Errors Related to Information Technology (IT) 16

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Definition:

This category includes transfusion adverse events that relate to laboratory information management systems (LIMS) as well as other information technology (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. Where the corrective and preventive action suggested in response to errors included IT solutions, these have been included.

Key SHOT message

- Electronic blood management systems should now be a standard integral part of safe transfusion practice

Abbreviations used in this chapter

BSH	British Society for Haematology
DHSC	Department of Health and Social Care
EBMS	Electronic blood management system
EPR	Electronic patient record
FHIR	Fast Healthcare Interoperability Resources
IBMS	Institute of Biomedical Science
IT	Information technology
LIMS	Laboratory information management system
NBTC	National Blood Transfusion Committee
NHS	National Health Service
SCRIPT	SHOT UK Collaborative Reviewing and Reforming IT Processes in Transfusion

Recommendations

With respect to clinical and laboratory transfusion information technology (IT) systems, organisations should:

- Ensure laboratory and/or clinical input alongside IT department expertise in any procurement and implementation to ensure that the system is fit for purpose
- Configure IT systems to ensure they are used to their full potential according to local requirements
- Validate IT systems for safe use as well as compliance with regulatory and best practice guidance
- Consider the interoperability of IT systems involved in patient care as part of both the procurement and upgrade processes
- Ensure downtime processes and procedures are robust, accessible, and easy to implement

Action: Chief information officers, IT departments, transfusion IT subject matter experts, and transfusion leads

Introduction

This chapter focusses on two key themes. Firstly, the importance of the interoperability between IT systems used in clinical transfusion practice and secondly the progress made with the SCRIPT initiative. In addition, a new SHOT Bite (no.13) was published in August 2020 on Information Technology in Transfusion – Highlights and Lessons.

A discussion of how IT contributes to errors in clinical and laboratory transfusion practice can be found in the individual chapters as detailed in Table 16.1.

Table 16.1: IT error by main reporting category n=474, and near miss cases n=250

IT errors by reporting category		Discussed in chapter	Number of cases	Near miss cases
Incorrect blood component transfused (IBCT)	Wrong component transfused (WCT)	Chapter 10	50	72
	Wrong blood in tube (WBIT)*	Chapter 13a	-	23
	Specific requirements not met (SRNM)	Chapter 10	111	36
Near miss WBIT		-	-	23
Handling and storage errors (HSE)		Chapter 11	137	37
Right blood right patient (RBRP)		Chapter 14	116	58
Avoidable, delayed or under/overtransfusion (ADU)		Chapter 12	39	6
Miscellaneous		N/A	-	1
Sub-total		-	**453**	**233**
Adverse events related to anti-D immunoglobulin (Anti-D Ig)		Chapter 9	21	17
Total		-	**474**	**250**

** WBIT that have resulted in transfusion are included under IBCT-WCT*

Interoperability in transfusion IT systems

The provision of safe and appropriate blood transfusion requires effective, comprehensive, and timely communication of complex information. IT provides us with powerful tools to interrogate data and communicate information and the benefits of this power have led to IT permeating all aspects of daily life.

We are all familiar with smartphone technology that is easy to use and saves time. Being aware of what IT *can do* makes our experience of what it *does do* in healthcare so jarring. It also makes the decision by reporters as to which SHOT-reportable errors are IT related fascinating; if every error in transfusion can be ascribed in part to IT systems, either through their commission or theoretical omission, then the selection of a particular case tells us a great deal about professional expectations of what IT systems *should do.*

We continue to learn that the lack of interoperability between the myriad IT systems involved in patient care is greatly limiting the potential of IT systems to deliver on their promise of enhancing the quality and safety of transfusion practice. Such interoperability must be meaningful. Terms relating to interoperability are explained below.

Technical interoperability – the ability to move data electronically from one system to another - reduces transcription error which, as with other manual steps, is identified as a major source of error (Benson 2016). It is, however, not enough to realise the full potential of IT.

Semantic interoperability - wherein the context and meaning of data is understood between IT systems – provides a great opportunity for error reduction (Arvanitis 2014). To give two theoretical examples which go beyond current functionality but would enhance patient safety; data on fludarabine prescription contained within an electronic chemotherapy prescribing system could be sent to the transfusion LIMS and be understood to require the insertion of an irradiated blood component flag; a Wi-Fi connected infusion pump could stop transfusion of a blood component if the cold chain data or sample validity indicated the unit to have expired.

IT-related error reports demonstrate that healthcare professionals have an expectation of this degree of interoperability but that it is rarely achieved. The problem is complex and difficult and will require the convergence of political, organisational, technical, and cultural solutions.

Interoperability is a clear goal for the UK. The DHSC England policy paper - The future of healthcare: our vision for digital, data and technology in health and care was published in 2018 (DHSC 2018). The Scottish Government have also produced a digital strategy (Scottish Government 2018), Wales have produced the Written Statement: Digital Health and Care Wales (2021) and Ireland have produced an eHealth strategy (Government of Ireland 2020). Innovation in transfusion IT should be aligned in this political direction.

The constraints and challenges posed by the COVID-19 pandemic have accelerated the need for widespread technology adoption over very short periods of time. The clear need and urgency of the situation have shown that healthcare staff can adapt quickly when the benefit is sufficiently clear. This past year has taught us that rapid cultural and organisational change has proved possible and the technical potential offered by the FHIR standard, if widely adopted, could give traction on the previously intractable challenge of achieving meaningful interoperability. Fast Healthcare Interoperability Resources (FHIR) is the global industry standard for passing healthcare data between systems. It is free, open, and designed to be quick to learn and implement (https://fhir.nhs.uk/).

SHOT UK Collaborative Reviewing and Reforming IT Processes in Transfusion (SCRIPT)

The SCRIPT group was formed initially comprising of the laboratory and IT SHOT working expert group members, to begin a constructive dialogue between transfusion departments and IT providers, as well as identifying the support required by transfusion experts to harness the opportunity of IT systems to improve patient safety. An early goal was to agree minimal standards for LIMS that support safe practice and to explore options for interoperability with other clinical systems that may provide safer practices.

To identify the requirements of clinical and laboratory transfusion professionals SHOT designed and distributed a survey to all registered reporters via email. The aim was to understand which IT systems relating to blood transfusion are in use throughout the UK. The survey has provided valuable information on the scope, as well as the successes and challenges of these systems and will be used to plan and prioritise the work of the SCRIPT group going forwards.

Responses received from NHS and private organisations represent a wide range of blood usage and, in addition to laboratory information management systems, information has been provided on clinical EBMS, electronic blood ordering and prescribing systems, electronic temperature monitoring systems for blood storage devices, and other systems used for medications, chemotherapy and vital observations.

The full results of the survey are available on the SHOT website and the key highlights and important messages are summarised below.

- There was a general lack of knowledge regarding electronic systems in use within the hospital and some respondents were unaware how blood components were authorised and/or prescribed. There appears to be a lack of an electronic systems forum, or group, within organisations where implementation of systems that may be interconnected can be discussed. Potential for interoperability and improvements to transfusion safety may be missed in the absence of such a group. For example, interaction between chemotherapy prescribing systems and LIMS as described earlier in this chapter. Fully integrated systems, such as EPR systems may provide safety checks at every point of the transfusion pathway
- There is a clear deficiency in the use of electronic systems for blood component prescribing compared to the use of systems for chemotherapy, medications, and clinical observations. Electronic ordering, clinical decision support and prescribing of blood components is accessible with fully integrated EPR systems, but these were only available for 26.7% of respondents. Alignment of transfusion systems with other electronic systems may bridge this digital gap for organisations that do not have EPR implemented

- Upgrades to LIMS are often not implemented by laboratories due to financial or time constraints. Opportunities for safety improvements are being missed if upgrades are not applied to the system. Upgrades provide resolution to deficiencies noted by other users and will increase safety and functionality of the system
- Many respondents indicated a desire for greater transparency and support from the IT providers. The relationship between users and suppliers is critical in ensuring that systems are functional, updated, supported and that deficiencies can be identified and resolved in a timely fashion
- Despite the clear evidence for patient safety provided by EBMS, 43% of respondents have not implemented a system. The majority of those that had implemented EBMS included blood refrigerator controls, but less than 30% had full vein-to-vein functionality. Blood refrigerator controls have a clear impact on the safety of collection of components, but bedside functionality is vital to reducing errors that occur at the administration stage
- A clear need for training and resources to support IT experts in transfusion was noted. The functionality of transfusion LIMS is complex compared to other pathology LIMS and needs subject matter experts with knowledge of IT and transfusion. Such experts are critical to bridge the gap between clinical and IT staff and to provide expert advice during the implementation of large projects such as the procurement and implementation of an EPR. The continuous change and improvements in national transfusion practice requires responsive IT development to stay current
- National standards for transfusion LIMS are required to ensure that all systems operate to the same level of safety and functionality to reduce the risk of error. SHOT intends to collaborate with IT suppliers, BSH and NBTC to establish minimum standards for safe delivery of care and to explore support from the NHS Business Services Authority and NHS Digital

The SCRIPT group would like to thank those who responded to the survey, the responses will be used to progress the project. The SCRIPT project will continue with a survey of suppliers and the systems provided by them to support transfusion activities. A joint workshop for suppliers and users will be organised later in 2021 to review the responses to the surveys. The SCRIPT group will continue to collaborate with all key stakeholders to address the digital gaps identified in this initial survey. Updates from this work can be found on the SCRIPT page of the SHOT website (https://www.shotuk.org/resources/shot-surveys/).

Recommended resources

SHOT Bite No. 13 Information Technology in Transfusion
https://www.shotuk.org/resources/current-resources/shot-bites/

SCRIPT User Survey
https://www.shotuk.org/resources/shot-surveys/

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

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