Errors Related to Information Technology (IT) n=541

16

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Definition:

This chapter includes transfusion adverse events that relate to laboratory information management systems as well as other information technology systems and related equipment used in the delivery of hospital transfusion services.

Cases selected include events where IT systems may have caused or contributed to the errors reported, where IT systems have been used incorrectly. Where the corrective and preventive action suggested by hospitals in response to errors included IT solutions, these have been included.

Abbreviations used in this chapter

BSH	British Society for Haematology
CAPA	Corrective and preventative action
EBMS	Electronic blood management system
EPR	Electronic patient record
HSE	Handling and storage error
IBCT	Incorrect blood component transfused
LIMS	Laboratory information management system
NHS	National Health Service
RBRP	Right blood right patient
SCRIPT	SHOT collaborative reviewing and reforming IT processes in transfusion
SRNM	Specific requirements not met
UK	United Kingdom
UK NEQAS	UK National External Quality Assurance Scheme
UKTLC	UK Transfusion Laboratory Collaborative
WBIT	Wrong blood in tube
WCT	Wrong component transfused

Key SHOT messages

- There is increasing recognition that IT systems can prevent recurrence of errors in clinical and laboratory transfusion practice thereby improving patient safety. It is important to note however for this to happen, IT should be implemented correctly, or existing systems modified appropriately
- The learning from the implementation of new transfusion-related IT systems should be shared with others through the SCRIPT group and SCRIPT resources can be used to support and educate all those involved in procurement, implementation and operation of these IT systems

Recommendations

- Undertake a gap analysis for all existing transfusion-related IT systems and automation against the updated UKTLC standards (standard 3) (Dowling, et al., 2024) and the updated BSH guidelines for the specification, implementation, and management of IT systems in hospital transfusion laboratories (Staves, et al., 2024). A gap analysis tool has been provided by BSH
- The specification of new IT systems and upgrade of existing systems should be undertaken with reference to updated BSH guidelines for the specification, implementation, and management of IT systems in hospital transfusion laboratories (Staves, et al., 2024)

- When introducing new IT systems across any part of the transfusion pathway, human factors and ergonomics should be considered to gain all the possible benefits of technology for staff, as well as for patient safety

Action: Laboratory managers, IT professionals, hospital transfusion teams

SHOT Collaborative Reviewing and reforming IT Processes in Transfusion

The SHOT SCRIPT group formed in 2019, continues to work to improve transfusion safety through improved IT systems and practices. Many resources have been added to the webpage to support organisations with purchasing, validating, and implementing IT systems that support safe transfusion practice, including LIMS, EBMS and EPR systems. The interactive document 'Using Information Technology for Safe Transfusion' has been designed to support organisations in identifying how IT could be used across all SHOT 10 steps. SCRIPT resources now include educational cases relating to IT, and a short IT video is available on the webpage. In 2023 the SCRIPT group published the SCRIPT survey focussing on LIMS: Laboratory information management systems: Are we ready for digital transformation? (Davies, et al., 2023). The BSH IT guidelines have now been published, including a gap analysis tool for local compliance monitoring (Staves, et al., 2024). SCRIPT continue to work with key stakeholders to improve uptake and use of IT systems in transfusion, including UK NEQAS, IT suppliers and the NHS England (Transfusion Transformation project).

Introduction

The number of IT errors in 2023 have increased by 39.8% (2023 n=541, 2022 n=387). Of the cases included in the IT chapter the question 'Did IT contribute to this error?' was answered by the majority of reporters. Only 156/541 (28.8%) said 'YES', IT *did* contribute which means that 71.2% of IT cases were not identified by the reporters themselves. The question 'Could the error have been prevented by using IT?' was answered by 463 reporters, of whom 222 (47.9% of respondents) said 'YES' therefore identifying need for greater use of technology. Not only did the expanded IT questions provide additional information about the type and providers of IT systems in use, and the nature of the IT contribution to errors, but there was greater reflection on *possible* IT solutions. Further information can be found in supplementary Table 16.4 on the supplementary information on the SHOT website (https://www.shotuk.org/shot-reports/report-summary-and-supplement-2023/).

Table 16.1: Categories containing errors related to IT in 2023 (n=541)

Primary reporting category	Laboratory errors	Clinical errors	Total cases 2023
Incorrect blood component transfused laboratory (IBCT-WCT)	58	20	**78**
Special requirements not met (IBCT-SRNM)	112	51	**163**
Right blood right patient (RBRP)	30	56	**86**
Avoidable, delayed and under/overtransfusion (ADU)	19	50	**69**
Handling and storage errors (HSE)	45	100	**145**
Total	**264**	**277**	**541**

Other cases with IT errors	
Anti-D immunoglobulin errors	68
Near miss	148
WBIT	224
Total	**440**

Table 16.2: Other categories containing errors related to IT in 2023 (n=440)

Flags, alerts, and warnings n=194

The largest group of clinical and laboratory errors related to IT systems are due to flags, alerts, and warnings as well as the use of logic rules and algorithms within the software. In 66 cases, alerts and warnings were in place but not heeded; in 56 cases, flags were not updated or were removed in error; in 72 cases, the available flags or logic rules were not used. Cases related to the LIMS are addressed within Chapter 15, Laboratory Errors.

In the clinical area, at the point of blood collection and at patient's side, EBMS are used to identify the right component for the right patient. The lack of clarity of alerts can cause messages to be overlooked or misunderstood by clinical operators. Also, staff in the laboratory are not always able to support clinical staff who contact them with queries about error messages. This may sometimes be due to lack of familiarity or inadequate training but also, particularly with lone workers, be due to competing priorities.

Case 16.1: Alert on EBMS overridden twice

The wrong platelet pack from a two-unit donation was issued electronically and the discrepancy between codes was highlighted by the EBMS at the point of collection. The laboratory re-issued the same unit, but the discrepancy remained, so the alert was overridden without identifying or resolving the source of the error. The same discrepancy was highlighted at the pre-administration check and again was overridden, and the unit transfused. This error came to light when the second pack from this donation could not be issued because it had already been fated as 'transfused'. This highlights the importance of understanding the exact nature of the error message and effective troubleshooting before proceeding with transfusion.

Learning points

- Error messages should be both clear and specific. It is important that both clinical and laboratory staff understand what action to take in response to an error message so that patient safety is maintained, and delays are minimised
- Training in the use of clinical and laboratory IT systems must include troubleshooting advice. When a problem has been identified, this should be investigated and resolved appropriately. The learning from the incident should be disseminated widely and added to any future training resources

Interoperable IT systems n=55

The recently updated UKTLC standards and BSH guidelines highlight the importance of interoperable IT systems to reduce the risk of transcription errors and to ensure that all clinical and laboratory information to support a patient's transfusion is available (Dowling, et al., 2024; Staves, et al., 2024). It is also important that data on previous LIMS or a merged/networked LIMS is accessible. There were 23 reports of patient ID discrepancies between the LIMS and the EPR which resulted from an IT error although blood components were issued to the right patient; 24 reports where there was failure to link, merge or

reconcile computer records on different systems; 8 reports of WCT or SRNM where historical data was available on an IT system, but the record was not accessed.

Errors arising from use of IT systems including EBMS n=98

These errors related to the functionality of computer systems, both LIMS (n=23) and EBMS (n=44) as well as errors arising from manual processes such as selecting the wrong record (n=7) or entering data incorrectly into an IT system (n=24). It is advisable when implementing or updating IT systems to ensure that there is appropriate validation to ensure the systems work as intended. With updated BSH guidance available, checking existing systems against the guidance using the gap analysis tool provided will highlight any lack of functionality that may need addressing. Where any unexpected errors occur or IT systems do not function as specified, contact with the manufacturer is essential to highlight the faults so that all users of the system can benefit from any improvements.

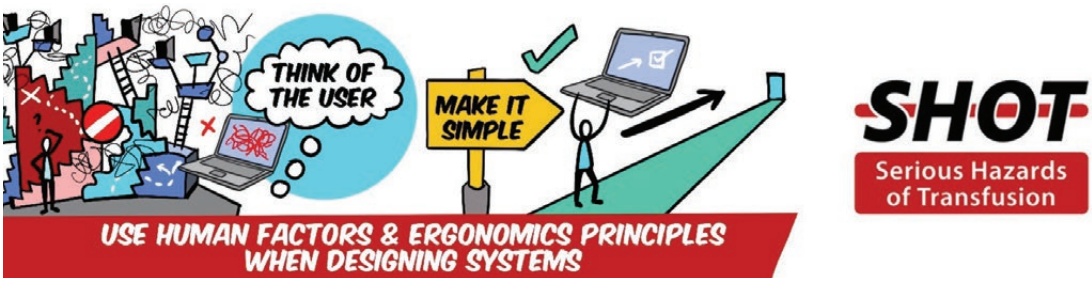
IT system and other equipment failure n=130

BSH guidelines highlight the importance of having a documented contingency plan for planned or unplanned IT downtimes, which may be isolated to one system or may affect whole networks (Staves, et al., 2024). The UKTLC standards recommend that the plan must be 'accessible and easy to implement and be included in staff training and competency assessments' (Dowling, et al., 2024). There were 23 reports of errors due to failure of IT systems during both planned and unplanned downtime and one notable feature was the potential for failure of communication before, during and after such incidents. Good downtime processes can always be improved by incorporating learning from errors and incidents. Having a short script, action list or aide memoire to support staff through unfamiliar downtime processes has been implemented with some success.

Other equipment failure (n=107) is included in this category, and this includes infusion pumps, refrigerators, and temperature-monitoring systems. These are discussed further in Chapter 11, Handling and Storage Errors (HSE).

Learning point

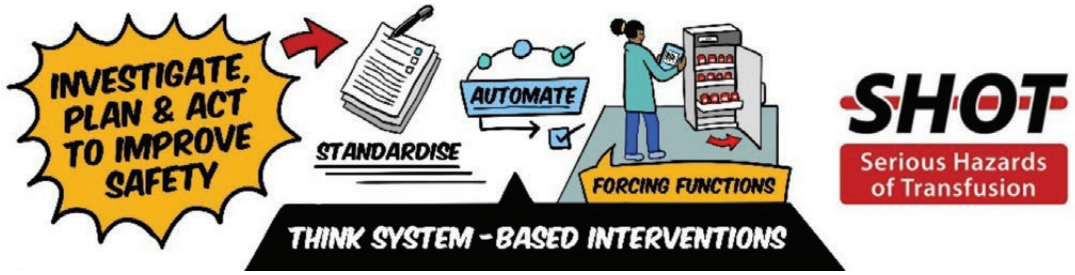
- Action cards, scripts or aide memoires can be rapidly and consistently deployed to support processes in planned and unplanned downtime



IT systems as CAPA n=64

It is encouraging to see new clinical and laboratory IT systems in place, or in advanced stages of implementation, although some of the errors reported relate to these new systems. When analysing the

2023 reports we have identified where a new or upgraded IT system has been suggested as CAPA. This includes systems that have been specified, procured and are at various stages of implementation and cases where additional IT functionality is identified as necessary to reduce the likelihood of an error occurring. Some CAPA were clearly aspirational with no specific funding identified or capacity to implement systems that have the potential to prevent the errors reported. This has always been part of the definition for inclusion, but it is notable that more consideration is being given to the safety benefits of IT systems. Approximately half of these were systems that had already been specified, procured, or implemented and would have prevented the errors, had they been fully operational. The other systems were identified with the comment that there was either no funding or no capacity to implement systems that may have prevented the errors reported.



IT errors relating to Anti-D Ig n=68

These are discussed further in Chapter 9, Adverse Events Related to Anti-D Immunoglobulin (Ig).

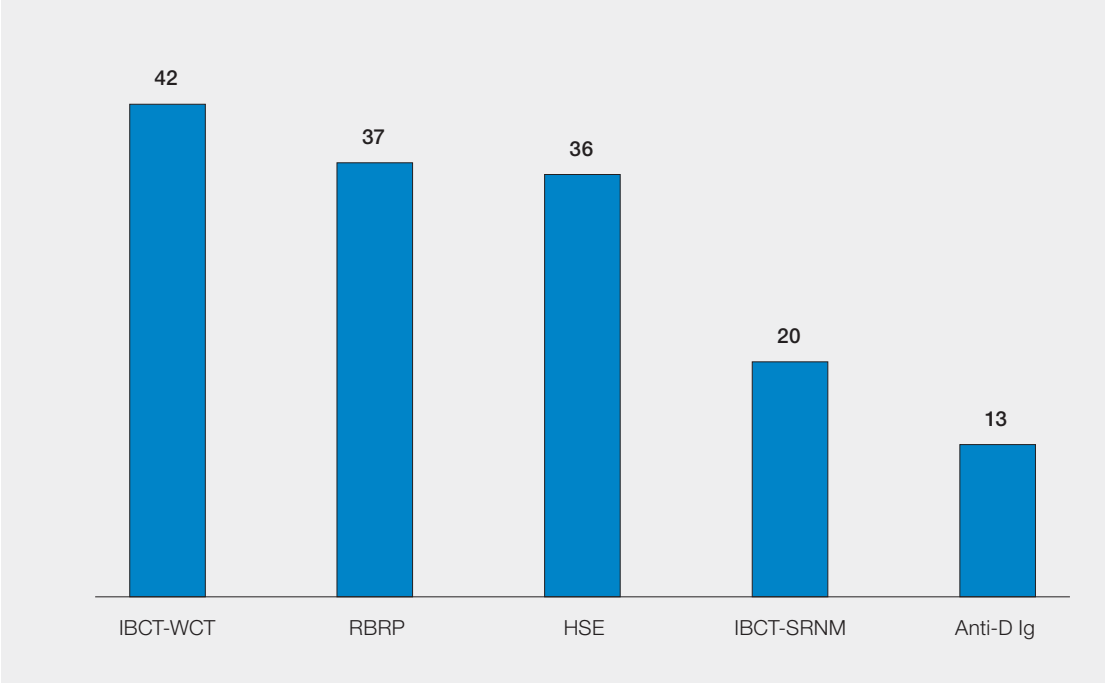
Near miss WBIT n=224

A total of 224 near miss WBIT were IT related, and a further 148 near miss events in other categories also involved IT. IT was recognised as being a method to reduce errors in 124/224 (55.4%) of WBIT cases, with many reporters noting lack of funding and resource capacity being a barrier to obtaining electronic sample labelling systems. IT was in place but not used correctly in 49/224 (21.9%) cases, IT was in place but not used in 29/224 (12.9%) cases. Where patient blood groups were reported (n=122), 70/122 (57.4%) had the potential to result in an ABO-incompatible transfusion. A formal incident investigation, where this question was answered, was performed in 163/224 (72.8%) cases.

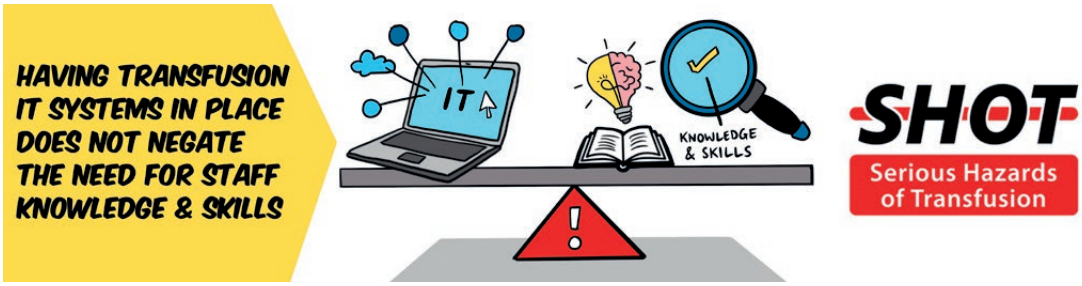
Other near miss IT-related events n=148

The majority of IT-related near miss events were seen in the IBCT-WCT, RBRP and HSE reporting categories (Figure 16.1). For IBCT-WCT errors, where the blood group of the component and recipient were reported (n=30), 6 of these cases would have led to an ABO-incompatible transfusion. Errors originated in the laboratory, 84/148 (56.8%) and the clinical setting, 64/148 (43.2%). In 94/148 cases, the reporter stated that IT did not contribute to the error. In 23/94, the reporter did not consider that IT could have prevented the errors. Review of the 23 cases noted that IT was implicated, with common themes including failures to heed IT warnings, IT systems not being updated and staff over-reliance on IT. It is encouraging to note that a formal incident investigation was carried out in 117/148 (79.1%) of cases where this question was answered.

Figure 16.1: Near miss events related to IT by SHOT reporting category in 2023 (n=148)



IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; HSE=handling and storage errors; RBRP=right blood right patient; Ig=immunoglobulin



Recommended resources

UKTLC Standards (2023) Standard 3 - Information Technology
https://www.shotuk.org/resources/current-resources/uktlc

Using Information Technology for Safe Transfusion
https://www.shotuk.org/resources/current-resources/script/

References

Davies, J. et al., 2023. SHOT UK Collaborative Reviewing and Reforming IT Processes in Transfusion (SCRIPT) survey: Laboratory information management systems: Are we ready for digital transformation?. *Transfusion Medicine,* 33(6), pp. 433-439. doi: https://doi.org/10.1111/tme.13010.

Dowling, K. et al., 2024. UK Transfusion Laboratory Collaborative: Minimum standards for staff qualifications, training, competency and the use of information technology in hospital transfusion laboratories 2023. *Transfusion Medicine,* 34(1), pp. 3-10. doi: https://doi.org/10.1111/tme.13029.

Staves, J. et al., 2024. Guidelines for the specification, implementation and management of IT systems in hospital transfusion laboratories: A British Society for Haematology Guideline. *Transfusion Medicine,* 34(2), pp. 81-166. doi: https://doi.org/10.1111/tme.13027.