.9% of cases
- In NM RBRP, 73.6% errors were detected at the pre-administration checks, with 67.2% using a formal pre-administration checklist

Next steps:

- Consistent use of safety checks, such as laboratory exit checks, collection checks and the consistent use of pre-administration checklists should be embedded throughout the transfusion pathway

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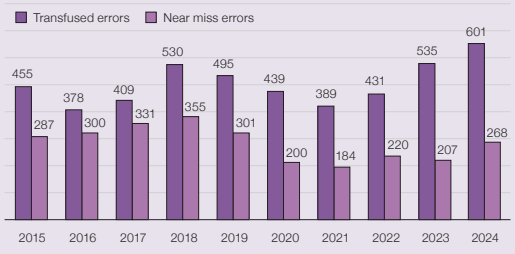
17 Laboratory Errors n=869 (601 transfused errors and 268 near miss)

Authors: Victoria Tuckley, Nicola Swarbrick, Pete Baker and Heather Clarke

Headline data 2024

Number of reports n=869
Deaths n=3
Major morbidity n=4

Laboratory reports by year



Key findings:

- Overall increase in cases (transfused errors and near miss (NM)) with a large increase in laboratory delays adversely impacting patient management
- An increase in the number of deaths, all due to laboratory delays
- ABO-incompatible (ABOi) plasma transfusions continue to be reported
- Most laboratory errors occur at the testing step

Gaps identified:

- Worsening knowledge gaps in laboratory staff were evident in many cases
- Inadequate staffing levels and skills to match workload and distribution between shifts
- Communication between the laboratory and clinical area
- Inadequate functionality or configuration in laboratory information management systems (LIMS) allowing inappropriate electronic issue
- Delays in timely provision of blood components in urgent and emergency situations including failure to use concessionary release when appropriate

Good practice:

- Fewer errors reported at the component selection and handling and storage steps
- Over half of reports stated implementation of a component exit check (54.4% in 2024, up from 47.1% in 2023)
- Please see Chapter 5, Acknowledging Continuing Excellence in Transfusion (ACE), Case 5.2 in Table 5.1 for a description of the laboratory and clinical area collaborating to ensure timely provision of blood components for a patient with complex antibodies

Next steps:

- A 'back to basics' approach should be taken when reviewing training materials to ensure staff have the essential knowledge and skills to carry out routine and non-routine tasks
- Business continuity plans (BCP) should be regularly reviewed, updated and followed. These should cover various scenarios to ensure resilience

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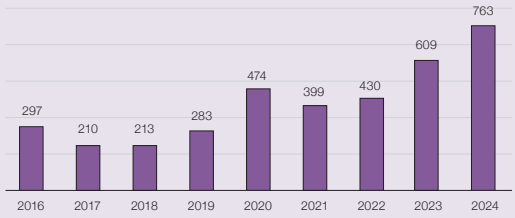
Errors Related to Information Technology (IT) n=763

Authors: Jennifer Davies and Megan Rowley

Headline data 2024

Number of reports n=763
Deaths n=2
Major morbidity n=7

IT-related cases by year



Key findings:

- Reports of IT-related errors to SHOT are rising each year
- This trend reflects both the increased use of IT systems and growing awareness of their role in supporting safe clinical practice
- There is a growing dependence on IT in both clinical and laboratory environments to enhance safety and efficiency

Gaps identified:

- IT systems not configured correctly and/or lack of algorithms in IT to support safe practice
- Ineffective training for staff using new IT systems leads to errors
- Alerts and warnings not heeded
- Manual downtime processes may not be effective in preventing error
- Failure to consider human factors and ergonomics when implementing IT systems

Good practice:

- Near misses (NM) detected by electronic systems used as part of pre-administration checks
- IT identified as an improvement action in incident investigations
- Laboratory information management systems (LIMS) being upgraded and networked to meet changing delivery of healthcare

Next steps:

- There is a need for critical function standards for IT systems, including LIMS, electronic blood management systems (EBMS) and electronic patient records (EPR)/order communications to reflect available national guidelines
- Consideration of human factors and ergonomics principles during all stages of implementation to ensure optimal use of the IT systems

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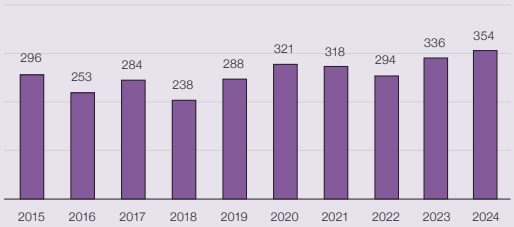
19 Febrile, Allergic, and Hypotensive Reactions (FAHR) n=354

Author: Catherine Booth

Headline data 2024

Number of reports n=354
Deaths n=0
Major morbidity n=113

FAHR reports by year



Demographic data

Male n=158
Female n=196
Adults n=308
Paediatric n=46

Blood component data

Red cells n=192
Platelets n=121
Fresh frozen plasma (FFP) n=20*
Solvent-detergent FFP n=1
Granullocytes n=4
Cryoprecipitate n=2
Multiple components n=14

1 FFP case also involved SD-FFP

Key findings:

- An increase in reports in 2024 – the highest number in 10 years
- Particular increase in reactions to pooled platelets (febrile and allergic)
- One third of patients with febrile reactions were treated inappropriately with antihistamine and/or steroid
- Red cell serological investigations were commonly performed unnecessarily (for allergic reactions or reactions to platelets/plasma)

Gaps identified:

- Lack of knowledge amongst clinicians about appropriate classification and targeted management and investigation of FAHR reactions
- Laboratory staff not empowered to challenge inappropriate requests for investigation

Good practice:

- Inappropriate use of antihistamine and/or steroid for febrile reactions reduced in both 2023 and 2024

Next steps:

- Check out the new SHOT Bite on appropriate investigation of febrile, allergic, and hypotensive reactions

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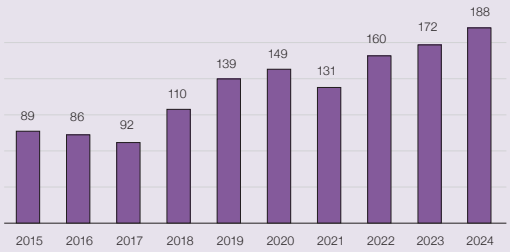
20a Transfusion-Associated Circulatory Overload (TACO) n=188

Author: Sharran Grey

Headline data 2024

Number of reports n=188
Deaths n=31
Major morbidity n=32

TACO reports by year



Demographic data

Male n=91
Female n=97
Adults n=184
Paediatric n=4

Blood component data

Red cells n=162
Platelets n=4
Plasma n=3
Granulocytes n=1
Cryoprecipitate n=2
Multiple components n=16

Key findings:

- TACO-related mortality has doubled for the second consecutive year
- TACO-related major morbidity has increased by more than 50% compared to 2023
- Unnecessary/avoidable and overtransfusion is a factor in around 25% of reported TACO cases in 2024
- The release of the TACO National Patient Safety Alert (NatPSA) may have contributed to the increase in the numbers reported

Gaps identified:

- The cause of anaemia not identified and hence unable to establish the indication for transfusion which informs the appropriate dose of red cells
- Cases continue to be reported where the TACO pre-transfusion risk assessment was not used, or risk mitigation measures were not instituted appropriately despite the identification of risks

Good practice:

- Evidence of structured investigation following TACO
- Continued implementation of the TACO pre-transfusion risk assessment into paper and electronic systems

Next steps:

- Promotion of the updated TACO pre-transfusion risk assessment (Figure 20a.1) and associated supporting tools (Figures 20a.3)
- Addressing unnecessary/avoidable and overtransfusion is a key element of TACO risk reduction and has been added to the TACO pre-transfusion risk assessment as a mitigation measure

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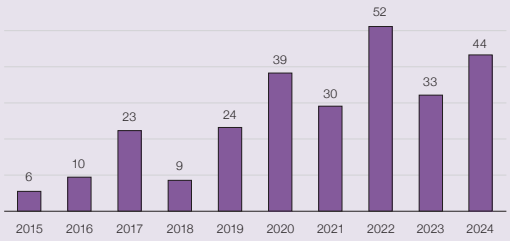
20b Pulmonary Complications of Transfusion: Non-TACO n=44

Author: Tom Latham

Headline data 2024

Number of reports n=44
Deaths n=4
Major morbidity n=9

Non-TACO reports by year



Demographic data

Male	Female	Adults	Paediatric
n=21	n=23	n=44	n=0

Blood component data

Red cells n=33
Platelets n=3
Fresh frozen plasma (FFP) n=1
Granulocytes n=1
Multiple components n=6

Key findings:

- Excessive fluid contributed to 48% of cases but did not meet transfusion-associated circulatory overload (TACO) criteria
- There was 1 case of antibody-mediated transfusion-related acute lung injury (TRALI)
- At least three comorbidities were identified to have contributed to the reaction in almost 50% of the cases. Hypoxia or raised respiratory rate were identified prior to transfusion in 64% of the cases
- There was 1 case of TRALI following granulocyte transfusion

Gaps identified:

- Insufficient information available to apply international criteria meant that 38% of cases were classified as transfusion-associated dyspnoea (TAD)
- No significant concordance between identification of TACO risk and presence of fluid risks

Good practice:

- Improved rate of TACO pre-transfusion risk assessment completion (66% vs 33% in 2023)
- Diuretic was given in response to reaction in 81% of cases where fluid overload was thought to be likely
- Structured TACO investigation was used in 40% of reports and identified areas for improvement in 71% of cases

Next steps:

- Ensure recommendations from the National Patient Safety Alert: Reducing risks for transfusion-associated circulatory overload (NatPSA/2024/004/MHRA) are fully implemented

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Haemolytic Transfusion Reactions (HTR) n=51

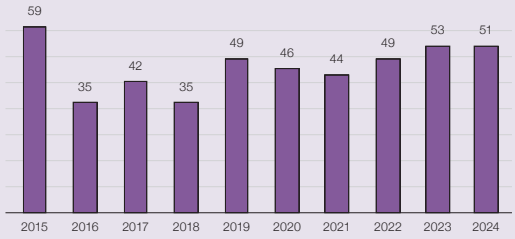
21

Authors: Tracey Tomlinson and Anicee Danaee

Headline data 2024

Number of reports n=51
Deaths n=3
Major morbidity n=14

HTR reports by year



Demographic data

Male n=24
Female n=27
Adults n=45
Paediatric n=6

Blood component data

Red cells n=51
Platelets n=0
Plasma n=0
Multiple components n=0

Key findings:

- The number of HTR cases reported to SHOT each year remain stable
- Antibodies to the Kidd blood group system (anti-Jk^{a} and anti-Jk^{b}) are most commonly implicated in causing delayed HTR
- Most cases of hyperhaemolysis were reported in patients with sickle cell anaemia

Gaps identified:

- Incomplete investigations in patients with suspected HTR
- Direct antiglobulin tests (DAT) and elution studies on the post-transfusion sample are inconsistently performed making it difficult to distinguish between a HTR and haemolysis due to other causes
- Partial information submitted to SHOT makes it difficult to assess the effectiveness of the various treatment options available to manage hyperhaemolysis

Good practice:

- Lifesaving transfusions were provided even in the absence of suitable antigen-negative blood. In urgent clinical situations where suitable components are not available it may be necessary to transfuse red cell units which are positive for a confirmed antibody. Where this occurs the patient must be closely monitored for signs of a HTR

Next steps:

- Adequate and thorough laboratory investigations should be carried out in patients with suspected HTR
- Relevant information should be provided to SHOT to facilitate effective analysis

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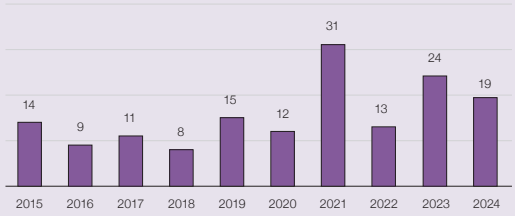
Uncommon Complications of Transfusion (UCT) n=19

Authors: Caryn Hughes and Shruthi Narayan

Headline data 2024

Number of reports n=19
Deaths n=1
Major morbidity n=1

UCT reports by year



Demographic data

Male n=11
Female n=8
Adults n=13
Paediatric n=6

Blood component data

Red cells n=12
Platelets n=4
Plasma n=0
Granulocytes n=1
Multiple components n=2

Key findings:

- Fewer cases reported compared to 2023
- Incomplete details provided in reports impact on analysis and inferences

Gaps identified:

- Lack of early recognition of symptoms suggestive of possible transfusion reactions and prompt reporting and communication to the transfusion laboratory
- Poor vital sign monitoring of patients receiving transfusions
- Organisations lacked defined processes for reporting, reviewing, and trending uncommon complications of transfusion
- Learning from these events is not always evident from reports

Good practice:

- In some cases, there were clear actions taken by hospital transfusion committees to address poor practice
- An unusual cluster of reactions was identified and escalated appropriately by the organisation

Next steps

- Reporters are encouraged to continue to report cases with atypical reactions to transfusion. This will help gain a better understanding of these complications, identify risk factors, and develop risk-reduction strategies

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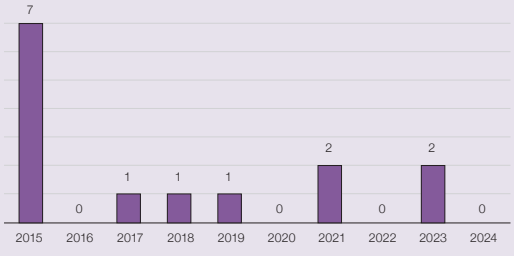
23 Transfusion-Transmitted Infections (TTI) n=0

Authors: Tali Yawitch, Katy Davison and Su Brailsford

Headline data 2024

Number of reports n=0
Deaths n=0
Major morbidity n=0

Confirmed TTI recipients by year



Key findings:

- No confirmed TTI were reported in 2024
- Two bacterial near miss cases were reported in 2024

Gaps identified:

- Bacterial transfusion transmitted infections are rare due to the mitigations in place such as bacterial screening of platelets however, colleagues are encouraged to check for visually abnormal units and remain alert for transfusion reactions

Good practice:

- Visual inspection of blood component packs by vigilant staff at various steps in the transfusion pathway have helped to reduce TTI
- The United Kingdom (UK) Blood Services store a sample from every blood donation for at least 3 years, allowing testing of these samples if a TTI is suspected
- Use of SHOT data to inform policy and prompts necessary changes to improve safety
- The UK Blood Services continuously monitor infection rates in donors to maintain a safe supply of blood components

Next steps:

- All suspected TTI should be reported for investigation, even though confirmed or probable TTI are rare
- Hospitals are encouraged to report suspected TTI when there are no other obvious risks
- The consultant microbiologist, virologist, and/or other infectious disease experts should be consulted to confirm the diagnosis of a suspected TTI
- Once confirmed, the suspected TTI should be reported to the appropriate UK Blood Service for further investigation

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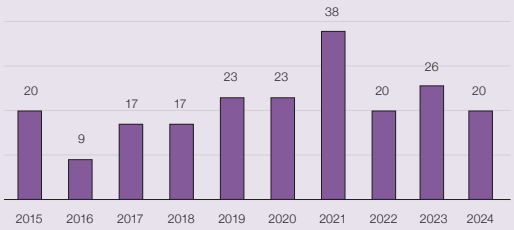
24 Cell Salvage (CS) n=20

Authors: Sarah Haynes and Rebecca Elder

Headline data 2024

Number of reports n=20
Deaths n=0
Major morbidity n=0

CS reports by year



Demographic data

Male n=11
Female n=9
Adults n=18
Paediatric n=2

Blood component data

Red cells n=20
Platelets n=0
Plasma n=0
Multiple components n=0
Other n=0

Key findings:

- There are fewer reports in 2024, suggesting under-reporting
- Avoidable procedural errors were the most reported incidents. Many of these represent themes that recur annually. Of the 20 incidents submitted, only 1 led to a change in practice
- Hypotension represents the most frequently reported adverse reaction, and not always associated with the use of a leucocyte depletion filter (LDF)

Gaps identified:

- Issues with labelling of the cell salvage reinfusion bag with incorrect patient identifiers
- Inadequate training of staff involved in cell salvage
- Lack of foresight and planning for elective cell salvage use in high-risk patients

Good practice:

- One procedural error was managed proactively through a change in practice with a safety briefing and introduction of a second check designed to prevent recurrence
- All machine/disposable malfunctions were recognised early, and the appropriate corrective actions undertaken to minimise impact on the patient
- Hypotensive reactions to salvaged red cells were recognised promptly and dealt with effectively, minimising complications

Next steps:

- Review current training needs and ensure that trained operators are available. Staff members should recognise the limits of their own sphere of competency and ask for help or retraining where there is unfamiliarity with processes and procedures
- Adequate, proactive planning of the use of cell salvage for elective surgeries in high-risk patients should be included early on in the surgical pathway

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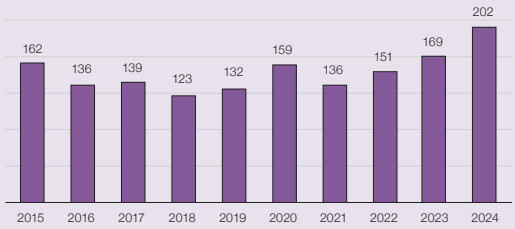
Paediatric Cases n=202

Author: Anne Kelly

Headline data 2024

Number of reports n=202
Deaths n=2
Major morbidity n=25

Paediatric cases by year



Key findings:

- A large proportion of paediatric reports to SHOT were in infants <1 year
- Febrile, allergic, and hypotensive reactions (FAHR) continue to be a significant cause of morbidity in children

Gaps identified:

- Prescribing errors due to knowledge gaps around blood component prescribing. Protocols do not always consider the nuances for different patient groups such as those with sickle cell anaemia and neonates
- Transfusion-associated circulatory overload (TACO) may be under-reported in paediatrics due to difficulties in recognition

Good practice:

- Multi-disciplinary team meetings between clinical and scientific staff from Blood Services and hospitals facilitate timely management of complex cases
- The identification of a donor with pseudohyperkalaemia following a high potassium result in a blood component. This is an excellent example of the impact of transfusion research on direct patient care

Next steps:

- Ongoing education in the correct prescribing of blood components for infants and children is vital

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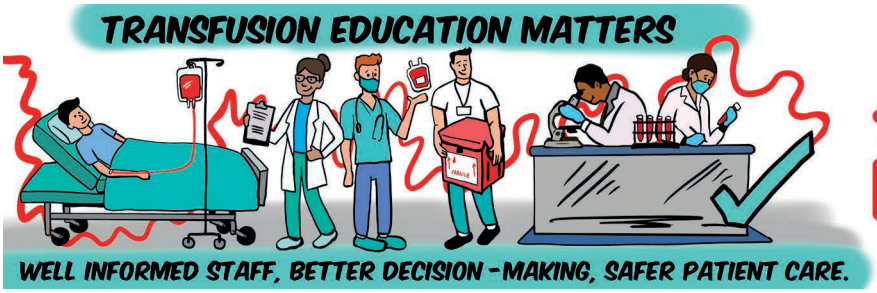


SHOT
Serious Hazards of Transfusion

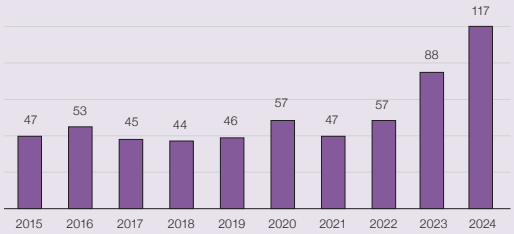
26 Haemoglobin Disorders n=117

Author: Joseph Sharif

Headline data 2024

Number of reports n=117
Deaths n=3
Major morbidity n=14

Haemoglobinopathy cases by year



Key findings:

- The number of reports related to haemoglobin disorders have increased year-on-year
- Haemolytic transfusion reactions (HTR) are a particular problem in patients with sickle cell disease (SCD) and make up a significant proportion of all HTR reported to SHOT
- There were 3 deaths following HTR, all were in patients with SCD
- Reports of febrile, allergic, and hypotensive reactions (FAHR) more than doubled in 2024
- Cases of specific requirements not met (SRNM) continue to be reported

Gaps identified:

- Lack of awareness among healthcare professionals regarding the significant risks associated with transfusion, particularly in SCD
- Advice from haematologists specialising in SCD is not always sought prior to transfusion decisions
- National guidance is not always adhered to as demonstrated by examples of unnecessary and unclear indications for transfusion

Good practice:

- It is encouraging to see an increasing trend in reports received in this category as under-reporting continues to be an issue

Next steps:

- Haematology teams must be involved in the management of haemoglobinopathy patients presenting to secondary care and be consulted regarding transfusion decisions
- All haemoglobinopathy patients should have a baseline extended red cell phenotype or genotype prior to transfusion
- It is important to gain a full transfusion history from the patient and inform the transfusion laboratory when patients present to an unfamiliar hospital. The national database (Specialist Services Integrated Clinical Environment (Sp-ICE) or equivalent) should be checked, and the patient's base hospital transfusion laboratory asked for previous transfusion records

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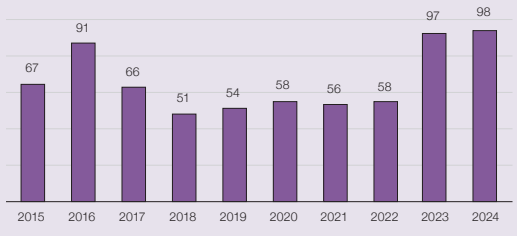
27 Transfusion Errors in Transplant Cases n=98

Authors: Jennifer Davies, Vera Rosa and Shruthi Narayan

Headline data 2024

Number of reports n=98
Deaths n=0
Major morbidity n=0

Transplant cases by year



Key findings:

- Transfusion errors in transplant recipients continue to be reported
- While the total reports received were comparable to 2023, there was a change in the distribution of cases between near misses and errors resulting in an incorrect transfusion
- Incorrect blood component transfused-specific requirements not met (IBCT-SRNM) account for most of the reports

Gaps identified:

- Suboptimal information technology (IT) functionality
- Knowledge gaps and staff unfamiliarity with IT systems
- Complex systems leading to workarounds
- Transplant protocols not clearly detailing transfusion requirements and not communicated to all staff involved in patient care

Good practice:

- Formal investigations incorporating human factors analysis are being used for errors enabling identification of all contributory factors
- Sharing specific requirements with patients enables understanding and can prevent errors
- The number of near miss events reported relating to transplant recipients has increased suggesting errors are being picked up by controls in place

Next steps:

- Haemopoietic stem cell transplant (HSCT) protocols should include guidance on ABO/D compatibility for post-transplant transfusion practice and should be easily accessible
- Electronic patient record systems should include decision support for safe transfusions
- Laboratory information management systems (LIMS) should include rules for ABO/D compatibility for HSCT patients that cannot be overridden and is not reliant on notes or flags

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Immune Anti-D in Pregnancy n=68

Authors: Vera Rosa and Susan Robinson

Key findings:

- 68 cases were analysed by SHOT, 13 women or birthing people with no previous pregnancy (NPP) and 55 women or birthing people with previous pregnancies (PP)
- There were 94.1% live births and 43.8% of babies that required treatment for haemolytic disease of the fetus and newborn (HDFN)
- Data regarding multiple (>2) pregnancies and high body mass index (BMI) (>30) continue to be collected to assess their impact as contributory factors for D immunisation

Gaps identified:

- Omission or late administration of anti-D immunoglobulin (Ig) following potentially sensitising events (PSE) continues to be an identifiable risk factor for D immunisation
- Anti-D Ig may be less effective in preventing D immunisation in gestations beyond 40 weeks
- Lack of awareness or knowledge gaps resulting in missed reporting when two SHOT submissions are required: one report for D immunisation and one report for anti-D Ig administration error

Good practice:

- Correct management of pregnancy was identified in 55.9% cases reported to SHOT
- There was an increase of D immunisation cases reported to SHOT in 2024 compared to 2023, potentially suggesting a better awareness of the reporting requirements

Next steps:

- Cases of alloimmune anti-D found for the first time in pregnancy should be reported to SHOT, aiming to provide a complete data set after delivery
- Hospital transfusion teams and women's services to check the advice in guidelines, policies and reflex pathways regarding women or birthing people typed D variant is to assign a D-negative treatment pathway
- Systems should be in place to support women or birthing people with complex social situations who are less likely to report PSE resulting in inequitable care
- The British Society for Haematology (BSH) and the National Institute for Health and Care Excellence (NICE) should update their respective guidelines to address discrepancies to facilitate consistent practice and optimise safety

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