

LEAN SIX SIGMA RENOVATION OF THE SPECIMEN PROCESS AT A MEDICAL DIAGNOSTIC CENTER

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ABSTRACT

The healthcare industry has faced rapid demand growth in recent years. Medical diagnostic centers (MDCs) play an important role in this industry to work as third-party suppliers that hospitals and other healthcare providers send blood samples and other test samples to them for diagnostic tests. Lately demands (in terms of number of jobs arriving per day) have reached such a high level that many MDCs simply cannot process them in a timely and efficient manner. The bottleneck turns out to be the MDC's front-end, labor intensive specimen process in which regular paperwork is processed and blood and other test samples are prepared before they are delivered to testing departments for technology-based tests. While managers believe that it takes only a few minutes for paperwork to be handled and samples to be prepared, samples often sit in the specimen area for many hours before they can be delivered to testing departments. The entire specimen process therefore needs to be remodeled in order for MDCs to better match supply with demand in an effective and efficient manner.

This research applies Lean and Six Sigma thinking on renovating the specimen process in order to help MDCs streamline processes, achieve on-time delivery goals, and reduce operational cost. Lean and Six Sigma are commonly used operations management methods for process improvement that are proven to be successfully in the manufacturing industry. With the continuous demand growth, the medical industry has realized the importance of business process improvement in order to maintain or improve service quality and at the same time for medical services not to be too costly. This research investigates an integrative way to apply Lean and Six Sigma in a non-production setting to improve process effectiveness and efficiency with an elevated demand level and suggests a framework for improving labor intensive service processes such as the specimen process in MDCs.

Discrete event simulation is used as a major tool to evaluate the renovated design of the specimen area in the Analyze stage of the Six Sigma DMAIC framework. Simulation results show that the new design similar to a "pull" production system can help eliminate almost all the tardiness of job deliveries even at a much higher demand level. Meanwhile, a balanced staffing strategy can help the specimen department significantly reduce its daily operational cost.

While this research focuses on process improvement at the production line level, it also recommended that future research to be conducted at both the stations level and the supply chain level. Lean principles such as the 5S can be implemented at work stations, and closed-loop supply chains of MDCs also have some very interesting aspects that need improvements.