REDUCING TURNAROUND TIME FOR TROPOGIN T AS AN EMERGENCY TEST

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Introduction
Troponin T is analysed within the Biochemistry Department at Monklands Hospital in NHS Lanarkshire. Troponin T is a protein which is released from cardiac muscle follow-
ing myocardial damage and is therefore an indicator of cardiac events such as myocardial infarction. The availability of a Troponin T results allows clinicians to triage patients effectively within an appropriate time period.

The turnaround times for Troponin T results for patients in the Emergency Department (ED) and the medical Emergency Receiving Unit (ERU) were creating a backlog of patients waiting for their results and this resulted in delays to decision making regarding admission or discharge. This resulted in a poor patient experience and an increased number of breaches waiting for diagnostic test results and congestion in A&E and ERU.

The aim was to reduce the turnaround time and also reduce the variability in the turnaround times to ensure a reliable process with staff confident when results would be available.

Methods
The Flow Cost and Quality project at Monklands facilitated the Service Improvement using the principles and tools from ‘clinical systems improvement’ which draws on concepts and principles from two key manufacturing methodologies – ‘lean’ and the ‘theory of constraints’.

The Flow Project employs The Big Room arrangement and the A3 Problem Solving method to achieve coordination, intellectual and emotional engagement and commitment. The Big Room in Monklands is the central hub of the project with the team holding a weekly open meeting and the room walls are dedicated to displaying the vital measurements at hospital and departmental level and also displaying the patient flows across wards and departments (Visual Management).

A patient centred approach and emotional engagement was achieved using patient stories at the weekly meetings.

The team used the A3 problem solving technique to review the current situation within Biochemistry and process mapping followed. The mapped process was reviewed by a multi-disciplinary team. Turn-around time of samples was calculated from the time a sample arrived in the laboratory to the time a result was available electronically. This data was obtained from the InterSystems Laboratory Information Management System (LIMS), TrakCare Lab.

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Results
As Troponin T results were susceptible to interference from haemolysis, samples had to be analysed to assess their degree of haemolysis on a chemistry analyser prior to being analysed for Troponin T on an immunoassay platform. This was creating a two stage process which was causing a delay. This was combined with a further time delay which was an increased variability in process time later in the day when the laboratory was processing a significant number of routine samples from General Practice as well as the hospital inpatient work.

Turnaround times from February 2014 are detailed in Figure 1. The original turnaround time had a median of 107 minutes during this month and 95% of Troponin T results were available within 142 minutes of the laboratory receiving the sample.

During March 2014 new analytical equipment (Roche Diagnostics Cobas 6000) was installed. This allowed Troponin T samples to be assessed for haemolysis and analysed on the same analytical platform, taking a manual step out of the process i.e. samples no longer had to be manually transferred from one analyser to another.

At the same time actions coming from the process mapping and the A3 problem solving method were implemented. Some of the actions were:

- The Emergency Department and Emergency Receiving Unit (ERU) highlighted their Biochemistry requests with orange stickers so on arrival in the laboratory their processing could be kept separate from the routine samples with the aim being that this would reduce variation reduce processing time.
- The Yellow top vacutainers were changed to Green top vacutainers to reduce the possibility of haemodilysis occurring.
- The A&E medical and nursing staff were giveresher training to ensure high quality reproducible vacutainer technique to reduce haemodilysis occurring.

The Results for the Turnaround Time for Troponin T following the introduction of these changes on the 4th March 2014 are displayed in Figure 2. Based on this data 99% of TNT results are now available 90 minutes after the Laboratory has received it and 95% will be available 75 minutes. With the changes implemented there is now a reduction to a median of 47 minutes. The spikes in the data illustrated in Figure 2 can be accounted for in the majority as “add on” tests, where the Troponin T request has been added retrospectively to a sample already received by the laboratory for other test analysis.

The number of breaches of the 4 hour waiting target has also been reduced. Original breaches, waiting for a test result averaged 15 per week (Dec 13-Feb14) and after the changes it is 8 per week (April 14 – August 14) – Figure 3.

Conclusion
In summary the changes made to the laboratory analyser configuration and the flow of samples through the laboratory has led to a significant reduction in the turnaround time of this test and reduced the variability. This has led to:

- An improved patient experience with less waiting.
- Improved patient safety through faster decision making and treatment initiation.
- Improved patient flow with an earlier decision being made to either discharge or admit patients attending the Emergency Department.
- Improved patient flow with discharges taking place earlier in the day, freeing up beds.

References
The A3 Problem Solving Process, Silvester, K. and the Teams at South Warwickshire NHS Foundation Trust and Sheffield Teaching Hospitals NHS Foundation Trust. The Flow, Cost, Quality Programme was commissioned by The Health Foundation an independent charity working to continuously improve the quality of healthcare in the UK. K Silvester The Big Room Process FINAL 12.4.12 PDF 250113


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