NHS Blood Tracking Pilot: City University Evaluation Project

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Abstract. Automation of healthcare processes is an emergent theme in the drive to increase patient safety. The Mayday Hospital has been chosen as the pilot site for the implementation of the Electronic Clinical Transfusion Management System to track blood from the point of ordering to the final transfusion. The Centre for Health Informatics at City University is carrying out an independent evaluation of the system implementation using a variety of methodologies to both formatively inform the implementation process and summatively provide an account of the lessons learned for future implementations.

Keywords: Blood transfusion, RFID, Evaluation.

Every day, thousands of routine and emergency transfusions take place across the UK, the vast majority being carried out safely and without adverse incident. However, due to the complex sequence of activities, occasionally mistakes do occur. Transfusion of the incorrect blood type - known as 'ABO incompatibility' - is the most serious outcome of blood type error, primarily resulting from the failure of final identity checks carried out.

Research by Serious Hazards of Transfusion (SHOT) has shown that between 1996 and 2004, five patients died directly resulting from being given incompatible blood. Furthermore, ABO incompatibility was a contributing factor in the deaths of nine patients and caused major illness in 54 patients.

Stringent standards and regulations have been created by national healthcare bodies with the ultimate aim to enhance patient safety. In 2005 the Medicines and Healthcare products Regulatory Agency (MHRA) produced the Blood Safety and Quality Regulations to maintain a complete traceability record for all blood components and products from donor to recipient for 30 years. In 2006, the National Blood Transfusion Committee (NBTC) along with the National Patient Safety Association (NPSA) and SHOT issued the 'Right Patient, Right Blood' Safer Practice Notice which provides recommendations for improving the safety of blood transfusions, including an IT specification, the Electronic Clinical Transfusion Management System (ECTMS) guide.

Stemming from this knowledge and the continuous drive by healthcare organisations to improve patient safety, the NHS Connecting for Health (CfH) group and the NPSA have been in collaboration with the Mayday Hospital Trust to carry out a pilot of a new electronic blood tracking system according to ECTMS guidance. The

guidance provides a 'gold standard' for the automation of the blood transfusion process from identifying a patient and ordering of blood transfusion, through to the taking of blood sample for cross-matching, to final transfusion of the blood product. The expected benefits to be gained by the deployment of an electronic blood tracking system range from reducing inpatient safety incidents, reducing the number of samples rejected by the lab, automated information checking, enhanced accountability and audit trail, and improved traceability of blood/blood products.

The Mayday Trust will be using pilot areas of the hospital to assess how the use of the Trust's wireless local area network, Order Communications System, Pathology Laboratory Information Management System, Radio Frequency Identification (RFID), wireless fidelity (WiFi) and barcodes (linear and 2D) can be used to support adherence to the ECTMS guidance and reduce human error.

The team at the City University Centre for Health Informatics has been commissioned by NHS CfH to undertake a full independent evaluation of the Mayday NHS Trust pilot to ensure that the process is recorded, user views are accounted for, and recommendations about the implementation and effectiveness are useful to share with other NHS Trusts looking to use the IT specification. The evaluation will be collaborative with the Mayday and CfH, will incorporate formative, summative and comparative elements.

The project will use a mixed conceptual framework to guide the evaluation. The Project Research Objective Evaluation (PROBE) framework [1] (produced for the NHS Information Authority) is being used to generate the relevant research questions/ objectives according to five evaluation areas – strategic, financial, human, operational and technical. This framework is merged with a classic model to assess Information Systems (IS) success, the DeLone and McLean (updated in 2003) framework [2], which is being used to generate lower-level criteria to answer the specific higher-level research questions. This looks at six interrelated dimensions of success: system, service and information quality, use/intention to use and user satisfaction, and finally net benefits (hierarchically from individual to overall system). Concurrent assessment of the adherence to CfH, NPSA and MHRA standards and guidance will also be carried out.

A multi-method approach will be used throughout the evaluation process to ensure assessment of the many dimensions of the implementation project and that an optimal amount of detail is captured from numerous angles. Both qualitative and quantitative methodologies will be used longitudinally to continually assess progress and feed back to stakeholders and the implementation team as part of the formative component of the project. Social research methods will be used to assess the human factors throughout the implementation, an arguably crucial element often omitted from IS evaluations. A triangulation approach is being used to study user, stakeholder and patient views using the semi-structured interviews, surveys and document analysis. Both statistical and qualitative analysis techniques will be used with the data gathered.

Quantitative methods will be used to track the effects of the blood tracking system, mainly via the Mayday's own pathology database system as a source of data. The evaluation team is also recording other factors such as issuing of second wristbands, training trajectories, process timings and observational auditing of standard operating procedures in the transfusion process according to a proforma created by the Oxford Radcliffe Hospital Trust as a basis for external comparison of conformance with the

ECTMS. The rate of uptake of the new system is key to the concept of transferability between trusts and will be primarily assessed by examining changes in usage in the old versus new system over time. Numbers, rates and reasons for blood request, blood usage and blood samples rejected by the lab will also be tracked, as will adverse incidents reported by the Mayday transfusion team.

With further evaluation of the nature and effectiveness of the automated blood tracking system, further applications to other aspects of healthcare administration such as drug tracking may be explored.

References

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