



B45 Use of Lean Six Sigma Methodology to Improve Laboratory Productivity and Reduce Backlog

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After attending this presentation, attendees will better understand how a laboratory can increase productivity and reduce case backlogs by implementing a workflow optimization method called Lean Six Sigma (LSS).

This presentation will impact the forensic science community by improving the experience and potential for success for laboratories considering implementing LSS concepts within their laboratory.

In 2012, the Massachusetts State Police Forensic Services Group (MSPFSG) secured grant funding to address existing case backlogs in the forensic biology section. As part of this initiative, the MSPFSG completed a LSS project that evaluated the laboratory's workflow and implemented changes to increase productivity and efficiency. The project team included two facilitators from the consulting agency and 12 MSPFSG members representing the Evidence Control (ECU), Criminalistics, Case Management (CMU), and DNA sections. The ultimate goal was to create a highly productive, quality-driven environment capable of meeting the demand for forensic biology examinations and eliminating the current backlog.

Employing the systematic process Define, Measure, Analyze, Improve, Control (DMAIC), the team evaluated the laboratory's current state and developed baseline metrics to monitor the progress of the project. Using data collected from the Laboratory Information Management System, current case demand and output were calculated and a project charter was constructed outlining specific, measurable goals and a timeline to achieve them. The forensic biology section spent approximately six weeks on the measurement phase eliminating all work in progress, mapping current processes to identify sources of process waste, and summarizing the current work and information flow. This data was analyzed to determine what changes could most significantly improve the overall process. A focused problem statement was developed by each unit with ideas for improvements to address these identified areas.

In Criminalistics, the improvement phase addressed extensive wait times between process steps and a lengthy review process. Data indicated that approximately 80% of errors identified during case review were administrative in nature. Consequently, standardized worksheets for evidence examination were created in place of "free-form" note taking, and ECU intake procedures were updated to address sources of administrative errors prior to case submission. The case assignment process was restructured to create smaller, more frequent case assignments and a standardized workflow schedule was designed to maximize the capacity of work completed in a five-day cycle; however, successfully implementing this schedule proved to be a challenge due to analysts' frequent court testimony and crime scene response. The unit is continuing to evaluate and modify the work flow and, despite these challenges, as of July 2014, the analysts' turn-around time decreased by 74% and the case review time decreased by 21%.

CMU focused on the case activation process for DNA testing and the method for obtaining authorization to consume samples of limited quantity. Many cases remained on the backlog indefinitely because they required critical documentation from the requesting agencies. Several redundancies were also identified in the case assignment process. The improved procedures streamline the activation of cases for DNA analysis and place specific timelines on the requesting agencies to provide the documentation required for analysis to proceed. Using these improved procedures, as of July 2014, the CMU case backlog decreased by approximately 30%.

In the DNA unit, the improvement phase focused on designing a schedule that condensed the workflow from 12 weeks to two weeks. This new schedule introduced standardized work practices, implemented a team-based approach, and defined expected daily tasks. Though the DNA unit needs to make further adjustments to meet the new schedule, as of July 2014, the average case turn-around time decreased from 202 to 102 days and the average analyst turn-around time decreased from 122 to 35 days. The control phase provided the unit with tools to monitor progress and a means for supervisors and management to predict the working capacity of the unit and the status of individual cases. This phase also introduced a significant shift in supervisory approach, with supervisors accountable for distributing work based on the DNA unit's daily needs and priorities.



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This study will present the journey of a large state laboratory implementation of LSS concepts. Though implementing these principles is not without operational challenges for a laboratory to consider, LSS provides effective tools for a laboratory striving to improve productivity and reduce backlog.

Productivity, Backlog, Quality