SCRIPT

SHOT Serious Hazards of Transfusion

SHOT UK Collaborative Reviewing and reforming IT Processes in Transfusion (SCRIPT) LIMS Suppliers Survey 2021 Summary Report

INTRODUCTION

The SCRIPT group was formed by the SHOT laboratory and IT Working Expert Groups, with plans to extend to a wider stakeholder engagement.

The main driver is to enhance transfusion safety through improved IT systems and practices.

SCRIPT aims to identify gaps in IT practices, barriers for IT implementation and/or upgrades, recognise areas for improvement and begin a constructive dialogue between transfusion stakeholders and IT providers.

Further goals include identifying training needs to support transfusion subject matter experts, and supporting and maintaining good IT practice in the transfusion community.

In 2020 an online **LIMS user survey** was sent to all registered SHOT reporters to begin gathering data from transfusion professionals working in hospitals throughout the UK.

The responses highlighted several key aspects that users felt were deficient in current laboratory information management systems (LIMS).

Using these as a focus, SCRIPT undertook a **LIMS supplier survey** between Sept – Dec 2021. This was in the form of a one-to-one interview between a SCRIPT team member and representatives from **each of the 10 LIMS providers** identified in the user survey. There was 100% response rate from LIMS providers.

This information was entered into an **Online survey (formerly BOS)**, from which thematic analysis was undertaken to explore the status of current LIMS.

The data from the LIMS supplier survey is detailed in a **SCRIPT LIMS Supplier survey report**, and the main findings shown in this summary report.

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This summary includes LIMS supplier survey responses, key findings and recommendations for:

- **Functionality, rules and algorithms**
- **Interoperability between hospital IT systems**
- **Data extraction and audit trails**
- **LIMS Upgrades**
- **Anti-D Ig management**
- **Communication**
- **Future developments**
- **Next Steps**
- **Further resources**

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FUNCTIONALITY, RULES AND ALGORITHMS

Users wanted improved algorithms for: sample validity, specific requirements base on age/gender, electronic issue, remote issue, dereservation times, prevention of ABO incompatibilities (ABOi), antigen match between component and patient, haemopoetic stem cell transplant (HSCT) compatibilities, alert flags and anti-D Ig release logic
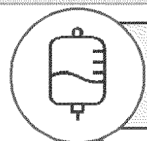
5/10 LIMS release incompatible red cells with a manual override by the user, and **5/10** do not allow release of ABOi red cells under any circumstances. **9/10** suppliers were compliant with electronic issue rules

All suppliers stated that their LIMS could release emergency components in the event of an unknown blood group and that only group O red cells and AB plasma could be released

7/10 LIMS provided support for appropriate release of all components for patients with HSCT, and **10/10** suppliers providing a system for antigen matching between patient requirements and component specification (4/10 only where antibodies where present on patient record, 6/10 with or without antibodies present on patient record)

All suppliers stated they had alerts to prevent release of components that do not meet patient's specific requirements, and **9/10** of these alerts were configurable by the user

10/10 provided a system for alerting where patients needed irradiated components, **9/10** alerts for CMV requirements, and **10/10** supported safe release of K-negative red cells based on patient age and sex
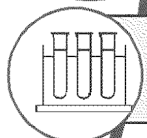
10/10 suppliers stated that their LIMS controlled sample validity, with **4/10** preventing release of red cells when sample validity had passed and **6/10** only allowing release with an appropriate override

5/10 provided Fetomaternal Haemorrhage (FMH) calculations

- **10/10** supported label verification
- **8/10** used the 2-sample rule for red cell issue
- **8/10** LIMS supported control over dereservation period
- **All suppliers** stated LIMS supported alerts for incomplete testing with 1/10 able to override without comment, 3/10 override with some comments and 6/10 supporting alerts for some tests
- **7/10** had an option for auto validation of results
- **8/10** had a process of identifying duplicate records

FUNCTIONALITY, RULES AND ALGORITHMS: Key findings and recommendations

Although the majority of LIMS included rules and algorithms that supported good practice a number of 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.

INTEROPERABILITY BETWEEN OTHER IT SYSTEMS WITHIN HOSPITAL

Users wanted improved interoperability with other systems (EPR orders, demographic updates, critical alerts, attaching reports, referral labs systems (Sp-ICE), pathology LIMS for Hb results, electronic traceability, blood stocks management, pharmacy and clinical systems for specific requirements)
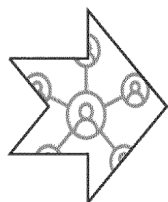
LIMS supported connections to:
- Blood tracking **(9/10)**
- Other Pathology LIMS **(9/10)**
- EPR **(8/10)**
- Blood bank analysers (8/10)
- Temperature monitoring **(2/10)**,
- Other IT systems (eg chemotherapy, DAWN and cancer registry)**(3/10)**
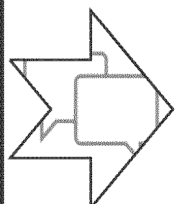
LIMS supported interfacing and messaging to:
- HL7 **(9/10)**
- NHSBT Electronic Delivery Note (EDN) **(9/10)**
- Full bidirectional interfaces to blood bank analysers **(7/10)** or partial interface **(3/10)**
- Bidirectional interface to Electronic Patient Records (EPR) **(8/10)**

INTEROPERABILITY: Key findings and recommendations

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 stakeholder, to ensure that electronic data flow is used to its full potential.

DATA EXTRACTION AND AUDIT TRAILS

Users wanted improved data extraction for monitoring purposes

- 7/10 LIMS supported a fully configurable reporting
- 1/10 supported limited reporting
- 1/10 supported but as separate statistics package
- 1/10 LIMS not supporting any reporting
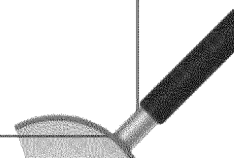
DATA EXTRACTION AND AUDIT TRAIL: Recommendation

All LIMS should support generation of reports that support the management of information by the laboratory

UPGRADES

Users stated concerns regarding upgrades including challenges with cost, implementation and supplier support

- There was a wide variety of upgrade frequencies with **1/10** ad hoc basis, **4/10** annual, **2/10** biannually, and **2/10** quarterly
- **7/10** stated no charge for software upgrades (**2/7** stated professional/service charges applied), **1/10** charges were customer specific, **1/10** charged for 'point' releases and **1/10** software was sold as licenced and upgraded versions were owned by the customer
- **All suppliers** stated provision of release notes in advance of upgrade
- Support with validation and implementation of upgrades could be provided at a charge by **6/10** suppliers and provided with no charge by **3/10** suppliers. **1/10** supplier stated validation was independent but could provide a 'test' system
- **All suppliers** stated they would share details with other users of the system if defect was found

UPGRADES: Key findings and recommendation

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, time and resource constraints.
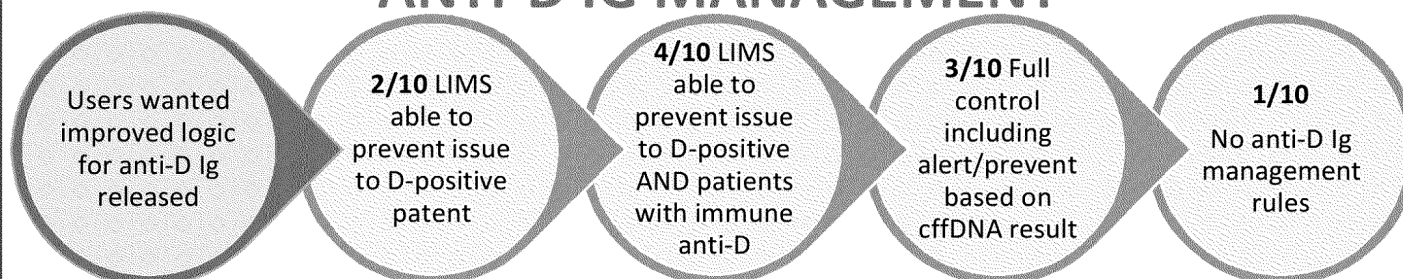
LIMS suppliers and transfusion service managers should initiate conversations to review the current LIMS version and upgrade where necessary.

LIMS suppliers provide resources to support validation of upgrades which should be utilised as appropriate, and in accordance with local validation recommendations.

ANTI-D IG MANAGEMENT

Users wanted improved logic for anti-D Ig released → **2/10** LIMS able to prevent issue to D-positive patent → **4/10** LIMS able to prevent issue to D-positive AND patients with immune anti-D → **3/10** Full control including alert/prevent based on cffDNA result → **1/10** No anti-D Ig management rules

ANTI-D Ig MANAGEMENT: Key Findings and recommendations

There is a general lack of control around release of anti-D immunoglobulin (Ig) in LIMS

Suppliers should review current UK guidelines and include rules and algorithms in the LIMS to support good practice.

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COMMUNICATION: Key findings and recommendation

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.

FUTURE DEVELOPMENTS

Suppliers noted improvement roadmaps for future LIMS releases included:

- Compatibility tables for post-HSCT patients are being extended to include platelet compatibilities.
- Identical system for all UK, configured locally for country specifications
- Interface to NPEx
- EDN connectivity
- Ability to capture patient information, including results from other systems, in a variety of ways such as comments, test results or external results. These can be used to guide clinical practice, e.g., antibody from NHSBT can be posted automatically to patient antibody file. Comments can be sent to EPR systems.

NEXT STEPS

| LABORATORY MANAGERS	LIMS SUPPLIERS	SHOT/SCRIPT
• Open dialogue between laboratory and LIMS providers to identify possible new interoperability options • Develop IT expertise within the transfusion department • Develop communications to LIMS suppliers to ensure functionality is being used to full potential	• Improve communication with laboratories • Improve awareness of system setup options • 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	• Facilitate workshop groups to allow users and suppliers to improve communication and details future needs and wants • Develop a community of practice and a body of transfusion IT experts • Create transfusion IT toolkits to aid laboratories to develop their systems to improve services

FURTHER RESOURCES
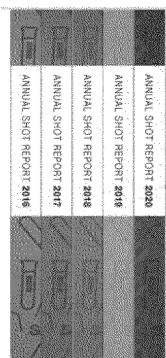
SHOT 2020 Annual Report - Errors Related to Information Technology (IT)
https://www.shotuk.org/wp-content/uploads/myimages/SHOT-REPORT-2020_V2.0_Chapter-16.pdf

SHOT 2020 Annual Report Laboratory errors
https://www.shotuk.org/wp-content/uploads/myimages/SHOT-REPORT-2020_V2.0_Chapter-15.pdf

SHOT Bite No. 13: Information Technology in Transfusion – Highlights and Lessons
https://www.shotuk.org/wp-content/uploads/myimages/SHOT-Bite-No.-13-IT.pdf

SHOT Bite No. 20: Incorrect blood component transfused – specific requirements not met errors
https://www.shotuk.org/wp-content/uploads/myimages/SHOT-Bite-No.20-IBCT-SRNM-September-2021.pdf

SHOT Bite No. 14: Transfusion Errors and Reactions in Patients with Haemoglobinopathies
https://www.shotuk.org/wp-content/uploads/myimages/SHOT-Bite-No.14-Transfusion-Errors-and-Reactions-in-Patients-with-Haemoglobinopathies.pdf

SHOT Bite No. 18: Transfusion errors in haemopoietic stem cell transplant patients
https://www.shotuk.org/wp-content/uploads/myimages/SHOT-Bite-No.18-Transfusion-errors-in-haemopoietic-stem-cell-transplant-patients-July-2021.pdf

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S Narayan (Ed) D Poles et al. on behalf of the Serious Hazards of Transfusion (SHOT) Steering Group. The 2020 Annual SHOT Report (2021)
https://www.shotuk.org/wp-content/uploads/myimages/Interactive_SHOT-REPORT-2020_V2.1.pdf

BSH Jones J, Ashford P, Asher D, et al. (2014) Guidelines for the specification, implementation and management of information technology (IT) systems in hospital transfusion laboratories.
https://b-sh.org.uk/media/15774/transfusion-jones-specification-implementation-and-management-of-informationtechnology-systems-in-hospital-transfusion-laboratories.pdf