15 Errors Related to Information Technology (IT) n=374

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Definition:

This chapter includes transfusion adverse events that relate to LIMS as well as other IT 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 and includes cases where IT systems could have prevented errors but were not used.

Abbreviations used in this chapter

ABOi	ABO-incompatible
BSH	British Society for Haematology
EBMS	Electronic blood management system
EPR	Electronic patient record
HTC	Hospital transfusion committee
HTT	Hospital transfusion team
Ig	Immunoglobulin
IT	Information technology
LIMS	Laboratory information management system
NHS	National Health Service
SCRIPT	SHOT Collaborative Reviewing and reforming IT Processes in Transfusion
UK	United Kingdom

Key SHOT messages

- Gaps in the interoperability of IT systems continue to cause errors in clinical transfusion practice
- Transcription errors made in the manual transfer of data between sources continues to result in avoidable incidents
- There is a disconnect between LIMS users and LIMS suppliers regarding functionality, system upgrades and interoperability with other systems that should be addressed by collaborative working to improve safe laboratory practices
- Fragmentation of the patient's electronic record across multiple digital systems makes clinically important information difficult to discover and act upon, particularly in increasingly busy working environments

Recommendations

- IT should be used to its full potential to support safe transfusion practice as well as guiding appropriate clinical decision-making relating to transfusion of blood components
- Healthcare organisations should ensure that collaborative working is in place between subject matter experts from clinical and laboratory departments together with hospital-based IT departments to ensure systems functionality and interoperability are optimised. The support of IT suppliers should be sought to further enable improvement across the range of transfusion activities

Action: NHS Trust/Health Board leaders, IT department managers, transfusion service managers, clinical service managers, IT suppliers

Background

The pandemic has had and continues to have profound consequences for the NHS severely disrupting healthcare. Digital tools have played an important role mitigating some of the challenges arising, with adoption being accelerated by necessity. Notable successes include the widespread deployment of video conferencing in support of social distancing. Over a million meetings a week are now conducted using Microsoft Teams across the NHS each week (NHS Digital 2021).

Digital infrastructure continues to be recognised politically as an important component of healthcare reform. The current Secretary of State for Health and Social Care has publicly stated the aim for 75% of all UK adults to be signed up for the NHS mobile app by March 2024 and to decrease the number of NHS organisations without an EPR from 20% to 10% by December 2023 (BMJ 2022).

Given the proliferation of digital systems in healthcare provision in the UK (DHSC 2018, Scottish Government 2018, Welsh Government 2021, Government of Ireland 2020), the need for the integration and interoperability of such systems becomes increasingly pressing. This year's incident reports continue to show that manual transcription of information between systems leads to preventable errors. In addition, opportunities to utilise information to support clinical decision making are being missed as information is not presented in a suitable accessible manner. For example, clinical information in the EPR that is essential to support decisions around transfusion is not always accessible to all those involved in decision-making. To make information available in non-interoperable systems, manual transfer of information from one system to another results in significant data integrity problems. This manual transfer is usually done either using verbal reports, paper records or transcription from one IT system to another. The choice of where and how information is stored varies from one organisation to another and the lists of systems to check for information is expanding to the point that a comprehensive review of all systems for possibly relevant information becomes impracticable for healthcare teams under increasing pressure.

In essence healthcare activity is increasingly reliant on practitioners aggregating information from an increasing number of disparate digital sources using manual steps that are vulnerable, amply demonstrated by successive years of SHOT reporting, to transcription errors. Much of the requirement regarding data aggregation is mundane, repetitive data entry work.

SHOT Collaborative Reviewing and reforming IT Processes in Transfusion (SCRIPT)

The SCRIPT group was formed by the laboratory and IT SHOT working expert groups in 2019. The main driver was to improve transfusion safety through improved IT systems and practices. SCRIPT aimed to identify gaps in practices, barriers for IT, recognise areas for improvement and begin a constructive dialogue between transfusion stakeholders and IT providers. Further goals included identifying training needs, promoting subject matter experts, and supporting and maintaining a community of practice within transfusion IT.

An initial online user survey was sent to registered SHOT reporters to gather data from transfusion professionals working in hospitals. SHOT requested that a single response was submitted per transfusion laboratory on behalf of all the hospitals/facilities that they supply blood to. Reporters were requested to submit their responses following discussion with members of the HTT, HTC and IT department, to get a holistic picture of transfusion IT throughout the hospital. The survey included questions relating to LIMS, EBMS, electronic temperature monitoring systems, electronic clinical systems, system functionality and barriers to improving systems. A summary of the findings can be accessed on the SHOT website (https://www.shotuk.org/resources/current-resources/script/). The key findings from the initial survey were:

- Several upgrades are offered for LIMS systems that transfusion services do not have the financial resources or time to implement consistently
- There was a general lack of knowledge of other electronic systems used within the hospital. For systems to be interoperable, communication should extend beyond the immediate users and the needs of the wider hospital considered where possible
- Many reporters indicated a desire for greater transparency from suppliers and increased support

- There were barriers to implementing new electronic systems for transfusion, mainly lack of resources and engagement from the Trust/Health Board
- There was a clear need for more training and resources for IT experts. A specialist role for IT experts in transfusion should be created

LIMS is a vital electronic system for transfusion laboratories, not only for controlling test results and issuing blood components, but also for interfacing with other electronic systems in the clinical area. The initial survey revealed problems with upgrades, as detailed in the key findings, and respondents noted that they would like to see:

- Increased interoperability of the LIMS with other systems (EPR, other pathology LIMS, pharmacy systems)
- Improved algorithms based on BSH guidance for sample validity, specific requirements based on age/gender, electronic issue, and remote issue, dereservation times, prevention of ABOi emergency unit release, antigen-matching between patient and component, apheresis platelets, COVID-19 convalescent plasma release, haemopoietic stem cell transplant compatibility, removal of flags, automated flags from other systems, logic for anti-D Ig release
- Improved functionality of flags and alerts

The SCRIPT team followed on from the initial survey with a survey designed to understand the current state of LIMS in the UK by speaking directly with the suppliers. The LIMS suppliers survey contained questions relating to LIMS support, functionality, and interoperability, particularly aspects identified by the responses to the initial user survey. An online survey was completed by a SCRIPT team member with representatives from the LIMS providers via virtual meeting or telephone contact between September and December 2021. There were 10 transfusion LIMS providers identified by the initial survey, all of whom were included in the supplier survey. Suppliers were asked about the specification of the current LIMS; the questionnaire did not cover details of any previous versions of the LIMS.

There was excellent participation from the suppliers, with all 10 suppliers identified from the SCRIPT user survey engaging in the survey process. The SCRIPT team would like to extend their thanks to the suppliers for engaging in this process. A summary of the findings can be accessed on the SHOT website (https://www.shotuk.org/resources/current-resources/script/) and is provided below, further details of the results can be provided on request to the SHOT office.

Interoperability with other IT systems

LIMS generally provided processes for interoperability with other IT systems. LIMS suppliers should work together with transfusion laboratory management, hospital IT departments and suppliers of other clinical IT systems to maximise interoperability within organisations and improve patient safety. Where interfacing with other systems is already present in organisations, suppliers and transfusion service managers should work together, with other relevant stakeholders, to ensure that electronic data flow is used to its full potential.

Upgrades to LIMS

Suppliers provide upgrades to LIMS which generally have no cost implications. The SCRIPT user survey noted that many organisations are not upgrading their LIMS due to cost related to implementation, time, and resource constraints. LIMS suppliers and transfusion service managers should initiate conversations to review the current LIMS version and upgrade where necessary. LIMS suppliers provide resources to support validation of upgrades which should be utilised as appropriate, and in accordance with local validation recommendations.

Functionality, rules, and algorithms

Although the majority of LIMS included rules and algorithms that supported good practice, several deficiencies were noted across a range of safe practice requirements. Suppliers should review their LIMS

to ensure that rules and algorithms support current national good practice requirements. Suppliers and transfusion service managers should work together to ensure that rules and algorithms in local LIMS are configured correctly to support good practice. Upgrading LIMS to current versions will ensure that the functionality of rules and algorithms is optimised.

Anti-D Ig management

There is a general lack of control around release of anti-D Ig in LIMS. Suppliers should review current UK guidelines and include rules and algorithms in the LIMS to support good practice.

Communication

There was a marked disparity between responses to the SCRIPT user survey and those in the supplier survey, particularly in respect to interoperability and functionality. This is potentially a result of many users having outdated versions of LIMS, a lack of understanding of LIMS configuration or lack of IT expertise within the laboratory. LIMS suppliers should work with transfusion service managers and IT departments to improve understanding, update systems, and ensure the LIMS is used to its maximum potential.

Errors related to IT in 2021

The number of reports related to IT is stable and Table 15.1 shows the distribution of errors across categories. This does not include near miss reports. The themes continue to be similar to previous years with IT flags, alerts, and warnings accounting for most errors.

Primary reporting category	Number of cases 2021
Incorrect blood component transfused (IBCT-WCT)	41
Specific requirements not met (SRNM)	116
Right blood right patient (RBRP)	109
Avoidable, delayed and under or overtransfusion (ADU)	41
Handling and storage errors (HSE)	67
Total	**374**
Anti-D Ig	25
Total including anti-D	**399**

Table 15.1: Source of cases containing errors related to IT

Further detail on IT errors can be found in individual case reports in this Annual SHOT Report.

Conclusion

The use of technology in healthcare provides an opportunity to support safe transfusion practice and reduce the risk of error. For clinical users the accessibility of patient data in a single system is key to providing safe care, however healthcare IT systems may be discrete, and integration may be challenging. When choosing electronic patient record systems, healthcare providers should ensure that interoperability with other systems is included in the user requirement specification. LIMS should support safe transfusion practice in the laboratory setting, including interfacing to other healthcare IT systems and should be regularly upgraded. Where system alerts are used in clinical and laboratory IT systems these must be appropriate and unambiguous to reduce risk of alert fatigue. IT systems have been shown to improve transfusion safety and efficiency (Murphy et al. 2019; Staples et al. 2019) and provide barriers to errors caused by human factors. However, it must be remembered that IT systems do not replace the knowledge and skills of healthcare staff. IT systems are subject to planned and unplanned downtimes and healthcare providers must have robust contingency plans for this and be able to provide continuity of the quality of care expected when the systems are unavailable. Teamwork is key to implementation and maintenance of effective electronic systems that support safe transfusion practice, this includes subject matter experts from the clinical, laboratory, IT suppliers and interfacing fields. With the inexorable march of new technology in healthcare in the UK it is incumbent on system providers to ensure that all relevant standards and best practice guidelines for transfusion are supported by their systems.

Recommended resources

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

SHOT Laboratory and IT webinar 2020
https://www.shotuk.org/resources/current-resources/webinars/

SHOT Bite No. 13: Information Technology and Transfusion (2020)
https://www.shotuk.org/resources/current-resources/shot-bites/

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