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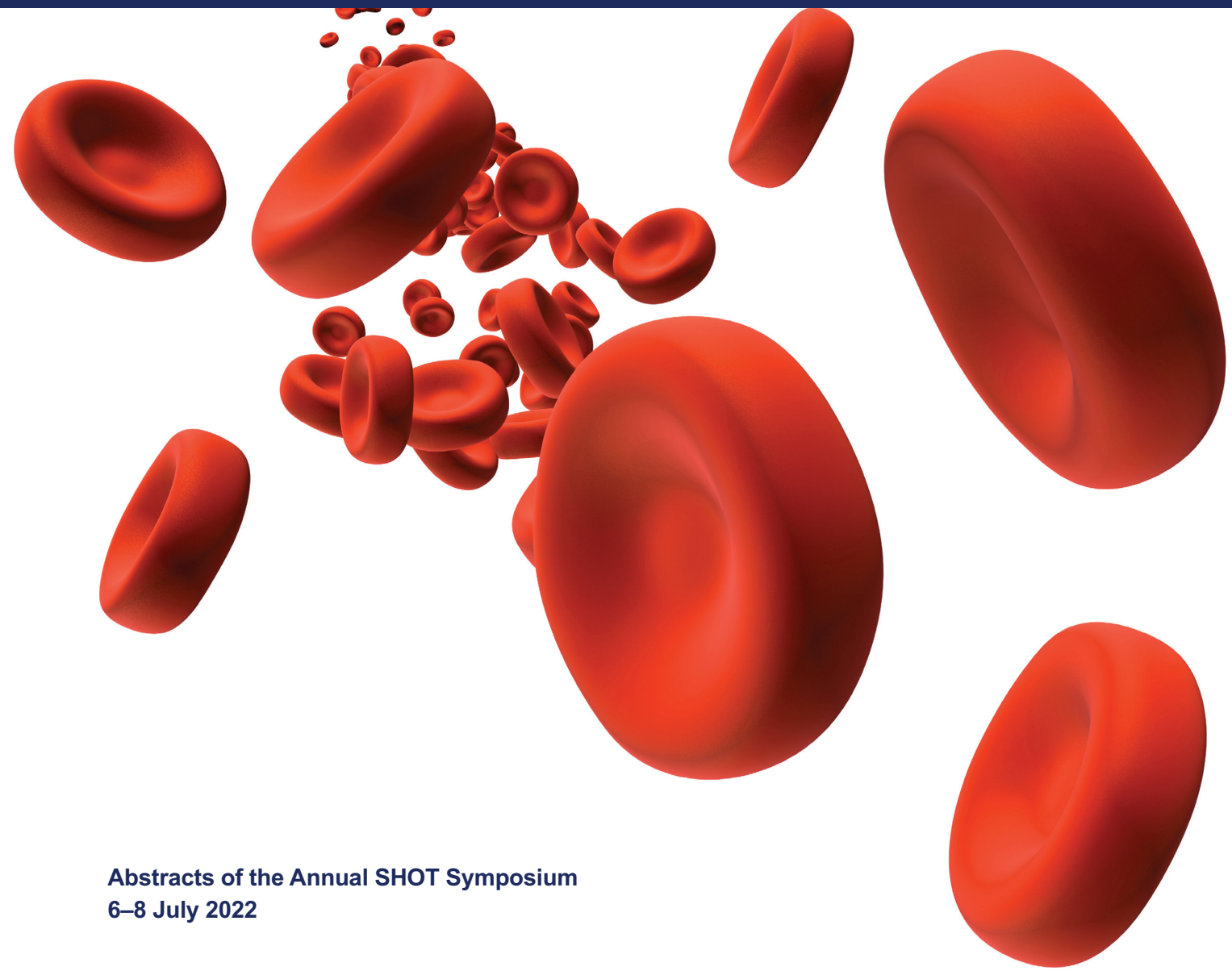

Abstracts of the Annual SHOT Symposium
6–8 July 2022

WILEY

British Blood Transfusion Society

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Transfusion Medicine

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ABSTRACT

Oral presentations

Integration of the TACO checklist into electronic blood prescription

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Background: TACO (transfusion associated circulatory overload) is a well-documented cause of mortality and morbidity in patients who require a blood transfusion. The rate of TACO in the UK continues to increase despite increasing awareness. The 2020 SHOT report identified that the pre-transfusion assessment checklist was only performed in 26.8% of patients who were reported to have TACO.

Cambridge University Hospitals (CUH) is a large UK, tertiary hospital with close to 30 000 units of red cells, platelets and frozen products issued every year. It uses a well-established unified electronic notes, results and prescribing system known as Epic. The TACO checklist was integrated into electronic blood prescriptions in June 2021 to improve the pre-transfusion assessment of TACO risk. This compulsory feature highlighted recent results that could indicate a risk of TACO to the practitioner at the time of prescription. To our knowledge, an integrated electronic blood prescription and TACO checklist has not been described in the literature. Here we present our experience of this intervention.

Method/ Study: All patients who had received a blood transfusion and had a TACO risk identified during June 2021–May 2022 were included in the study. Patients who had been reported to SHOT as having had an episode of TACO were evaluated further.

Results: In the period of June 2021–May 2022, 2599 patients received a transfusion in CUH, all of whom had the TACO checklist completed. Of these patients, 1115 were identified to have a risk of TACO. During this period, 6 cases of TACO had been reported to SHOT compared to 2 in the period of July 2020–June 2021 and 6 in July 2019–June 2020. Compared to previous years, almost all of the TACO cases in 2021–22 had an acknowledgement of TACO risk in the notes or identified by the checklist. This is an improvement to previous years where only 50% of patients had TACO risk acknowledged. In those who had TACO risk identified, only two had adjustments put into place. The incidences of TACO were more likely to occur in the acute setting particularly in the emergency department.

Conclusion: CUH has a higher level of pre-transfusion TACO assessment compared the national average as a result of incorporating the checklist into electronic blood prescriptions. It also appears to have increased TACO awareness in medical practitioners although further work needs to be done on improving TACO prevention interventions in those patients who have an identified risk.

Twenty-five years of surveillance and haemovigilance in Greece: The leading role of the coordinating haemovigilance centre and surveillance of transfusion (SKAEM) of the Hellenic public health organisation (EODY)

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Background: SKAEM, founded in 1995, was recognised in 2011 as the competent authority for haemovigilance in Greece. Working through 6 regional centres, its multidisciplinary team undertakes epidemiological surveillance of transfusion in the broader sense of the term within the National Health Organisation (EODY) and Ministry of Health infrastructure, in support of the National Blood Centre.

SKAEM's national epidemiological surveillance contributes to blood safety and quality by highlighting and preventing risks to the lives of transfused patients due to human errors and deviations from Good Practice Guidelines. All untoward adverse reactions (ARs) and events (AEs) in patients and donors are recorded, irrespective of severity, using standardised recording and reporting mechanisms.

We discuss trends in monitoring, reporting investigation, identification and analysis of ARs and AEs associated with blood transfusion and donation as well as blood-borne infections in the period 2010–2019.

Method/Study:

•Seroprevalence of mandatorily screened infections (HBsAg, anti-HCV, anti-HIV, anti-HTLV, syphilis) and molecular testing for HIV-RNA, HCV-RNA, HBV-DNA.
•Retrospective screening (look-back) and post-donation information.
•Transfusion–associated AR and AE, root cause analysis and post-transfusion information.
•Analysis of serious and "near-miss" AE.

Results: Infectious markers were detected in 9007 of 5 318 822 blood units tested (1:591). Recent years have seen a significant reduction of 8.5% in total seroprevalence: in particular, a 13% reduction of both HBsAg and anti- HCV, and a 10% reduction of anti-HIV but a 16% increase of anti-treponema antibodies. Prevalences in 2019 were HBsAg 1:678 blood units, syphilis 1:2319, anti-HCV 1:5199, anti- HIV

1:27832 and anti-HTLV 1:59143. Molecular testing showed 712 NAT-only positive cases in 5 318 822 units. Another 13% of Occult HBV cases were also detected. Look-back and post-donation information showed 15 probable cases of HBV transmission and 5 of HCV. No transfusion-transmitted HIV occurred in this period. Based on SKAEM's evidence, MSM donors are no longer permanently excluded from donating.

In 2010–2020, 14 transfusion-related deaths were reported (1:563861 units). Of 13 005 ARs (1:607), 8.4% were serious (1:7629), with febrile 43.7%, allergic 37%, and TAD 5.2% the most common. AR associated with respiratory-related symptoms—TACO, TAD, TRALI—represented 6.4% of all events (26% of serious).

Of 10 820 AEs related to 8 492 250 blood components processed (197/100000), 3% were serious (the European average is 2.8%), 27% "near misses" and 70% without serious consequences. Half (49%) fell under "Defective product"; 61.2% occurred in processing, 26.1% in blood collection, and 3.7% in storage. Implementation of patient identification systems has steadily reduced the frequency of transfusion of the wrong blood component.

In 2020, 5006 AR and AE were reported in donors of 407 631 blood units (1:82). Severe reaction was rare ($n = 20$), but at higher incidence (1:20381) than previously. Most reactions were vasovagal (69%). Reactions were much more frequent (1:25 units) In plateletpheresis than whole blood donors, almost entirely related to citrates. Rare AR, such as cardiovascular events, were not observed.

Conclusion: Twenty-five years of haemovigilance in Greece demonstrate coordinated progress towards better quality and safety in blood donation and transfusion. However, the prevalence of TTIs in donors remains relatively high.

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ABSTRACT

Poster Presentations

Automated data recording of adverse events by apheresis collection through electronic device connectivity

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Background: At the Blood and Tissue Bank of Navarra, Spain apheresis collections of donors platelets and/or plasma is performed using the Trima Accel system, version 7 (TA7). The device at this site is supported by TOMES 7 (TOMES) which is a dedicated software system that enables the centralized data as well as workflow management of connected devices. The purpose of this investigation was to demonstrate the TOMES/TRIMA capability to collect donor's safety data at the time of blood component collection.

Method/Study: TOMES Info events had been configured for automated and electronic record of adverse events. TA7operators had to answer 6 questions at the end of each run by selecting one of the preconfigured answering options directly on the TA7 screen. TOMES' view configured and exported in a. CSV format for further analysis.

Results: A total of 1765 operator's questionnaires, from 01.02.2021 until 31.01.2022 were analyzed. Seventy-three percent of the runs targeted platelet and concurrent plasma collections, the remainder 23% runs were dedicated to plasma only collections. In 85% of the runs, calcium was prophylactically given to the donors; in only one case calcium was given therapeutically to a platelet donor (0.06%). The most prevalent adverse events were nausea and vomiting, moreover one single case of loss of consciousness was reported to a plasma donor, which reached 0.23% and 0.06%, respectively. Among technical events, device failures were caught at an incidence of 0.51%, defective disposable at 0.28%, open circuit at 0.11% and operator's mistake at 0.06%.

Conclusion: Monitoring donor's adverse events is a very important contributor to a robust blood collection surveillance system. The combination Trima/TOMES offers a very efficient, simple and paperless system that enables operators to document adverse reactions immediately at the collection site. With that, blood centers can easily establish baseline reaction rates, identify risk factors and assess the impact of mitigation strategies as these are implemented.

Specific requirement forms – Audit of turnaround times for forms to be available for bedside checklist

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Background: The yearly SHOT report highlights the number of incidents where incorrect blood components are transfused where the patient's specific requirements are not met, the reasons for the failures include lack of knowledge of the requirement, poor communication through shared care and clinical electronic systems not being updated. As a multisite organisation, in November 2020 we implemented a new pathway to ensure that all forms were available electronically on the patient records (Cerner), setting the standard that laboratory and clinical staff would turnaround the forms within 24 h (Monday–Thursday) 72 h if form received on Friday. Outside of routine working hours it was agreed that a copy of the specific requirement form would be sent with any component issued to prevent any compromise in patient care.

The aim was to

1. Identify the turnaround time for laboratory to update LIMS on receiving the form from clinical staff.
2. Identify the turnaround time for admin staff to upload form onto Cerner to enable clinical team to review as part of bedside checklist.

Method/Study

1. All the specific requirements forms sent to the laboratory were reviewed for 1 month, 1 year after implementation of the pathway.
2. All email trails from generic laboratory to generic secretary email were accessed to assess timeframes of turnaround.
3. Date form available on patient electronic records 'Cerner' reviewed to assess when first available for bedside check.

Results: Between 4th–25th November 2021, 46 forms were received with a total of 19 diagnoses. There were 5 types of specific requirements stated—irradiated (21), CMV neg (2), allo SCT (1), auto SCT (2), HLA/HPA (1), with 19 not stating specific requirement. This information was updated onto LIMS on the same day for all, with a 1-day delay for one UABD file. There was a wide range of diagnosis with 15 patients having joint care with 13 other hospitals. Most forms were received Monday (11), Wednesday (10) and Friday (8). The number of days taken by the laboratory to send form to secretaries; 9 on same day, 14 took 1 day, 13 took between 2–7 days, 8 took 8–14 days and 2 took 15 days. Twenty-four forms were delayed due to batching by BMS and sent to secretaries on 17th November, all were

subsequently available on Cerner the next day. The secretaries loaded the forms on to Cerner within 24 h in 41 cases, the remaining 5 were done within 3 days.

Conclusion: The LIMS was updated on the same day for all 46 forms. There was delay in laboratory staff emailing forms to secretaries with batching of 24 forms, these were subsequently available on the electronic records within 24 h. The laboratory did not meet the standard of turnaround times of 24 h (Monday–Thursday), 72 h if form received on Friday. Further staff training in the laboratory is needed to prevent this. A limitation of the audit was the inability to assess forms given to clinical staff with products out of routine hours and at weekends.

Decoding a difficult diagnosis – Developing an anaemia e-learning programme for primary and secondary care

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Background: Anaemia affects 22.8% of the population, or 1.74 billion people globally,[1] commonly linked to poor quality of life, developmental delays and reduced economic productivity.

Causes and symptoms of anaemia are diverse, highlighting the importance of healthcare professionals (HCPs) understanding disease presentation for early diagnosis and appropriate treatment.

Delayed diagnosis and treatment may result in avoidable red cell infusion, introducing transfusion-associated risks, potentially increasing infection risk or a patients' length of hospital stay.

The objective was to develop a foundation programme of anaemia e-learning to support HCPs in primary and secondary settings to increase knowledge, thus supporting improved patient care and outcomes.

Method/Study: Engagement with stakeholders to understand users' needs identified three specific areas to address: basic understanding of anaemia and causes; and identification and management of anaemic patients in primary and secondary care.

The team agreed that the e-learning should aim to provide:

- Increased awareness of anaemia and its effects on the patient population.
- Understanding of key opportunities to identify anaemia.
- Understanding of processes for identification, investigation, and referral.
- Understanding of treatments, awareness of secondary care pathways and iron clinics, follow-up and longer-term monitoring.
- Knowledge of when urgent appropriate action or referral should be made.
- Confidence in understanding management of anaemia in their patient group.

Three e-learning modules were designed to meet these objectives, with assessments to consolidate learning:

Module 1: "Anaemia: The only introduction you need"—Designed as a baseline for both primary and secondary HCPs, this provides the theory to develop a good understanding of anaemia, a refresher session on erythropoiesis, what can go wrong, and why.

Module 2: "Anaemia in primary care patients"—Principally written for advanced care practitioners in general practice, with relevance to all nurses and junior medical staff, this describes key interventions for identifying and managing anaemia in primary care patients.

Module 3: "Anaemia in hospital patients"—Primarily written for junior doctors, nurses, and nurse practitioners, this provides further explanation of why hospital patients may be anaemic, diagnostic tests, and treatment options.

Results: The e-learning launched in March 2021 on three platforms: e-learning for healthcare (e-lfh); Electronic Staff Record; and the Hospital and Sciences website.

The largest uptake was seen on e-lfh, with 5732 sessions launched up to June 2022. Of these, 2284 modules were completed:

Module 1: 1138 completed sessions, Rated 4.6/5, 69% gave a 5-star rating.
Feedback: "Really informative and well presented".
Module 2: 919 completed sessions, Rated 4.6/5, 60% gave a 5-star rating.
Feedback:" Made lots of notes and learnt loads".
Module 3: 291 completed sessions Rated 4.4/5, 47% gave a 5-star rating.
Feedback: "Appropriate level of content for Advanced Care Practitioners but not doctors who should be familiar with anaemia from med school".

Conclusion: Developing education to aid identification and management of anaemic patients supports HCPs to optimise patient care, reducing anaemia-associated risks, and inappropriate transfusion. High uptake demonstrates the need for anaemia education, suggesting a demand for additional specific anaemia sub-groups resources to help further decode this difficult diagnosis.

1. Gardner W, Kassebaum N. Global, regional, and national prevalence of anaemia and its causes in 204 countries and territories, 1990–2019. Curr Develop Nutr 2020;4(Suppl. 2):830. https://doi.org/10.1093/cdn/nzaa053_035

Anaemia in whole blood donors: Summary of French 2021 data

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ANSM/France

Background: Anaemia are potential adverse reactions that may occur following a whole blood donation (WBD).

In male and female (non-pregnant), Anaemia are defined into 3 categories according to the WHO classification. The donation haemoglobin (Hb) is measured in blood donation laboratory testing (BDLT) and performed on a blood donor sample collected prior to the WBD. The average loss of Hb after WBD is estimated around 1.0 g/dl. Anaemia are therefore classified in 3 grades: 1, mild, 2, moderate and 3, severe.

The purpose of this study is to analyse the above-mentioned grade 2 and 3 Anaemia reported in 2021 to identify donors at risk of developing Anaemia.

Method/Study: The data collected between 01/01/2021 and 31/12/2021 were transmitted by the national blood service (EFS).

Quarterly, for each region, the ANSM receives the number of WBD, distributed by gender and donor status (first time donor [FTD] or repeat donor [RD]) and the number of WBD in which an Anaemia was detected.
For grade 2–3 Anaemia, the list of data collected predefined between ANSM and EFS, is for each WBD:

- the gender, age, body weight and height, body mass index (BMI) and status of the donor,
- pre-donation Hb of donor (capillary and venous), if available and Hb of BDLT,
- the interval between this WBD (donation N) and the previous donation (donation N-1),
- the WBD volume collected.

Results: 2400485 WBD were collected in France in 2021. More than 90% of donations come from RD and the distribution by gender is globally similar. An Anaemia of grade 1 was detected in 18.6% of the WBD. 62 923 grade 2 or 3 Anaemia were reported among the total WBD collected (2.6%).
WBD showing Anaemia grade 2–3 occurred mainly in female (79.0%) and female RD (74.6%). The average age is around 37 y/o for females, versus 48 for males. The averages calculated for each selected criterion made it possible to draw up the profile of the donor at risk of developing grade 2–3 Anaemia. The incidence of grade 2–3 Anaemia in France is 2621 per 100 000 WBD. This incidence is higher for females (4120) than for males (1105). The incidence of grade 2–3 is higher for the 3 regions of French overseas departments (incidence 4245–5809).
Grade 2 Anaemia represent 99.96% of the grade 2–3 reported. Only 22 grade 3 Anaemia occurred (21 in females and 1 in males) and 3 of them required transfusion.
Conclusion: The analysis of grade 2–3 Anaemia reported in 2021 shows disparities between regions of blood collection in terms of incidence and donor gender. Among these Anaemia reported, the grade 2 represent almost all of the reports; grades 3 being situations that rarely occur in WBD.
It will be interesting to continue this analysis in 2022 in order to confirm if these differences are proven, if they result from regional particularities and if the preventive measures implemented in 2022 allow the mitigation of the risk.

A quality improvement project: Improving the process for patients found to have antibodies on group and save before major elective surgery

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Background: Late detection of atypical red cell antibodies in patients admitted for major elective surgery can lead to unavailability of suitable blood products and cancellation of operations on the day. This study aims to assess the scale of the problem and generate a protocol that connects our pre-assessment team, the surgeons, and our blood laboratory to reduce the incidence of cancellations and improve the patient journey and health outcomes.

Method/Study: We completed a 4-month retrospective data collection of adults having major elective surgery to assess the cancellation rate due to non-availability of blood products. As part of our qualitative data collection, we surveyed our anaesthetic department to get a wider picture of the issue and the time spent dealing with it. We are implementing a multi-disciplinary team protocol to improve the communication between teams to help the blood laboratory prepare blood for a patient's surgery date.
Results: From August to November 2019, 55 surgical patients with atypical antibodies were selected for this study. Of these, 8 patients had their operations cancelled, with 2 cancelled solely due to non-availability of blood products on the day of surgery. Our survey found that 88% of anaesthetists in our department have encountered patients on their list with atypical antibodies with no blood products ready. 30% of these answered that it led to a cancelled operation and 94% of these anaesthetists have spent time trying to resolve the problem.
Conclusion: Our study so far has highlighted a lack of communication between the surgical teams, pre-assessment and our laboratory which leads to unnecessary cancellations of elective patients, some of whom are undergoing surgery for cancer. We will continue prospective data collection with the new protocol in place and remain interested in learning from other units and their processes in dealing with this problem.

Home-based transfusion in the Netherlands

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Background: TRIP registers reports concerning transfusion reactions and incidents in Dutch hospitals and also collects annual figures on transfusions, with the aim of increasing patient safety. In 2021, home-based blood transfusion was discussed at several conferences in the Netherlands as well as internationally. In order to gain more insight into the scope and organisation of transfusion outside the hospital, TRIP collected extra information on current practices in the Netherlands.
Method/Study: In addition to the requested annual data on blood use, hemovigilance officers in all Dutch hospitals were sent a questionnaire about the implementation of planned transfusions outside the hospital in 2021. The questionnaire included items about the number of transfusions administered and the location of transfusion outside the hospital, eligible patients, tasks and responsibilities and the course of action in the event of transfusion reactions.
Results: Fifty-two hospitals responded to the questionnaire (64% = 52/81), including 3 university hospitals. In 2021 these 52 hospitals were responsible for approximately 65% of red blood cell (RBC) transfusions in the Netherlands (254 660/391 075 units).

Twenty-four institutions (46% = 24/52, 32% of RBC transfusions nationwide) indicated that they facilitated transfusions outside the hospital. This amounted to a total of 1734 RBC units (0.7%, 1734/254 660) and 125 platelet concentrates; out-of-hospital platelets were administered only by three hospitals. Thirteen of the 24 hospitals issued fewer than 10 units for home-based transfusion in 2021. The median number of RBCs administered out of hospital by the 24 facilitating institutions was 3 (IQR 0–46). Most of the hospitals that facilitated home-based transfusion limited this service to palliative patients and/or patients with restricted mobility. Four hospitals extended this service to patients who had previously been transfused in daycare or to any patient wanting this service; these four hospitals performed the largest numbers of home-based transfusions in 2021.

Of the 28 hospitals that did not facilitate out-of-hospital transfusion, four planned to do so in the future and 14 had discontinued this service. The 24 hospitals that did not facilitate transfusion outside the hospital stated that the most important considerations were: little or no demand (11×), difficulty in assigning medical responsibility (5×), insufficient quality safeguards (6×) and problems with costs and/or logistics (5×).

Conclusion: Overall a small percentage of transfusions (0.7%) was administered outside the hospital by survey responders in 2021. Hospitals differ in policy regarding planned transfusions outside the hospital. Among hospitals that do not facilitate transfusions outside the hospital, there were concerns about responsibility and quality assurance. More research is needed into the assurance of competence and best practices for implementation. Questions remain about staff training and revalidation in the necessary competencies.

Evaluating the impact of root cause analysis (RCA) tools to help hospital transfusion teams investigate wrong blood in tube (WBIT) incidents

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Background: Wrong blood in tube' (WBIT) incidents occur when blood samples are taken from the intended patient but labelled with incorrect details, or taken from the incorrect patient and labelled with the intended patient's details. WBIT incidents have the potential to result in ABO-incompatible transfusion and patient harm, with most incidents occurring due to human error. UHNM is a very high blood use establishment with approximately 1200 units red cells transfused monthly.

Methods/Study: In July 2017 the Hospital Transfusion Team at UHNM introduced WBIT root cause analysis (RCA) forms to be completed by staff involved in WBIT incidents to better understand the human factors that influenced their practice. Data from these forms was collated to target training and support the roll-out of electronic patient identification devices in transfusion.

Results: There were 43 WBIT episodes reported between July 2017 and December 2021 (mean 0.8/m; range 0–3 m). Completed RCA forms were available for analysis in 29 (67%), with 28 involving first WBIT events. The cause of the WBIT in 86% was either fully or partially attributable to staff not labelling the blood sample at the bedside from the patient wristband. In only 10% was the request form written prior to the phlebotomy episode. 27 (93%) healthcare professionals were aware of trust policy surrounding sampling for transfusion but said they did not follow this mainly due to under-staffing and excessive workload. Significantly, the second WBIT for one staff member involved the use of the new PDA system, where the wrong patient's label was printed and insufficient checks took place at the bedside. 90% of WBITs were identified once samples reached the pathology lab.

Conclusion: Our study suggests that the area to focus on to reduce WBIT incidents is the labelling of samples at the bedside. Further training on trust policy is unlikely to significantly reduce the number of WBIT events, although the need to complete the request form prior and take to the bedside should be emphasised. Vigilance must be used when introducing electronic identification methods as human factors will persist to negatively impact on safety but will be much harder to identify.

Saving the precious resource – O RhD positive blood in emergency transfusions at Royal Derby hospital

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Background: Despite that the overall blood usage has been falling, demand for O D negative red cells remains high. This is due to multiple factors with one of them being the use of O D negative blood in emergency situations where blood group of the patient is unknown or there is no valid sample available. It has been recommended by National Blood Transfusion Committee (NBTC) as well as British Society for Haematology (BSH) that O D positive red cells can be used instead of O D negative red cells in adult males and women >50 years old who are D negative or whose D status is unknown in emergency situations. These recommendations have been translated into Patient Blood Management initiatives and numerous toolkits were designed to help blood transfusion teams to implement the change.

Method/Study: In 2019, our current use of emergency O D negative blood was audited, and the result showed that approximately 50% of emergency O D negative blood was transfused to adult males or women >50 years old.

In the last quarter of 2019, Hospital Transfusion Committee (HTC) of Royal Derby Hospital (RDH) agreed to the use of emergency O D positive red cells for adult males and women >50 years old. This large-scale project was led by Hospital Transfusion Team with

cooperation with the clinical areas. Critical steps for implementation were:

- To raise and complete laboratory change control process including the risk assessment.
- To train every member of staff working in the blood bank.
- To train clinical staff in the "high use" area for emergency blood, i.e., Emergency Department, Operating Theatres, Intensive Care Units.
- To communicate via ward transfusion links and hospital intranet to all clinical areas.
- To incorporate the use of emergency O D positive blood into blood transfusion theory training for new and existing staff.

Results: In 2020, total number of emergency blood transfused to patient was 219 units of red cells. From that, 83 units were O D negative, and 136 units were O D positive.

In 2021, total number of emergency units transfused to patient was 248, 105 units of O D negative and 143 units of O D positive.

In months January–May 2022, we have used already 130 units of emergency blood, 49 units were O d negative and 81 of O D positive.

Conclusion: All together RDH saved 360 units of precious O D negative red cells. It is clear that introduction of the use of emergency O D positive red cells in emergency situations at RDH was a positive step towards preservation of O D negative red cells.

Unlocking enablers to education to improve massive haemorrhage engagement – A teaching hospital experience

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Background: Transfusion delays are rising nationally where there were 54 potentially preventable deaths between 2010 and 2020 (SHOT/2022/001). Ward-based staff training in Massive Haemorrhage (MH) at our hospital is infrequent; main exposure is through annual e-learning which forms part of the Blood Transfusion module.

Aim: To increase MH knowledge for non-medical staff, by increasing learning opportunities and generate positive-learning experiences. Opportunities consisted of a 5 min face-to-face update for the ward, or slides for sharing at team meetings, and running virtual MH simulation sessions.

Method/Study: The Transfusion Practitioner (TPs) team created: a short series of MH update slides, a 45-min session using a 20 min MH-scenario video for virtual simulation, and a questionnaire for pre and post interventions. The questionnaire comprised knowledge-based (7/8) questions based on local MH policy, and a qualitative question (1/8) where participants had to describe their thoughts in one word upon reading the phrase "Massive haemorrhage". Thoughts were grouped into: positive, negative, and neutral, and frequency was represented by font size. We also gathered participant role, length of experience in their role, and e-learning status.

Results: From multiple specialities there were 56 participants in the baseline questionnaire, and 56 participants in the 6-months post, which included: Nurses, midwives, HCAs and operating department practitioners (ODPs).

KNOWLEDGE

Participant MH knowledge improved from 46% to 63% for correct responses with a mean of 4/7 compared to 3/7 previously, where 2/56 achieved a score of 100%. A significant improvement (between 18% and 200%) was observed across for each question.

E-learning compliance was over 80%, an improvement from 77% previously. Participants who were compliant performed better than those who were not. In addition, those who completed their eLearning recently (within 3 months) had marginally better results.

Registered professionals performed better than unregistered staff, and a positive correlation of performance with experience and seniority was noted.

ENGAGEMENT

Virtual MH simulation was more accessible, with 6–12 attendees per session, compared to 2–3 attendees in ward-based simulations historically, and feedback was enthusiastic were most had a positive experience.

Questionnaire response rate improved from 60% to 93% for word association with the phrase "MH", where the majority had previously left it blank. Responses associated with positive emotion/thoughts, increased from 32% to 70%. This suggested a significant shift towards a positive association.

Conclusion: Historically, barriers to gaining knowledge and experience was a lack of MH educational opportunities and time. However, we have found short updates, and virtual simulations are accessible and can be a driver to generate interest, changing mind-sets from being blank, suggestive of absence-of-thought, to one of decisive action, e.g., address the bleeding and escalating for help.

To maintain engagement with MH, we plan to make virtual simulations a monthly occurrence.

Check before you transfuse! Improving bedside checking process and practice to prevent never events using the COM-B model for behaviour change at Imperial College Healthcare NHS Trust

Denise McKeown and Katie McCormack
Imperial College Healthcare NHS Trust

Background: Following three transfusion never events in 18 months Imperial College Healthcare Trust undertook a trust-supported safety improvement initiative to improve bedside checking as the last opportunity to catch an error before harm occurs. New checking processes were needed and improved assurance. Face-to-face training was halted peri-pandemic and replaced with a basic online version. With a narrow denominator, tight timescales and no budget this version was opt-in, which did not provide assurance that all staff had completed training that needed to. An anonymous baseline survey and learning from incidents showed checks were being done but not always at the bedside, not always completely and not always by two people independently. The survey showed 100% staff said they complete the checks but 70% reported doing it together with another staff member, rather than sequentially.

Method/Study: The COM-B model was adopted within the model for improvement to deliver a successful, sustained improvement in practice. (C)apability is being improved via a comprehensive new opt out, not opt in, e-learning that allows relevant modules to be completed according to role, increasing assurance and accountability. Additionally, a programme of in-situ face-to-face training on HOW to effectively check at the bedside using new checking aids is being delivered simultaneously. A focus is ensuring two-person independent checking using the tagline 'I check, You check, not We check' to account for human factors and ensure safest practice. A just-in-time short training video is also being created to demonstrate correct checking at the point of need, with a QR code link on all blood compatibility tags. (O)pportunity is being improved by creation of an electronic bedside checklist, introduction of handheld checking devices to enable safe single person checks in theatres and areas where Cerner (Electronic Health Record) is not used, and a paper checklist for use during IT downtimes and in satellite sites. (M)otivation is being encouraged by sharing learning from incidents using flashcards, helping staff understand WHY it is important to check and check independently, as they clearly see the results of not doing so. They also prompt reflection and pledging during the training and when shared in other quality and safety forums. Regular trust-wide and localised communications using multiple channels also assist. Each change idea is tested using PDSA (Plan-Do-Study-Act) methodology; an ongoing process as we continue to roll out and act on feedback.

Results: Implementation is still ongoing. Progress will be reviewed in September. The capability interventions launched in late May. In the 7 days post-launch 157 staff received the face-to-face training and e-learning reached 10.2% compliance. The average number of relevant incidents per month remain stable (5) against a consistent rate of reporting. (B)ehaviour change will be measured using an observational measurement tool, commencing in July, and a repeat of the baseline survey in September.

Conclusion: Informal feedback following the face-to-face training suggests this mixed method approach is working to improve practice and patient safety. (M)otivation—helping staff understand WHY is an integral ingredient, often overlooked, in improving safety behaviours. Continuous review and intervention will ensure good practice is sustained.

SNBTS TT: Once for Scotland approach to SHOT Annual Report recommendations

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SNBTS Transfusion Team

Background: The Scottish National Blood Transfusion Service, Transfusion Team, Haemovigilance Group met in the summer of 2021 to explore the development of a tool to highlight and support the dissemination of the 2020 Annual Serious Hazards of Transfusion, SHOT, Report to NHS Scotland Health Boards.

The work was undertaken using a 'Once for Scotland' approach to promote a standardised and consistent approach to delivering the 2020 Annual SHOT Report key messages and recommendations to the NHS Scotland Health Boards.

Method/Study: Following the publication of the SHOT 2020 Annual Report, the team discussed how the report was usually disseminated to their local health boards and what would have been helpful in previous years. We used these ideas to guide the development of a national 'Gap analysis tool'. This would ensure a consistent message was delivered by the Transfusion Team and that each Health Board received the same supplemental documents to assist them in meeting the SHOT recommendations.

The group were aware that the document would need to be succinct, relevant and add value. The main driver was to produce several tools that held only key information on work required to be undertaken, identification of the person/group responsible for the work and hyperlinks to access the entire chapters and supplementary information. Each tool could be used independently or as part of a more extensive collection, depending on the audience. The tools and distribution list would be available to the Scottish Health Boards via the SNBTS TT. To ensure a 'Once for Scotland' approach, the team were updated on the tools and their use during a team CPD session, and the tools were made available on the shared SNBTS shared Teams library due to their size. Further communication was cascaded via Teams chat and emails to ensure the team were fully up to date.

Results: The group produced twenty-three bespoke SHOT 2020 Gap Analysis Tools and a distribution list. Each Gap Analysis tool consisted of succinct and pertinent information for the reader. The Gap Analysis Tools were shared and disseminated in the Scottish Health Boards by the Transfusion Practitioners as required. The use of the distribution list assisted in identifying those responsible for leading and delivering the required action set. The Transfusion Practitioner group warmly received the gap analysis forms as a supplement to the information already sent by SHOT. The full potential for the forms was not fully realised this year due to the time lag in initially agreeing on the content, layout and design of the forms. As such many of the Boards had already started delivering the recommendations.

Conclusion: We plan on undertaking this piece of work again for the Annual 2021 SHOT report utilising the templates we developed last year. Building on our previous experience and using our templates, we will be able to produce the Gap Analysis forms faster, allowing for the NHS Scotland Boards to utilise these in the early stages of planning.

Adverse reactions associated with the transfusion of blood components processed with different methods: The impact of automated pre-storage leukocyte depletion

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Background: In modern transfusion therapy, whole blood is used only in certain limited circumstances and trust is placed in the use of

specific blood components (BCs). BC must be processed using appropriate validated procedures, including measures to avoid contamination and microbial growth in the initial and final prepared BCs (Directive 2005/62/EC, Annex 6.42). Consequently, methods of centrifugation of whole blood, filtration of leukocytes, washing and irradiation must be specified.

Aims: We analyse national data on non-haemolytic pyrexial and allergic reactions related to blood transfusion reported to the Coordinating Haemovigilance Centre and Surveillance of Transfusion (SKAEM) of the Hellenic National Public Health Organization (EODY) by hospital Transfusion Departments in 2010–2020, in relation to the processing procedures applied using conventional blood bank methodologies. The results of an automated blood processing system employed in two hospital blood banks are also discussed in view of the national policy for stepwise implementation of a centralized automated processing procedure aiming to improve the quality and safety of blood transfusion.

Method/Study: Annual haemovigilance data for all adverse reactions associated with BCs transfusion are reported to SKAEM using standardized questionnaires. Protocols are in line with International Haemovigilance Network guidelines and ISBT definitions of the types of adverse reactions associated with blood transfusion.

The processing procedures used are: buffy coat removal, leukocyte depletion after storage, pre-storage leukodepletion, red cell washing in additive solution, and irradiation. The Reveos Automated Blood System (Terumo BCT) was also used, processing 4 units of whole blood to two components (plasma and red cells) or three main components (plasma, concentrated red cells and interim platelet unit) according to the manufacturer's instructions. Both protocols collect a Leukopak unit containing the main leukocyte fraction which is discarded. The resulting RCC is further leukoreduced by gravity using the Reveos in-line filter. Consistent leukoreduction of plasma is done through the simultaneous centrifugation/extraction step of this method.

Results: 13005 adverse reactions (AR) associated with the transfusion of 7 894 054 blood components were reported. Febrile non-haemolytic transfusion reactions were 43.7% and allergic 37%. The distribution of febrile reactions in relation to processing procedure was: in RBCs with buffy coat 61.7%, without buffy coat 10.9%, leukodepletion after storage 16.5%, leukodepletion pre-storage 6.7%, washing 4.1% and irradiation 0.1%.

Results from the use of the Reveos Automated Processing System (Terumo BCT) by the National Blood Centre for processing the blood collected and used by two large HBBs over a two-year period showed a statistically significant reduction of pyrexial reactions ($p = 0.044$ in one hospital and 0.002 in the other) in comparison with the relevant data before the use of this system. The corresponding difference in the allergic reactions was not statistically significant.

Conclusion: This study demonstrates high incidence of pyrexial non-haemolytic and allergic reactions associated with the use of blood components processed without leukodepletion, particularly during the COVID-19 pandemic when blood transfusion services were short-staffed owing to re-assignment to other duties. Compliance with Good Practice Guidelines and improvement of blood processing and safety by automation should be a national priority.

Assessing the residual risk of bacterial contamination in pathogen-reduced platelet concentrates in France

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Background: Preventing transfusion-transmitted bacterial infection (TTBI) remains an important transfusion safety issue. Platelet concentrate (PC) pathogen reduction (PR) is an effective mean to reduce TTBI occurrence. Pathogen reduction (Intercept©, Cerus) has been introduced for all PC issued in France since November 2017. No PC bacterial detection was in place before PR implementation, while ≈8% PC underwent PR. TTBI involving PR PC have been recently reported in the USA, possibly linked to storage container leaks and contamination with environmental bacteria (Fadeyi et al, Transfusion, 2021).

Objective: To assess the residual risk of bacterial contamination in PR PC since implementation of 100% PR PC in France.

Method/Study: Reporting of TTBI is mandatory in France. Occurrence of TTBI "near miss" (i.e., quarantined PC found to harbor bacteria) is recorded by the involved blood establishment. Occurrence, frequency and severity of TTBI as well as occurrence of TTBI "near miss" in France before and after implementation of 100% PR PC were assessed (study period: January 1st, 2013 to May 15th, 2022).

Results: A mean 304 300 (SEM: 1100) PC and 332 000 (SEM: 3200) PC were transfused yearly in France from 2013 to 2016, and from 2018 to 2021, respectively. Extended PC shelf life from day (D)5 to D7 was implemented in July 2019 for all PC. TTBI occurrence prior to 100% PR PC implementation was $n = 3$ (SEM: 1)/year (non-PR PC, $n = 15$, frequency: 1/93600 transfused PC between 2013 and 2016). A fatal outcome occurred in two patients (2/15). Since implementation of 100% PR PC, only one TTBI has been reported, involving *Bacillus cereus* (D4 apheresis platelets, grade 3, life-threatening) (frequency: 1/1 453 700 transfused PC).

Conclusion: Introduction of PR platelets has resulted in a steep reduction in TTBI occurrence in France. TTBI may however still occur. Potential mechanisms may involve resistance to PR (spore- and biofilm-forming bacterial species, very high bacterial load) as well as post-PR contamination by means of container leaks. Maintaining active TTBI preventive measures is therefore essential. These include careful handling of containers, PC inspection upon issuing, checking for swirling, bacterial testing upon suspicion (notably for >D5 PC) and careful patient monitoring during and after transfusion.

Playing your cards right: A human factors experience

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NHS Blood and Transplant

Background: A Human Factors card game was developed as an interactive training tool, providing staff with a novel means of exploring

Human Factors associated with transfusion laboratory errors. The game offers a vehicle for informal teaching relative to real life laboratory situations.

Human Factors are the scientific principles behind optimisation of human performance through understanding human behaviours and interactions within systems.

Red Cell Immunohaematology (RCI) investigations are complex, require manual intervention, and can therefore be impacted by Human Factors.

A key recommendation from the 2013 SHOT report was the inclusion of Human Factors in relation to transfusion processes, redesign, and audit at local and national levels. NHSBT embraced this recommendation, adapting critical RCI processes including crossmatching and result reporting to minimise the impact of associated Human Factors.

The card game was initially developed as part of a Corrective Action/Preventative Action (CA/PA) following Root Cause Analysis (RCA) of a crossmatching incident. The RCA identified Human Factors as a contributing factor. The game cards are generic to Human Factors within healthcare so are adaptable to multiple processes, tests, and scenarios.

Method/Study: Seven key areas in healthcare affected by Human Factors were introduced to small groups of staff using single sided flashcards. These included stress, fatigue, and cognitive workload. Twelve double sided flash cards were used to learn in more detail about the "Dirty Dozen", the most common human preconditions that can lead to making a mistake. Each of these cards had a definition printed on the reverse offering more detail to the participant. Small workshops were organised to allow an informal environment for open and honest discussion to evolve.

Staff were each dealt a card from the "Dirty Dozen" and asked to read the definition to the group. Each team member offered an example to the chosen human precondition printed on the card and how this could impact their own role. Staff volunteered real life scenarios from personal experiences.

The cards offer a novel platform to highlight Human Factors associated with laboratory errors.

Results: Feedback from staff discussions was captured on feedback forms. Areas of concern were acknowledged and fed back to the Laboratory Head for potential solutions to be identified locally. A solution to an increase in reporting errors at pilot sites was development of a visual aids.

Staff discussions of their own scenarios allowed other team members insight and learning from sharing experiences and reflection.

Initial reluctance was observed from some team members due to the interactive nature of the game, however, buy in was observed from most staff and valuable feedback obtained. Often productive discussions continued beyond sessions. An increase in staff satisfaction was observed at both pilot sites following sessions.

Conclusion: Development of a Human Factors game was well received locally at two pilot RCI sites. Sharing of this tool has begun across national RCI expert groups as well as the NHSBT Clinical Continuous Improvement (CI) community. The game is adaptable to many scenarios and applicable beyond the RCI laboratory, offering a useful training tool for the wider transfusion community.

A review of 10 years of transfusion transmitted infection investigations

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Background: The risk of acquiring an infection through blood transfusion in the UK is very low. Strategies to reduce the risk include bacterial screening of platelets, donor selection criteria and screening tests. Haemovigilance systems for transfusion-transmitted infections (TTI) are passive, relying on clinicians to suspect and report these infections. Furthermore, due to the chronic nature of many viral infections, they are often investigated and reported some years later than actual transfusion was given.

Method/Study: We reviewed reports of suspected TTI cases submitted to the NHSBT and UKHSA Epidemiology Unit by blood establishments in England, Scotland, Wales and Northern Ireland between 2011 and 2020. All reports were classified by the outcome of the investigation as possible, probable or confirmed TTIs, which are further reported to SHOT and included in the annual reports, or 'not a TTI'.

A transmission is considered as such if a bacterial or viral infection in a blood transfusion recipient is identified that was not present prior to the transfusion and no alternative source of infection is identified. The archived donor sample is tested, and transmission is classed as confirmed only if identity of pathogen in recipient and donor samples is shown by sequencing.

Results: From 1037 suspected bacterial TTI cases reported, 1010 were investigated. Cases were not investigated if the donation pack was discarded, leaking or not available for testing. Most investigated cases were from England (1006) but a small number from Northern Ireland (3) and Wales (1). Based on these investigations, one confirmed TTI (*Staphylococcus aureus*) and one probable TTI (*Staphylococcus epidermidis*) were identified.

A total of 139 suspected viral TTI cases were reported and investigated, the majority from England (121), and the remainder from Scotland (15) and Wales (3). Of these investigations, 14 were confirmed, six probable and five possible TTIs and the remainder excluded as not TTIs. Of the confirmed TTIs, 10 were due to hepatitis E virus (HEV), HAV, HBV, HIV and parvovirus B19 were each linked to one case. The probable cases included two HEV and four HBV transmissions, and the possible cases two HBV, two HCV and one HEV transmission. All possible and probable HBV transmissions were linked to donors with occult HBV infection.

Conclusion: The risk of a TTI in the UK remains low, as demonstrated by two bacterial (one confirmed) and 25 viral transmissions (14 confirmed) over a 10-year study period when over 20 million blood donations were made. It is important to note that the confirmed TTI in 2015 was the first transmission since universal bacterial screening of platelets started in 2011 and 8 of the 10 confirmed HEV transmissions were identified before the introduction of universal HEV screening in 2017. However, as the identification of TTIs relies on clinical suspicion, it is important to remain vigilant and consider blood transfusion as a possible source of infection. Any such cases should be reported to the appropriate UK Blood Service as soon as possible to allow full investigations and actions to be taken.

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