27 Transfusion Errors in Transplant Cases n=98

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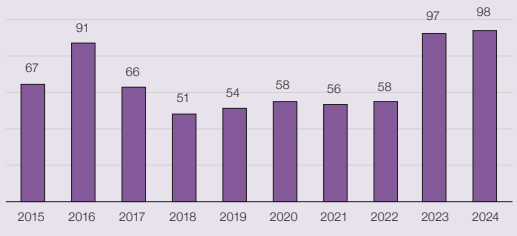
Headline data 2024

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

For all abbreviations and references used, please see the **Glossary** and **Reference list** at the end of the full Annual SHOT Report. Please see the supplementary information on the SHOT website (https://www.shotuk.org/shot-reports/annual-shot-report-2024/).

Introduction

HSCT are an important treatment option for patients with haematological malignancies. The number of HSCT have increased over the last two decades in the UK (BSBMTCT, n.d.). The patient and donor may have different ABO/D groups, and so subsequent transfusion with blood components may not follow the normal compatibility rules well known by laboratory and clinical staff and controlled by LIMS. Patients are often referred to a specialist centre for the transplant and then return to their local hospital for post-transplant care. As highlighted in previous Annual SHOT Reports, transplant centres should provide a protocol for patients that includes the ABO/D group of the donor, ABO/D group of blood components for transfusion and any other specific requirements, such as irradiated blood components.

SHOT data continue to highlight challenges with provision of appropriate blood components post-HSCT. Shared care introduces communication challenges, transplant protocols may not be sent to the local hospital, or there may be delays in transferring the information into the clinical notes and LIMS. Selection of ABO/D appropriate components in the laboratory often relies on staff reading notes or flags in the LIMS. LIMS rules for controlling ABO/D compatibility for HSCT was noted in the top ten of items that users would like to have in the SHOT UK Collaborative Reviewing and reforming IT Processes in Transfusion (SCRIPT) user survey in 2021 (Davies, et al., 2023). Conversely, in the SCRIPT supplier survey in 2021, 7 of the 10 suppliers stated that their LIMS did include this functionality. This gap is likely related to failures to configure rules or upgrade systems, as described in the chapters covering errors with information technology in previous Annual SHOT Reports. Where there has been an ABO/D mismatch between HSCT recipient and donor, this can cause anomalous blood groups in the post-transplant phase, and often the recipient will never show the full ABO forward and reverse group of the donor. This causes challenges within the laboratory, LIMS may not support release of components without a confirmed ABO/D group, consequently laboratory staff may be forced to report a 'safe' ABO group appropriate for red cells but not necessarily for plasma components (SHOT, UKTLC and NEQAS, 2024). Patients undergoing solid organ transplants (SOT) also have specific requirements for transfusion, these are subject to similar challenges to the HSCT, with communication and IT support being key to success.

Deaths and major morbidity related to transfusion n=0

There were no deaths or major morbidity following transplant-related errors in 2024.

A detailed review of all cases of deaths and major morbidity reported to SHOT related to HSCT recipients is being planned to be carried out in the future.

Summary of cases

A total of 98 cases are included in this chapter, 26 related to a wrong component transfused (IBCT-WCT) event and 32 where specific requirements were not met (IBCT-SRNM). There were 40 near miss cases, 16/40 (40.0%) related to provision of irradiated components and 8/40 (20.0%) related to the selection of an incorrect blood group. The majority of these were identified using a formal pre-transfusion check and 1 was noted by the patient. In addition, there were 13/40 (32.5%) wrong blood in tube reports which were mostly detected by laboratory staff during testing or authorisation of results.

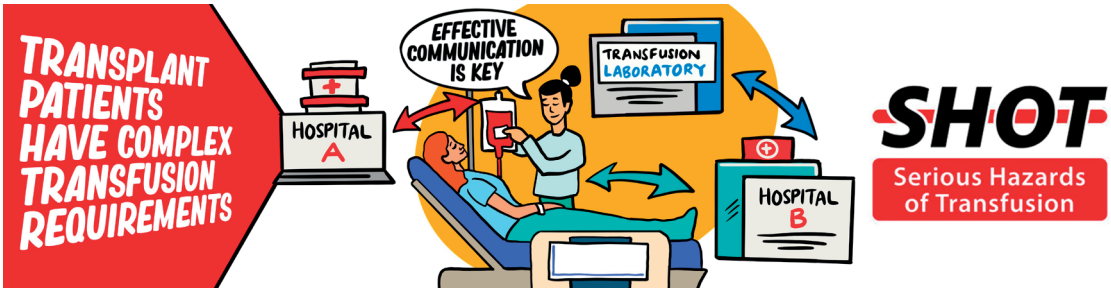
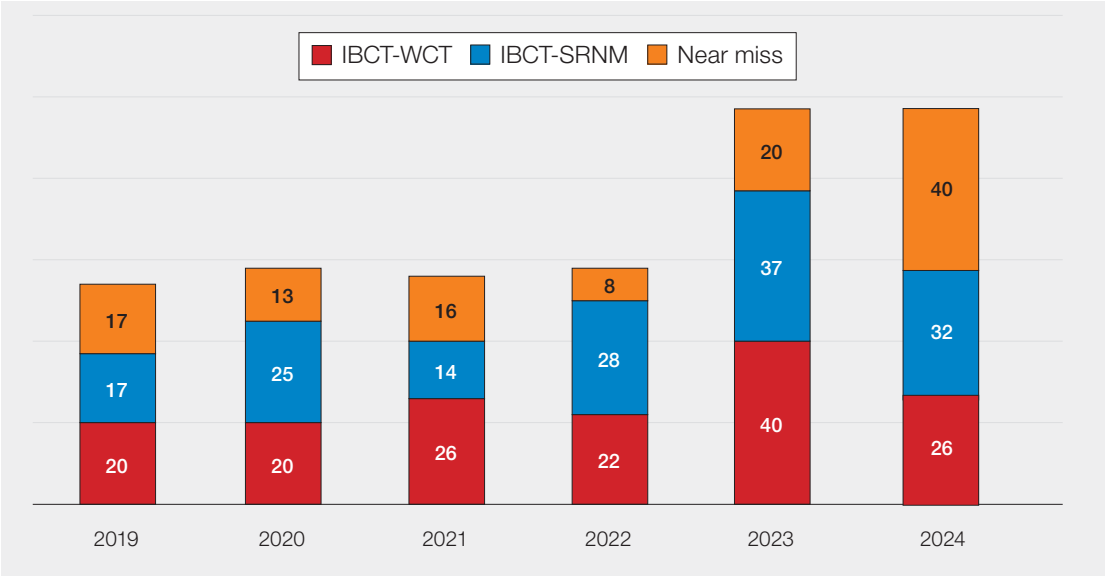


Figure 27.1: Number of transplant-related reports (HSCT and SOT) from 2019 to 2024



IBCT-SRNM=incorrect blood component transfused-specific requirements not met; IBCT-WCT=IBCT-wrong component transfused

Errors where the blood component was transfused mainly involved red cell components, 26/58 (44.8%). Platelet components accounted for 16/58 (27.6%) reports and in 3/58 (5.2%) reports, multiple components were involved. IBCT-WCT errors mainly occurred in the laboratory, 19/26 (73.1%), whereas IBCT-SRNM errors were more equally spread between laboratory, 15/32 (46.9%) and clinical, 17/32 (53.1%) settings. The majority of errors occurred in HSCT patients, for both IBCT-WCT and IBCT-SRNM, 50/58 (86.2%), with only 8/58 (13.8%) occurring in SOT.

IBCT-WCT summary n=26

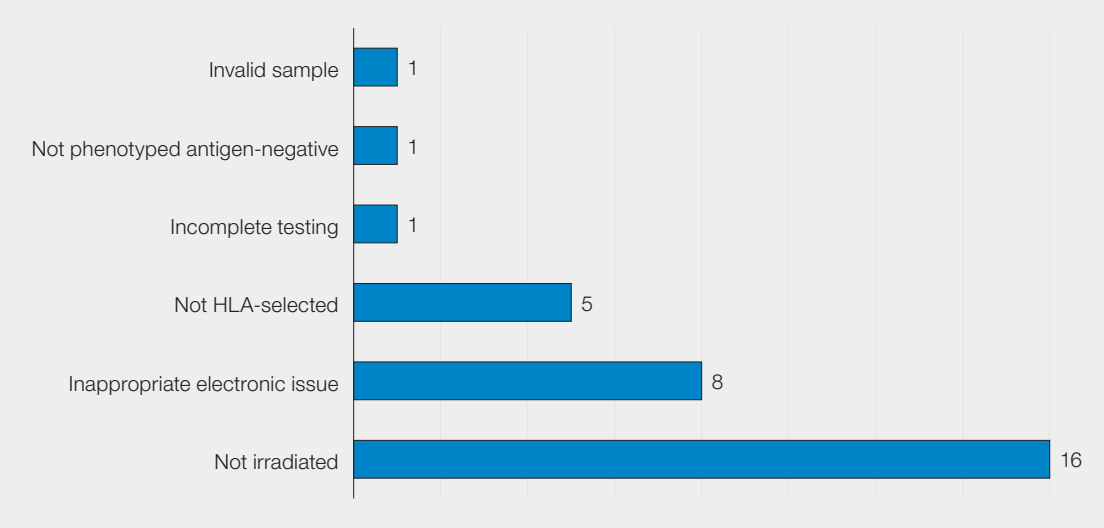
Of the 26 IBCT-WCT errors reported, 19 were laboratory errors with 17/19 cases related to the component selection step. In 7 cases where clinical errors were reported, 5 were at the transfusion request step. For SHOT reporting, all cases where a component has been transfused that is not consistent with ABO group specified for the relevant phase of transplant are discussed in this chapter and classified as wrong ABO/D group in transplant recipients (n=22). In addition, there was 1 case involving an ABO-incompatible transfusion of group O fresh frozen plasma (FFP) to a group A transplant recipient during a major haemorrhage. There were 2 transplant patients who received transfusions intended for other patients but were fortuitously ABO-compatible. These were a case where human leucocyte antigen (HLA)-selected platelets were transfused to the wrong patient, and a transfusion of red cells was connected to the wrong patient. In the final case, the wrong component type was transfused; platelets were prescribed for the patient, but red cells were transfused in error.

In 19/26 (73.1%) cases, IT was a contributory factor. Issues identified included a lack of functionality within the LIMS, failure to heed or failure to update the flag in the LIMS. In a few cases, IT was seen to have been able to prevent an error but was ineffective, lack of communication meant that IT could not be updated, and incorrect information was recorded in the LIMS.

IBCT-SRNM summary n=32

Failure to provide irradiated blood components accounted for 16/32 (50.0%) errors, and 8/32 (25.0%) cases were related to inappropriate use of electronic issue of red cells. Lack of communication of the specific transfusion requirements accounted for 15/32 (46.9%) of the errors and involvement of IT was cited in 25/32 (78.1%). Similar to IBCT-WCT, IT involvement related to failures to heed or update flags or was seen as an improvement. In 1 case, an incomplete LIMS replacement led to failure to provide irradiated components, this is described in Case 27.1. This case demonstrates the reliance on the LIMS and the importance of ensuring all relevant information is available in the current system.

Figure 27.2: Errors related to specific requirements not met in transplant recipients in 2024 (n=32)



HLA=human leucocyte antigen

Case 27.1: Missed requirement for irradiated blood components following LIMS replacement

Prior to the implementation of the new LIMS, data migration from the old LIMS took place but the most recent data had not been yet migrated. To address this gap in data migration, an interim process was implemented to check patient's notes on the legacy LIMS. A check label on the request form to confirm this process was implemented. Prior to the implementation of the new LIMS, all staff were trained, and instructions provided. In this case, the transplant information was in the legacy LIMS, but the biomedical scientist (BMS) did not check when processing the request in the new LIMS. Another BMS performed the crossmatch but also did not check the legacy LIMS. There was reliance on the first check and the instructions for use of the check label were not clear.

Shared care

Addressing communication issues with patients in shared care settings is crucial for ensuring safe, coordinated and patient-centred care. Communication failure between hospitals which share the care of transplant patients is a recurring theme in recent years. For example, when a patient has the transplant at a transplant centre, the information about the transplant, changes in ABO/D group and specific transfusion requirements may not be communicated to the local hospital or its transfusion laboratory. The transplant may have taken place several months or years before and specific transfusion requirements in the post-transplant period may vary. It is also important to keep the primary care team informed.

Case 27.2: Patient transfused non-irradiated red cells pre transplant with shared care barriers

A patient with relapsed high-grade lymphoma received a unit of non-irradiated red cells at their local hospital, 6 days prior to stem cell harvest. The request form did not indicate the patient's diagnosis, or the need for irradiated red cells. The requirement for irradiated blood components was also not recorded on the prescription. Furthermore, there was incomplete communication from the transplant centre to the local hospital regarding the specific transfusion requirement. The error was discovered when a second request for irradiated red cells was received. Laboratory staff acted promptly to contact the ward and asked for the transfusion to be stopped and added flags to the LIMS. Contributory factors included the haematology ward at the local hospital not using the organisations' electronic patient record and relying on handwritten documentation. Following this event, a system had been set up for the transplant centre to notify the local transfusion laboratory, the transfusion practitioner and clinical staff about specific requirements using secure email. The patient was given an irradiated components card, relevant information leaflet and had the rationale for specific requirement explained to them.

In shared care settings, clear role definition, consistent information sharing, and patient involvement are critical. Leveraging technology, ensuring effective structured handovers between clinical and laboratory teams across all sites is vital. Continuously seeking patient and staff feedback can significantly improve quality and patient experience enhancing transfusion safety.

Learning point

- Information relating to safe and appropriate transfusion for HSCT and SOT patients must be easily accessible, clear, and concise in clinical and laboratory settings

Incident investigation and human factors summary

It was encouraging to note that a formal investigation had been completed for 69/98 (70.4%) of cases including all near miss cases and wrong blood in tube events. Where the contribution of human factors had been noted, these mainly related to communication, gaps in knowledge and the fact that this is a unique cohort of patients with very particular transfusion needs. Staff may not be familiar with transfusion requirements for this patient cohort and so instructions must be easily accessible, clear, and concise. This is particularly important where patients are being treated in non-specialist settings.

Conclusion

Transfusion in HSCT and SOT patients is complex. Shared care requires that communication pathways are effective for every case and include both clinical and laboratory teams. There is clearly a reliance on LIMS to support safe practice in the laboratory. Flags and notes in the LIMS are not effective in preventing errors. LIMS suppliers should ensure that where current versions do not support safe practice for HSCT and SOT patients, this functionality is in development, with a clear roadmap for delivery, and that this is shared with customers. Where electronic patient record systems are being implemented, functionality for safe practice and decision support should be considered. Training and competency assessment for laboratory staff should include transfusion in transplant patients. Organisations should use the resources currently available to identify and address gaps in processes.

Recommended resources

Safe Transfusion in Haemopoietic Stem Cell Transplant Recipients
https://www.shotuk.org/resources/safe-transfusions-in-haemopoietic-stem-cell-transplant-recipients/

Good practice guidance document for managing indeterminate ABO blood groups to support safe decision-making
https://www.shotuk.org/resources/good-practice-guidance-document-for-managing-indeterminate-abo-blood-groups-to-support-safe-decision-making/

SCRIPT surveys and resources
https://www.shotuk.org/resources/current-resources/script/

SHOT
Serious Hazards of Transfusion