

Improving Radiology Practice Using the DMAIC Approach of Lean Six Sigma

Penny Impey
November 2015

Many methodologies



ed, White and Blue
yfe Lockwood



Koru (Black)
Designed by: Andrew Fyfe



Silver Fern (Black, White and Blue)
Designed by: Kyle Lockwood



Black & White Fern
Designed by: Alofi Kanter



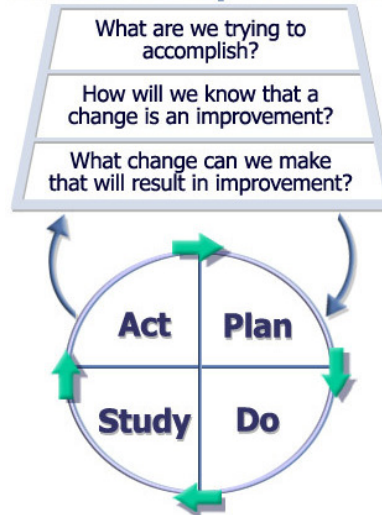
Red Peak
Designed by: Aaron Dustin

Accreditation



Risk Management

Model for Improvement



A3 Reporting



Breakthrough Series Collaboratives



- Lean is about the *elimination of waste* and non-value adding work
- Lean was pioneered by Toyota post WWII and became the TPS
- Six Sigma focuses on the understanding, *reduction and control of variation*
- Six Sigma can be traced back to the early 1800's but is most often associated with Motorola.

The DMAIC Approach

- Measurement Plan
- Handover plan



- Identify solutions
- Pilot changes

- Identify the problem
- Build the team
- Hear the voice of the customer/patient

- Current process maps
- Data collection
- Control charts/Graphs

- Root Cause and hypothesis testing



Define - Project Charter

Problem Statement:

Starship (SS) radiologists are reporting on, or giving second opinions on imaging that have been done by other DHB Radiology departments.

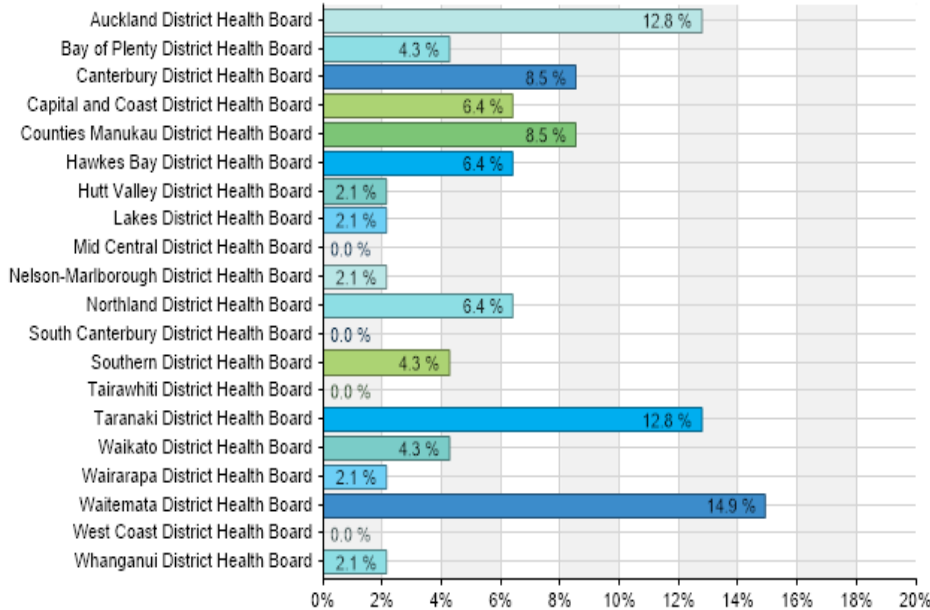
There are currently no defined processes, documentation or funding mechanisms for this work which increases the clinical risk for patients and quality and efficiency issues for ADHB radiologists and resulting in unfunded work.

Project Goal

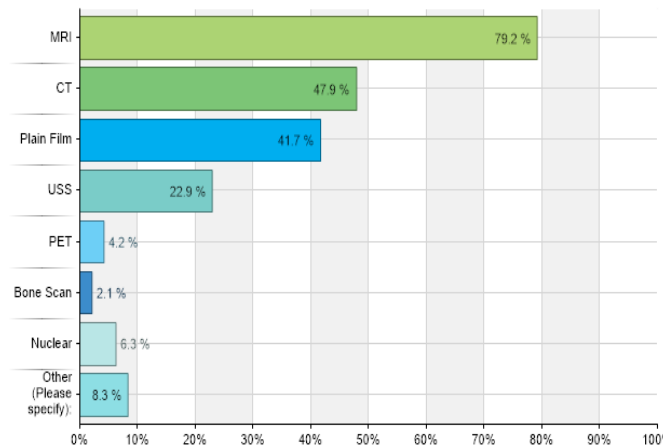
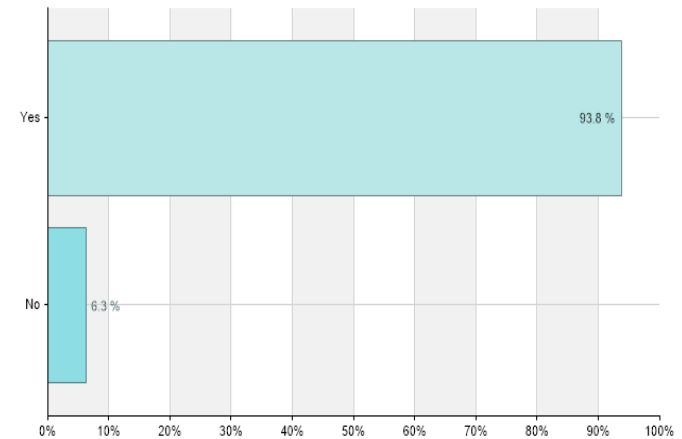
By November 2015 there will be a defined and agreed process, documentation and funding model for external requests to Starship radiology.

Voice of the Customer

Responding Radiology Departments



Are you satisfied with the response time to your request?

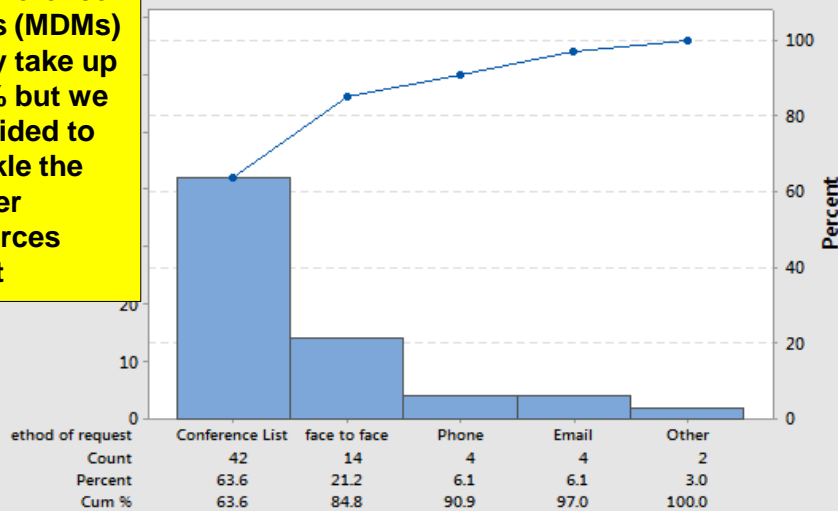


Which modalities do you request reports or second opinions on?

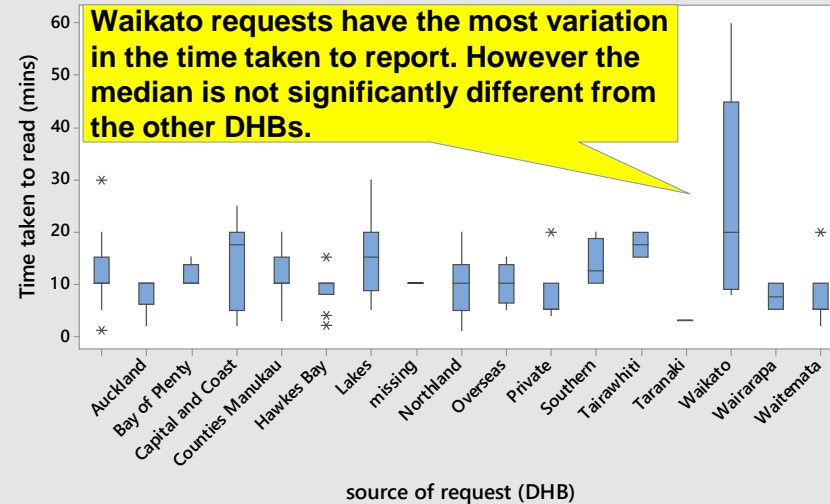
Measure - Baseline Performance

Conference lists (MDMs) may take up 44% but we decided to tackle the other sources first

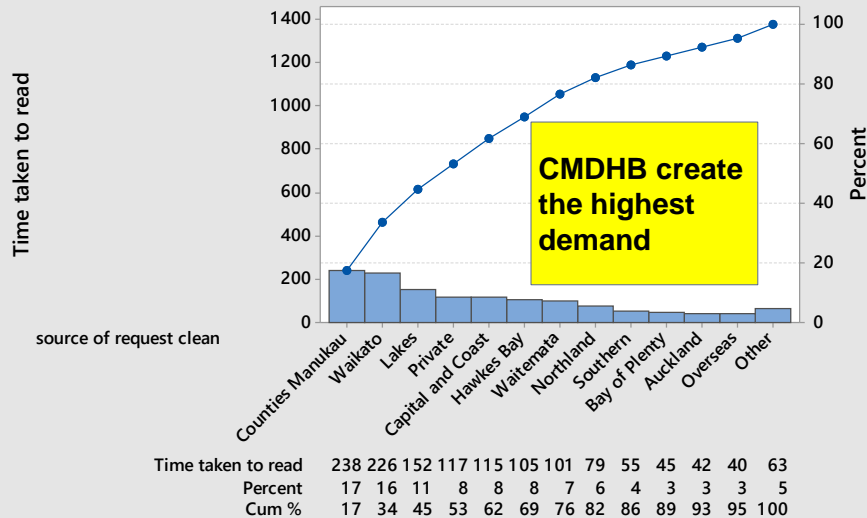
Method of Request



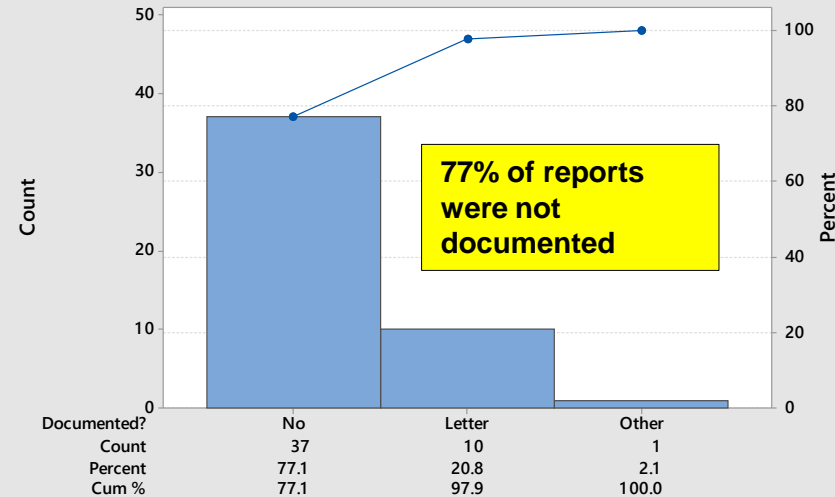
Boxplot of Time taken to read



Pareto Chart of source of request clean

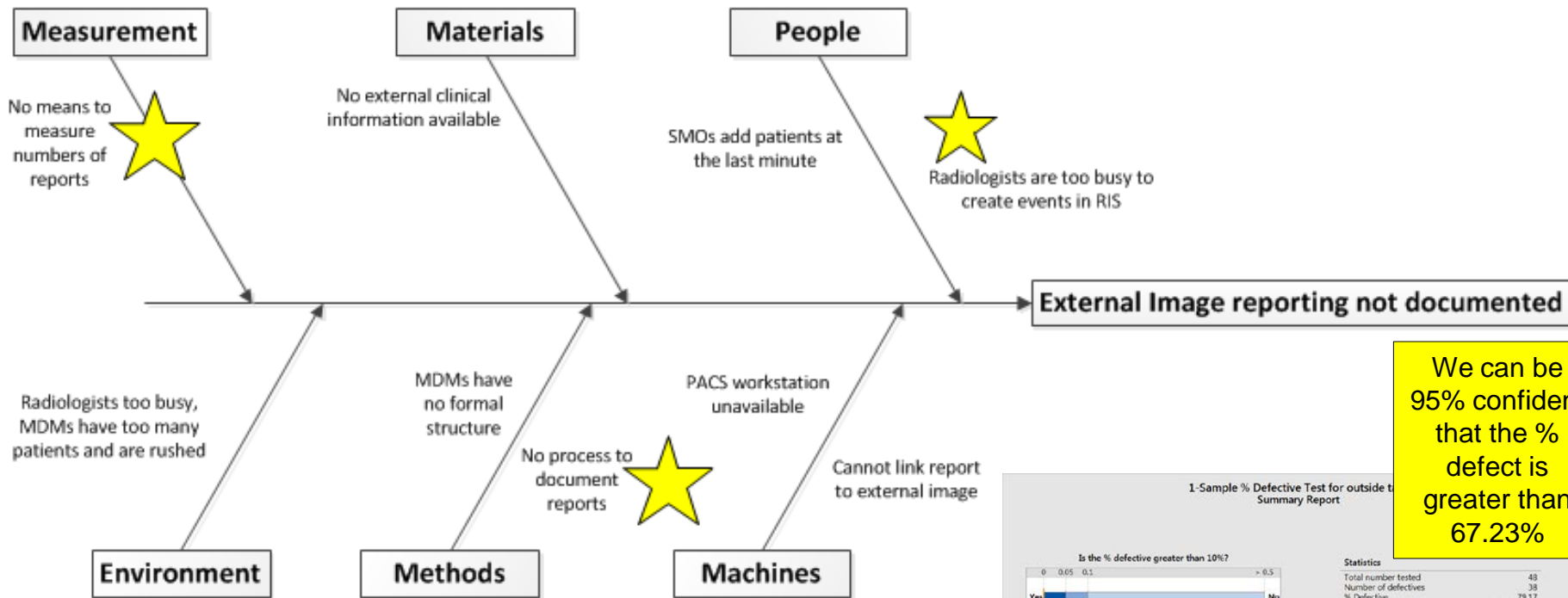


Pareto Chart of Documented?

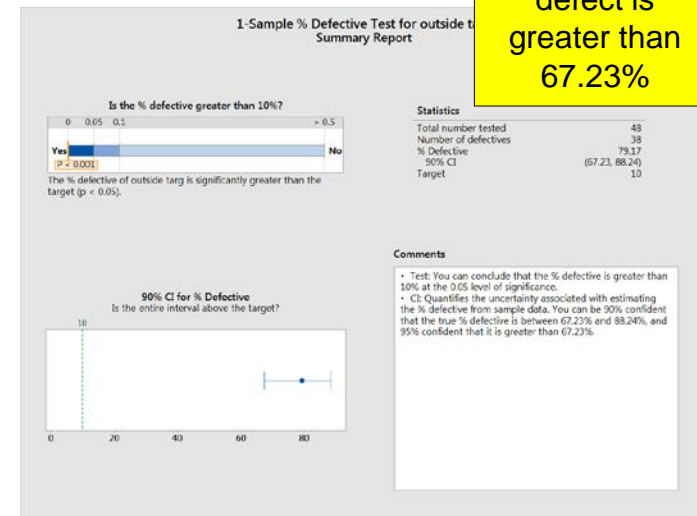


Analyse – Identifying Potential Root Causes

Cause and Effect Diagram for External Image reporting



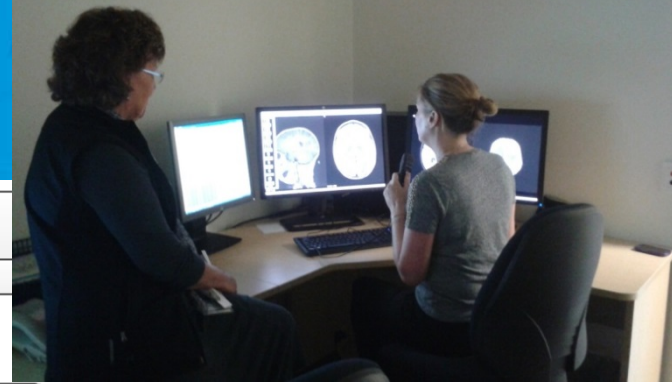
We can be 95% confident that the % defect is greater than 67.23%



Hypothesis testing: Null Hypothesis: There is no difference in the number of reports that are not **documented** against the target of 10%.

We have very strong evidence against the null hypothesis and the p value is 0.001, we can therefore reject the null hypothesis.

Improve – Selected Solution

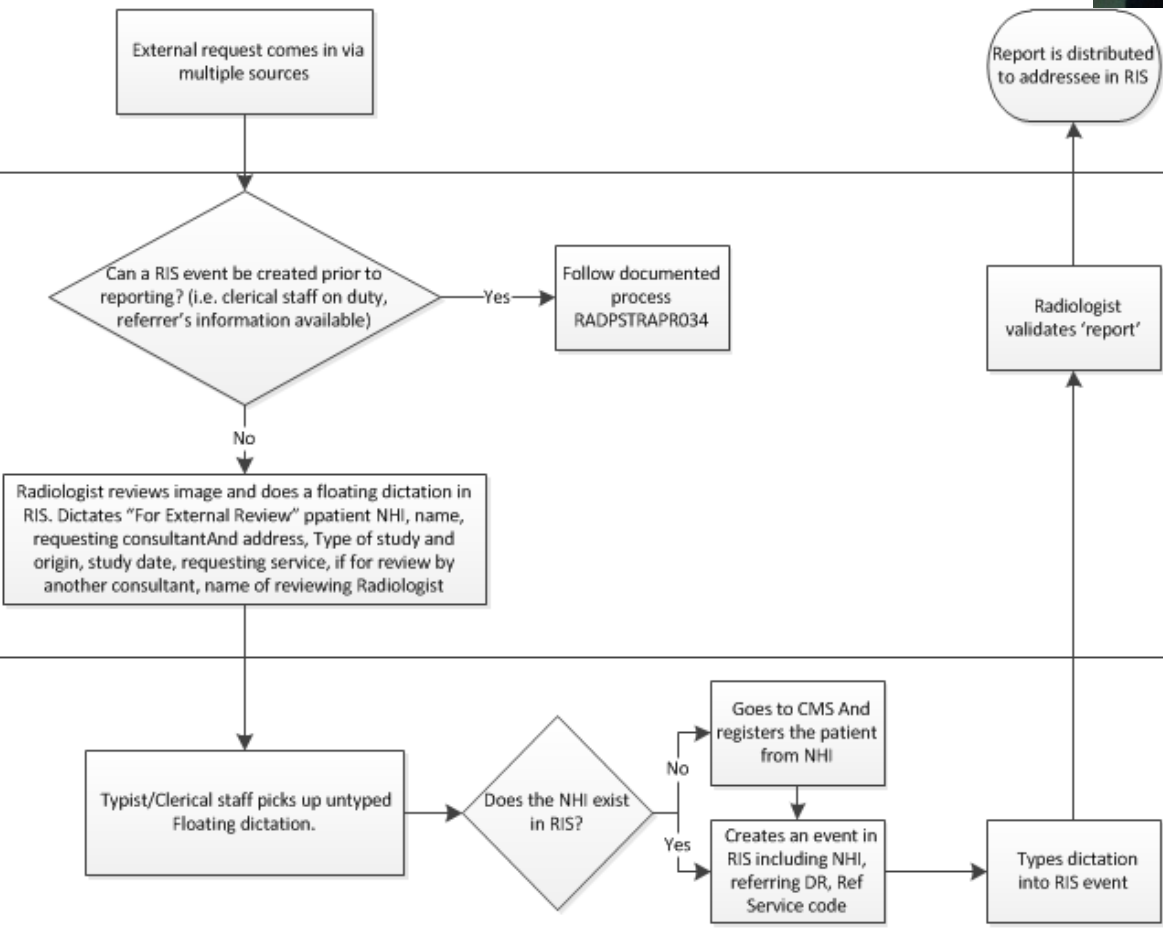


Radiology Ad Hoc External Image Reporting Process

External Referrer

Radiologist

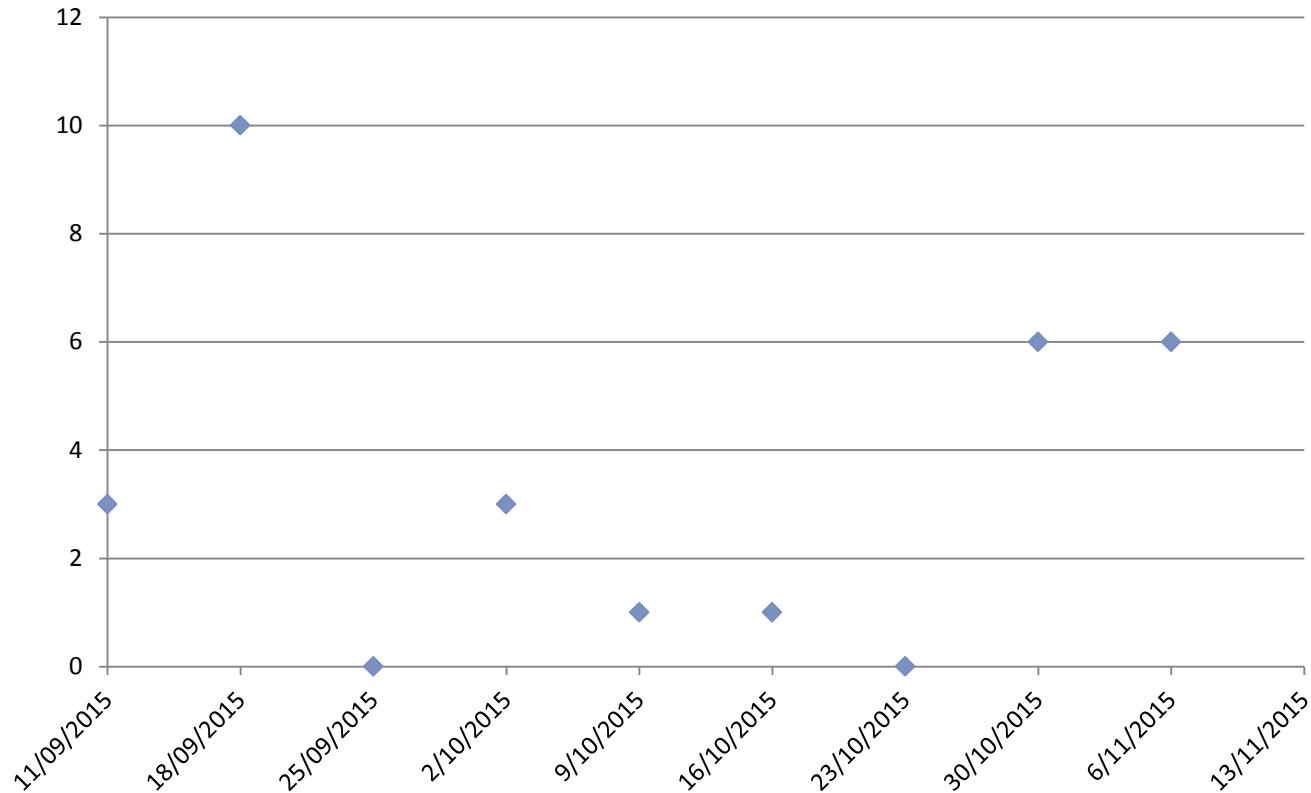
Typist/Clerical



We decided to carry out a 10 week pilot of the new documentation process using floating dictation with three radiologists

Pilot results

Number of Floating Dictations in Pilot Weeks



Over the 10 week pilot there has been a total of 30 floating dictations completed resulting in documented reports that are accessible and with a potential revenue of \$NZ6,000 so far.

Control – handover and lessons learnt

Handover Plan

- The process map and guidelines have been completed
- Training of all Starship radiologists is underway
- We are measuring the numbers of floating dictations weekly
- Roll out across adult radiology is in the planning stage

Lessons Learnt

- Using the DMAIC approach helped maintain some project structure and momentum, and it was clear that one stage fed the next
- There is enough flexibility in the methodology to allow for human behaviour and change management
- Having a common language for improvement projects is useful