Achieving Six Sigma Quality for Lost Samples: A Success Story
INTRODUCTION

Laboratorians recognize that every lost sample carries the potential for a poor patient outcome. Lost sample metrics are one of several universally accepted measures of lab quality. The goal of these measures is to prompt actions that will ensure effective management of each sample the lab receives. The quality-management principles applied at ARUP provide a case study for reducing lost sample rates in the laboratory.

QUALITY-IMPROVEMENT INITIATIVES

Following the implementation of ARUP’s initial automation system in 1998, ARUP noted a steady decline in lost sample rates, validating the error-proofing maxim that removing the human factor from the process reduces error potential and improves performance. A second major initiative adopted in 2004, which included automated storage and retrieval of samples, resulted in another noticeable drop in lost sample rates. However, automation of the delivery process alone did not remove every opportunity for error.

In October 2005, the specimen processing and technical sections collaborated on an improved process for lost sample investigation, which included a requirement for two independent searches for each missing sample report, management signatures to ensure awareness, a time frame for initiating and completing searches, a training module, and a missing sample checklist. Each area developed and published an individual checklist detailing where to look for misplaced samples. Reports were analyzed, and the forms were adjusted to include any new insights.

Lost Sample Investigation Checklist

Each search is completed and documented twice by different employees.

With the assimilation and standardization of this process, for the first time, ARUP achieved Six Sigma performance for sample management in November 2007; this means fewer than 3.4 “defects” or lost samples per one million “opportunities” or tests performed.

ARUP anticipated that conversion to a new LIS in January 2009 would disrupt normal workflow, but a heightened-awareness campaign paid off, and the lost sample rate remained stable during this period.

The greatest value of the new checklists proved to be the information gleaned from a retrospective review of the reports. In 2009, all sections handling samples were required to include a misplaced sample indicator in their quality plan. Misplaced samples are those that are reported missing but are later found. Based on the information from the indicators,
ARUP realized that for samples not placed on the automated track for delivery, human error at hand-off remained a significant factor in poor sample management.

An internally developed system for managing the hand-off between specimen processing and the testing sections was implemented in spring 2010. Implementation of the Sort-to-Light system, which uses bins that light up to indicate the correct storage location when a corresponding specimen bar code is read, resulted in a 43 percent drop in the mean lost sample rate.

In September 2010 and again in April 2011, ARUP Laboratories achieved a Six Sigma process metric for lost specimens.

Lost Samples Per Million Tests Performed

CONCLUSION

Achieving Six Sigma quality requires judicious use of a variety of quality methods and models. Even those strategies considered weak (such as enhanced awareness and training) have value in the right context.

The act of measuring allows management to assess where and how errors are happening. This information prevents tampering and leads to proactive preventive action rather than reactive corrective action.

A checklist, considered a moderately effective quality tool, is remarkably effective for error management with tasks that cannot be automated. Additionally, managing hand-offs yields large returns in terms of consistent improvement.

However, pushing a process to its greatest potential—a Six Sigma performance metric—requires removing the human from the process through automation.
REFERENCES


CONTRIBUTORS

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