

**CASE STUDY****The Lean Pathology Lab**

Pathology lab embraces lean methodologies to process specimens faster and save money. Benefits included liberated capacity to support a sister lab, happier customers, optimization of material use and billing system corrections worth \$1.5 million.

**CLIENT**

A medical lab with approximately 150 employees. The lab collects samples of bodily fluids from different locations in the U.S. The lab operates 24/7 and sends the results to medical facilities around the country.

**CHALLENGE**

Serving hospitals, doctors and other health care providers, the lab was struggling to deliver results by 7:00 a.m. the next morning. The operation had to receive, split and test specimens (up to 30,000) that it received through the late afternoon and early evening. Excessive reagent use was costing the lab \$2 million per year.

**SOLUTION**

Through a series of kaizen events, TBM worked with lab managers and workers to analyze and optimize reagent use, and to redesign workflows to eliminate wasteful activity and improve productivity.

**RESULTS**

More reliable delivery ultimately improved customer satisfaction rates, and productivity improvements earned the lab more business from a sister facility. Reagent material savings and a billing system correction saved \$1.5 million per year.

**Lean Lab Design Changes Improve Customer Satisfaction and Boost Productivity**

The highly competitive nature of the medical-testing industry means that any process hiccups and failure to keep customer promises can result in lost business or jeopardize future business opportunities. Applying the same lean principles used in manufacturing plants to boost reliability and efficiency while improving productivity, this case study reviews TBM's work with a midsize lab to optimize workflow and meet customers' early morning delivery requirements.

Promising results by 7:00 a.m. the next day, the pathology lab faced the daunting task of processing up to 30,000 specimens overnight. Throughout the late shift over 120 employees scurried about trying to process all of the samples, which the operation received through the late afternoon and into early evening. Despite significant overtime and hiring more people—who only added more chaos and further reduced productivity—the lab was regularly exceeding the target delivery times by one to two hours.

Initial observations by TBM quickly identified some of the challenges. The specimens arrived at the lab in uneven “drops,” some much bigger than others, creating an unbalanced production flow that often resulted in bottlenecks.

The arrival of every batch would trigger a flurry of activity, with material handlers traveling from workstation to workstation to deliver recently received samples or move them to another bench for additional processing. Test operators themselves could often be found walking around looking for supplies, or looking for something to do when they ran out of work. Large amounts of work-in-process (WIP) would regularly accumulate in the work areas, indicating a lack of flow and an imbalanced workload.

TBM worked with the lab to arrange for smaller, more frequent pickups of specimens within a 200-mile radius. The lab also is transferring the process of receiving specimens that arrive from more distant locations to its collection centers. Traditionally, when the lab receives specimens from its out-of-state receiving centers they arrive in large quantities.

The lab splits those specimens into smaller samples so they can be tested. That work will eventually take place at the collection centers. The strategy, combined with the more frequent local pickups, is expected to help level production and reduce excessive inventory.

One of the most costly problems at the lab was the poorly controlled use of reagents. Excessive calibrations, workers disposing of vials that still had some useable material in them, and expired reagents that then had to be discarded, added up to several million dollars in material losses per year.

Starting with reagent use, TBM worked with a crossfunctional kaizen team to determine how many pieces of equipment were truly necessary—and therefore required calibration—during testing processes.

In addition to optimizing equipment usage, the lab workers came up with a simple method for monitoring reagent usage and waste. They placed bins near the workstations for discarded reagent vials. The process improvement team then created a log sheet to record discarded items. This helped managers track how much reagent was being used and wasted.

These initial measurements, process changes and controls, combined with several other refinements to reagent procedures, saved the lab more than \$500,000 a year. During the initial project, the team also discovered a software glitch in the billing process. If any one of a series of tests did not execute properly – even if all the other tests for the patient were successful – a glitch in the system would not bill the entire series. Correcting the error enabled the lab to recoup more than \$1 million per year.

## Lab Workflow Optimization

After addressing reagent utilization, the lab's operation managers decided to focus on delivery reliability and productivity improvement. In a series of kaizen events, TBM introduced lean principles, such as takt time, production flow and pull systems, to kaizen teams and helped them transform key processes.

For example, after logging them in the receiving station was transporting samples to sorters located at other workstations. The process created unnecessary travel time between stations and often created excess WIP. It was a clear non-value-added activity that slowed throughput and reduced lab productivity.

A kaizen improvement team examined the workflow and realized that sorting time could be nearly eliminated by co-locating splitters next to the receiving station. The work-cell design helped balance the workload between the receivers and splitters. The lab managers also implemented a pull system where two receivers feed the product to one splitter based on visual cues, which nearly eliminated the WIP.

As a result of the redesigned workflow, the lab cut sorting times by 80 percent. Overall, the redesigned process helped shrink the sample arrival to test start time by 28 percent. This reduced the chances of late deliveries to the client, which ultimately had a positive impact on customer satisfaction rates. Over time, with many similar process improvements, the lab has become much more cost competitive and even gained work from one of its sister labs because of its ability to process specimens quickly and efficiently.

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