GE Healthcare

Power of Lean in the Laboratory: **A Clinical Application**

By *Jennifer Blaha* and *MariJane White*

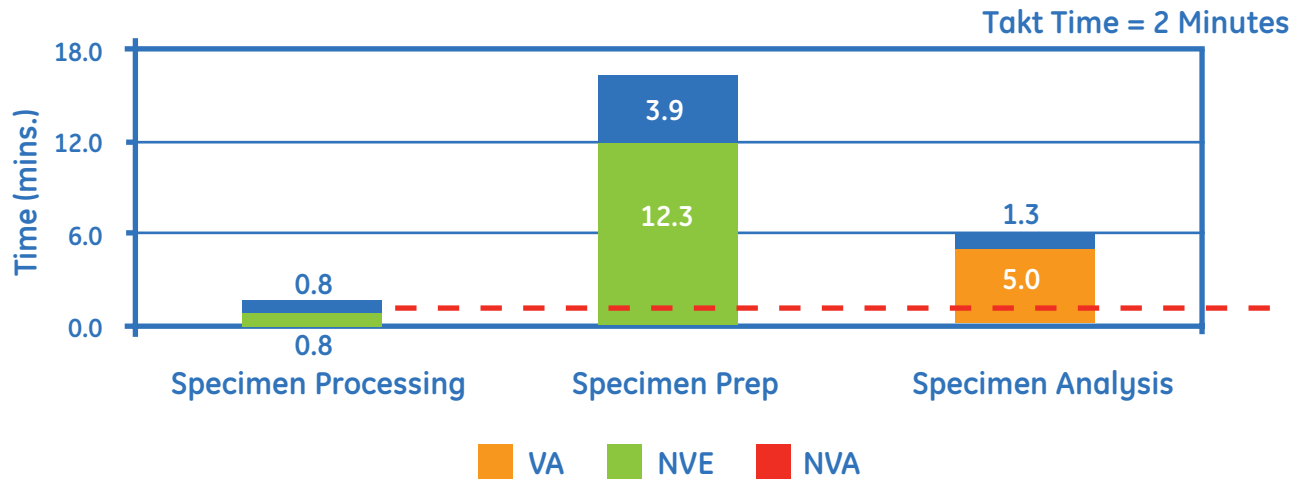
Improvement ideas are frequently considered in most organizations, but it is all too rare that these ideas are pursued and implemented. Lean offers a powerful set of tools to address this issue. Born in the automotive industry, Lean focuses on eliminating waste (non-value-added activities) throughout a process. Reducing or eliminating needless steps – such as inspection, wait times and travel distances – while focusing on activities that customers are willing to pay for is at the core of Lean.

This methodology has been successfully adapted to the healthcare environment, enabling hospitals and clinics to streamline their operations and to focus on value as perceived by their patients. Opportunities to deploy Lean in healthcare are abundant – addressing delays of medication delivery from the pharmacy, decreasing overall travel distance for caregivers, and reducing unnecessary paperwork, to name a few.

A large healthcare organization based in the Northwest embarked on a Lean journey in early 2005. It experienced the positive impact of Lean through two Kaizen events and is looking forward to continuing these efforts as part of its formal operations improvement initiative. The two areas addressed first were medical records and the pharmacy. Given that the hospital laboratory impacts the care of nearly every patient entering the emergency department, the next Kaizen focus area was clear – turnaround time for test results, the primary metric affecting all users of the laboratory.

Through analysis of several months of specimen volumes, the hospital's project team determined the process takt time. (Takt time represents the rate at which an entity must operate in order to keep up with demand.) This, along with time and distance observations, enabled the team to determine areas of opportunity for the Kaizen event. A time value analysis showed that the test result turnaround time could best be improved with a focus on the front end of the process, including the specimen drop-off area and preparation. The front-end process touched 100 percent of the specimens entering the lab. The team also included chemistry specimen testing, which covers more than 60 percent of the test volume. Both processes were operating above takt time, indicating that a bottleneck was present.

Takt Time Analysis in Minutes



Front-End Processing

In the specimen drop-off area, the team began by using the 5S tool (Sort, Straighten, Shine, Standardize, Sustain, plus one: Safety). The primary purpose of the tool is to remove clutter, enhance organization within the work area and standardize where possible. Through this, the team was able to reduce phlebotomist travel distance by 65 feet, which translates into 90 miles per year.

The team also freed up 40 square feet of storage space. The simple strategy was to organize by user. Understandably, the phlebotomists were thrilled with the change. And news of an unexpected win came from the staff from central supply. Clearly marked supply aisles, room to move, and better organization positively impacted them as well – reducing the time and effort associated with the delivery and restocking of supplies to the lab.

Next, it was time for the heavy lifting – layout changes. The goal was to reduce overall travel distance by 25 percent. After a day spent studying the lab floor plan and exploring possible layout changes on paper, the team was ready to kick into action. Tables, computers, printers and refrigerators were moved. Barriers were removed, leading to a more streamlined flow of traffic through the lab. Centrifuges were relocated for better access, and furniture was modified to provide better line of sight and ergonomics.

The physical layout of the lab was changing. When all was said and done, processor travel distance was decreased by 36 percent, or about 694 miles per year.

While the physical changes were occurring, another exceptionally important step was taking place. Half of the Kaizen team focused on training and documenting the new processes. A new communications plan for the entire lab staff was developed. In the process, new standard operating procedures were created. The team came up with a plan to educate the staff members on every shift. Staff would be coming into work the following day, walking into new processes and a new layout. A solid training and communication plan laid the foundation for sustainability of the improvements.

Chemistry Specimen Analysis

The second focus area in the lab was chemistry specimen analysis. The initial data collection and subsequent analysis highlighted a substantial amount of waiting time between the time the specimen was presented for analysis and the time it was prepared for analysis. Specimens were delivered to the analysis area where they waited to be put in the centrifuge by a technician. Later, the centrifuge would finish spinning and the specimen would again wait until the technician came over to transfer the specimen to the analyzer.

Between the two wait times, specimens were sitting for an average of 31⁄2 minutes. After a brief observation period, the team had identified ideas for improving the process. It was time for "trystorming," which is a technique that extends beyond traditional brainstorming to create a proof of concept.

To address the first wait time, a simple process change was put in place. Instead of dropping off the specimen in the holding area, the processors placed the specimens directly into the centrifuge and began spinning immediately. To address the second wait time, andons or visual devices were put on top of the centrifuge. Once centrifuging was complete, the andon would display a blinking light alerting the tech that the specimen was ready for analysis. Two small changes were implemented with a big impact. Wait times were reduced by an estimated 4,522 hours per year and the chemistry result turnaround time was reduced from 35 minutes to 31 minutes.

Pulling It All Together

The laboratory Kaizen was a challenging and action-packed week producing impressive results.

Kaizen Impact Summary

Before	After	Impact
Lab Times-Chemistry		
NVA Hours = 10,444/Year Chemistry TAT = 35 Minutes*	NVA Hours = 5,922/Year Chemistry TAT = 31 Minutes*	Reduced NVA Hours 4xxx/Year Reduced TAT 4 Minutes (Weighted Average)
Operator Travel Distance		
Processor = 2,226.5 Miles/Year Phelab = 97 Miles/Year	Processor = 1,533 Miles/Year Phelab = 7 Miles/Year	Reduced Travel 783 Miles/Year
Operator Travel Distance		
11 Safety and Quality Issues	All Issues Resolved or on Track to Be Within 30 Days	Safer Work Environment

* Data comparison between six-month volume and one year volume

Remember those improvement ideas that routinely get pushed to the side, to be implemented at "another time"? Prior to and during the Kaizen event, the entire laboratory staff was encouraged to share improvement ideas with the Kaizen team. Out of more than 50 ideas generated, 39 percent were fully implemented by the end of the four-day Kaizen event, and another 11 percent were in process and set to be implemented within 30 days. As one excited staff member put it, "I have been trying to do this for two years and you guys did it in two hours!"

The power of Lean – action, involvement and quick results.

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