NHS Blood and Transplant

NHSBT Board

28th July 2016

Interim Report - Transcription Errors in DTS Specialist Services

1. Status - Public

2. Executive Summary

Transcription errors have comprised around 0.5% of quality incidents occurring in Specialist Services[1]. Four of the 12 transcription errors reported over the last three years had the potential to affect patient care and were managed as serious incidents.

This interim report describes the changes made, and being made, to diagnostic platforms and Hematos to prevent a re-occurrence of past transcription errors. The introduction of an automated platform for rapid human leukocyte antigen (HLA typing) by August 2016 will remove the manual transcription step responsible for 8 of the 12 transcription errors reported over the last three years. This paper also summarises the work currently being delivered or under evaluation to:

- Further reduce the requirement to manually transcribe data;
- Design less error-prone processes and working environments through an improved understanding of the contribution of "human factors".

3. Action Requested

The Board is asked to:

- Note the progress made introducing an automated typing platform which will obviate the need for manual transcription in reporting deceased donor HLA types to ODT;
- Note the work planned and in progress to further reduce the opportunities for human error in Specialist Services.

4. Background

4.1. NHSBT's Specialist Services are geographically dispersed across multiple sites. As a generalisation, the services are more complex than those provided by NHS pathology laboratories; they involve patient-specific investigations rather than automated diagnostics, they demand the highest levels of scientific expertise and technological capability. Moreover, blood transfusion and transplantation are inherently high risk therapies in that the provision of an incorrect result or inappropriate product can lead to harm or patient death. A systematic and patient-centred approach which minimises the occurrence of laboratory errors is therefore an essential part of providing clinically-

[1] Specialist Services comprise Red Cell Immunohaematology, Histocompatibility and Immunogenetics, Cellular and Molecular Therapies, Stem Cell Donation and Transplantation, and the International Blood Group Reference Laboratory.

appropriate services. Each laboratory is subject to inspection and licensing by a variety of regulatory and accreditation authorities.

4.2. Quality incidents are assumed to be representative of errors occurring across Specialist Services, because all errors which escape detection and correction are reported and managed within the quality system as major or "other" quality incidents. An analysis of quality incidents occurring in Specialist Services over a three year period[2] revealed 12 events (0.5%) due to erroneous data transcription. These 12 events are shown in Table 1.

Table 1. Transcription errors in Specialist Services over a three year period

Type	Transcription errors occurring between 2013/14 and 2015/16
A	1 x recipient weight recorded incorrectly (CMT)
B	1 x donor progress report compiled incorrectly (H&I)
C	8 x deceased donor HLA type recorded incorrectly (H&I)
D	2 x patient name or number recorded incorrectly (RCI)

4.3. At time of writing, the following actions have been completed, or are nearing completion, to prevent a re-occurrence of the events shown in Table 1:

A. A spreadsheet now alerts the operator when a potentially discrepant patient weight is entered (preventing a re-occurrence of event type A, Table 1);

B. The manual compilation of donor progress reports has ceased, and will be resumed in November 2016 once fully automated (preventing a re-occurrence of event type B, Table 1).

C. Deceased donor HLA types will be automatically transferred from a new rapid HLA typing platform to Hematos from August 2016 (preventing a re-occurrence of event type C, Table 1).

D. RCI and H&I currently receive requests for investigations on paper forms, and patient details and demographics are entered manually into Hematos. While various checks and constraints are imposed on this process, there is no immediate prospect of introducing the widespread electronic interchange of data with hospitals to remove this requirement for manual data entry.

4.4. Future initiatives to further reduce laboratory errors, including transcription errors, are being considered and delivered through improvements to IT systems and through continuous improvement initiatives including work on the contribution of human factors to laboratory errors. These key components of a patient-centred error-reduction framework are considered below in relation to transcription errors. The action plan for Specialist Services is summarised in Table 2 the end of this paper.

5. Information Technology

5.1. IT systems, and Hematos in particular, remain at the centre of efforts to reduce laboratory errors including transcription errors; 84 of 210 software and settings changes introduced since 2013 were designed to reduce the likelihood of laboratory error.

5.2. Around 65% of laboratory platforms in Specialist Services are currently networked with Hematos, in this way supporting the automated transfer of data and obviating the need for manual transcription. An additional opportunity therefore exists to extend the

[2] The data given in this section were derived via a manual review of quality event descriptions on Q-Pulse and will therefore be subject to some degree of interpretation bias. The definition of transcription error used here excludes errors of data interpretation.

automated exchange of data to the remaining 35% of platforms. A Project Request Form (PRF) to this effect will be submitted to the Transformation Programme Board in August 2016 (Table 2). Within scope will be an extensive audit of data transcription steps amenable to automation and subsequent risk-based approach to removing transcription. A "proof of concept" phase involving the automated transfer of RhD genotyping data from a PCR (polymerase chain reaction) device to Hematos will be included, as this is a technique increasingly used for certain tests.

5.3. A further opportunity is to continue work on the automatic exchange of data between hospitals and Hematos. NHSBT has assembled a small group (led by the Head of RCI) to provide expert advice to NHS Digital who are developing standards for the exchange of transfusion-related data. This work is scheduled to substantively complete during 2016 (Table 2), and is seen as a pre-requisite for Laboratory Information Management System suppliers to adapt their diverse systems to exchange data with Hematos.

6. Continuous Improvement

6.1. All Specialist Services business units engage in a programme of continuous improvement (CI) events, informed each year by a value stream analysis. There are two over-arching aims relevant to reducing transcription errors namely:

a. To equip frontline staff with the skills and tools to pro-actively identify error provoking situations;

b. To provide frontline staff with a structured opportunity to reduce laboratory errors by designing better processes, systems and environments.

6.2. The first aim is achieved by applying an improved understanding of the role of human factors in laboratory errors (discussed below). The second aim is effected though set piece events as well as smaller local improvements initiated by staff. Standardisation and adoption of best practice need to be maintained, and so the programme is co-ordinated by a small central team with a deep understanding of both CI and Specialist Services operations. Error reduction is achieved by:

a. Incorporating error prevention and error detection into process design (this often involves changes to Hematos);

b. Designing processes to fail safely;

c. Simplifying processes to reduce ambiguity and complexity;

d. Providing staff with distraction-free work environments including "reporting cells";

e. The use of visual management aids with a focus on safely handing work over between shifts (an increasing requirement of extended day working);

f. Consistently recording, reviewing, trending and acting on errors including near-misses.

6.3. With respect to reducing the likelihood of future transcription errors, two initiatives are being introduced across Specialist Services (Table 2). First, CI events are starting to incorporate Failure Modes and Effects Analysis (FMEA)[3] where appropriate. This is a systematic process for identifying potential process failures before they occur. In addition, all Specialist Services laboratories will implement Kamishibai from July 2016 onwards. This system of "spot-check" inspections will provide increased assurance that optimal and standardised procedures are followed in all laboratories.

[3] Failure Modes and Effects Analysis (FMEA) is a systematic, proactive method for evaluating a process to identify where and how it might fail, and to assess the relative impact of different failures in order to identify the parts of the process that are most in need of change.

7. Human Factors

7.1. Employee haste and distraction are often cited when investigating quality incidents. Spikes in workload are inevitable and are associated with an increased risk of laboratory error, especially out of hours, and workload, staffing levels and on-call rotas are regularly reviewed. Recently the science of human factors has been applied to healthcare with the recognition that people cannot be made perfect, rather attention should be given to improving the working environment to minimise risks[4],[5]. Hence the human factors approach seeks to create environments where staff can focus on one critical task at a time without distraction or the perceived pressure to "cut corners".

7.2. Organisations such as the National Air Traffic Services (NATS) have developed and refined a proactive approach to error reduction by observing and evaluating work as done, not as imagined, focussing on how humans interact with equipment, processes and each other.

7.3. Through June to October 2016, Specialist Services will be integrating human factors into its CI programmes as part of an NHSBT-wide initiative co-ordinated through Quality Assurance. Further detail is provided in Table 2.

8. Action Plan

8.1. Table 2 summarises the key activities planned from Q2 2016/17 onwards as part of a patient-centred error-reduction framework to further reduce the likelihood of transcription errors.

[4] Reason J. Understanding adverse events: human factors. Quality in Health Care 4:80 (1995)

[5] The Human Factors Concordat. NHS England (2013). https://www.england.nhs.uk/wp-content/uploads/2013/11/nqb-hum-fact-concord.pdf

Table 2. Key Elements of SpS Planning to Further Reduce the Risk of Transcription Error

Action	Outcomes	Deadline
Information Technology		
The automated transfer of data from laboratory platforms to Hematos, reducing the requirement for manual data transcription. *Subject to PRF approval, it is anticipated that the first phase of this work will take around 11 months to complete and will culminate in an Outline Business Case.*	1) Completed proof of concept, transferring binary genotyping results from a real time PCR platform to Hematos; 2) A list of equipment currently lacking an interface with Hematos; 3) Maps of data and process flows including an assessment of transcription risks; 4) Potential solutions identified.	PRF August 2016
NHSBT to contribute to the development of standards to enable to exchange transfusion-related data between IT systems.	NHS Digital-endorsed standards for transfusion-related data sets made available to providers of laboratory information management systems (LIMS).	April 2017
Continuous Improvement		
All CI events will deploy FMEA methodology where appropriate.	A more systematic approach to scrutinising laboratory processes and opportunities for failure.	June 2016 onwards
Kamishibai will be extended to all laboratories	Ongoing assurance that best practice is embedded and sustained.	July 2016 onwards
Human Factors		
The use of problem solving cells[6] currently being piloted in RCI Filton will be extended to all Specialist Services laboratories.	A lean, routine and rapid approach to identifying and implementing opportunities to reduce errors.	December 2016 onwards
NATS-provided specialist training in observational techniques.	1) Scientists trained to identify opportunities for human error associated with the controlled-rate freezing procedure; 2) 10 checklists completed by trained staff at each laboratory; 3) A rapid improvement event informed by the data above; 4) A less error-susceptible process, rolled out and sustained nationally. 5) Based on learning achieved, a plan to roll out the human factors approach to further reduce laboratory errors.	June to November 2016

[6] Problem solving cells are scheduled weekly opportunities where staff participate in finding solutions to ongoing problems typically identified through analysis of local Manhattan plots. In this way, problems are solved "in real time" rather than weeks after the event.

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