ValuMetrix® SERVICES

PROCESS EXCELLENCE CASE STUDY

Children's medical center uses Lean to meet turnaround time goals consistently

Struggling with rapid growth and unable to meet throughput goals, the lab at a Texas children's medical center invited ValuMetrix® Services to guide it through a Lean initiative. Within a month of making the Lean changes, the laboratory achieved turnaround times that had eluded it for years.

Trying to remain "a good lab" in the face of rapid growth

While the children's medical center has seen rapid growth in the past few years, its laboratory had been struggling to keep up. "We considered ourselves a good lab," says the medical center's chief of pathology. "But we were rarely able to meet our quality monitor to provide STAT potassium results in 45 minutes. We wanted 95% of our CBCs to be out in 30 minutes, and we just never quite made it." The lab considered additional staff to increase its capacity, but the director of clinical pathology hesitated to "throw more bodies at this."

Ortho Clinical Diagnostics
a Johnson & Johnson company

"We saved thousands of dollars implementing a formal inventory management system alone."

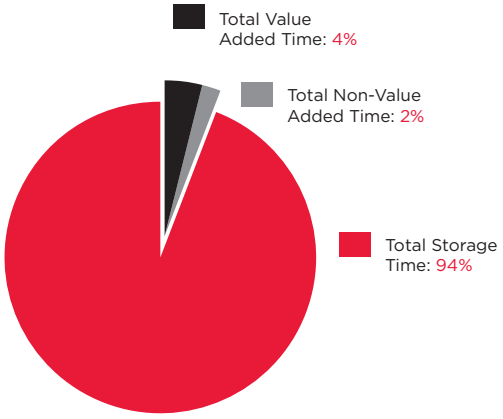
Meanwhile the senior director for laboratory operations had seen what two other children's hospitals had accomplished with Lean. "I was impressed with the improvements in turnaround time and service levels that had been achieved and felt it was something we needed to check into," he says. "One month later, we had the initial assessment scheduled for our lab."

Assessment finds room for dramatic gains

Conducted by ValuMetrix® Services, the Lean assessment determined that the laboratory was indeed performing as well as many others. But it found numerous opportunities to eliminate waste and do even better. For example, while the average turnaround time for CBC tests was less than 27 minutes, many tests took longer, and an average of 25 minutes went to wasteful transportation and storage.

The assessment also helped define the scope of the initial project. It suggested that the medical center would see its greatest gains if it focused first on implementing Lean in the core laboratory.

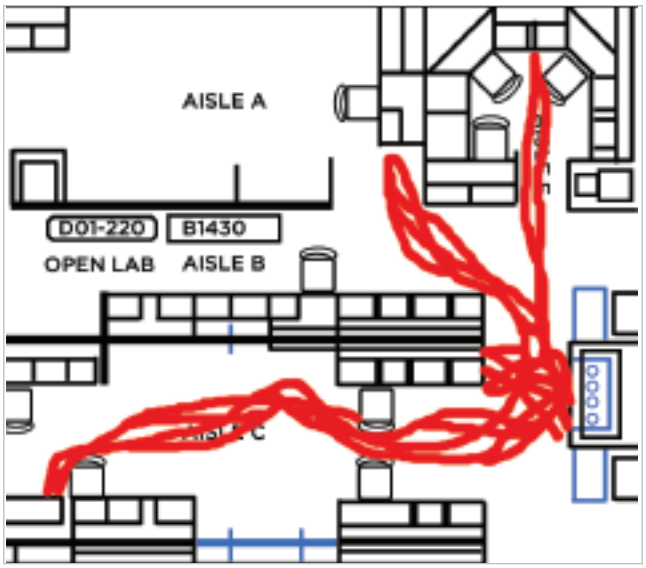
BEFORE Lean:
On average, a hematology test spent 94% of its lab time just waiting for something to be done to it.



Studying video of product flow and operator activity

Trained by a ValuMetrix® consultant as they worked, a four-person Lean team began by videotaping the flow of specimens. They followed the entire workflow, from specimen receipt through verification of results. Then they videotaped the process again, focusing on operator activity.

"The biggest surprise for me was the amount of time samples sat waiting for something to happen," recalls the manager of the core laboratory. "There was just so much time samples were waiting to be received in and then waiting to be spun." She would often fast-forward the tape, watching the time counter in a corner of the screen.



BEFORE Lean:
Because accessioning, processing, chemistry, and hematology were not contiguous, testing required 197 ft. of walking. That added up to 1.4 miles of walking per shift for one lab support specialist.

Batch processing heads the list of causes of waste

Why were samples waiting so long? Analysis revealed that much of the delay was due to "batch" processing. "Conventional wisdom says you don't want to put just one specimen in the centrifuge," the director of laboratory operations explains. "So you wait until you have at least two, or maybe four. But then there's storage time after the centrifuge finishes, so the four samples sit. And when they get to the actual testing there's more storage there." In short, every time a technologist worked on one sample from a batch, all other samples in that batch were sitting idle.

A less-than-ideal layout made the batching even worse. After technologists checked and logged samples at the pneumatic tube station, they were supposed to move them to a processing area. But because that area was 10 feet away, technologists often waited until several samples had accumulated. A 10-foot trip might not seem like much, but it meant stopping what you're doing, getting up from your chair, and walking around a bench to another area. It took effort, so why do it for just one specimen?

Additional causes of waste included:

- Poor scheduling. One of the lab's busiest times is between 3:30 and 5:00 a.m. Yet it only had one lab support specialist to receive and process orders during those hours. Technologists would take breaks or perform maintenance work during periods of high volume.
- Lack of standardized work. There was a variety of ways of performing the same tasks, some more efficient than others.
- Lack of formal inventory management. The same item might be ordered by different people in different areas. It would then be stored in different places throughout the lab, so no one had a clear sense of when it was time to reorder.

AFTER Lean: When the supply of wipes reaches the yellow line, it's time to reorder. A technologist simply drops the laminated "kanban" card on the left into a bin. The card contains all necessary vendor, part number, and reorder quantity information.

Changing inventory management saves space, money, and search time

Now it was time to address the identified causes of waste. The Lean team began by clearing out the clutter. Members of the team took down cabinet doors and marked off permanent locations for each supply item. "People who had their secret stashes of things weren't happy that those were being taken away," the lab's manager recalls. "But once everything had a place and everyone knew where everything was, people started to see that this really did make their job easier because they were not hunting for supplies."

To keep those supplies in stock, the team instituted a formal "kanban" inventory management system. It identified items that were being ordered by multiple staffers and consolidated them into single bulk orders. "We saved thousands of dollars in that process alone," says a vice president of the medical center.

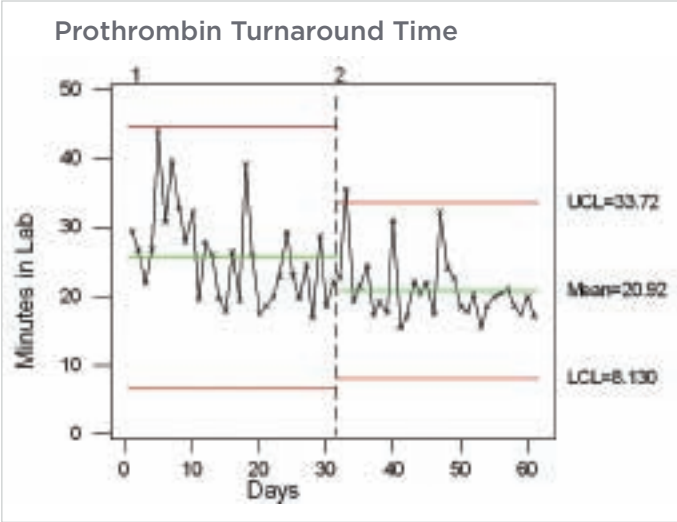
As the lab became more confident that supplies would be reordered in time, it was able to keep less on hand, improving cash flow and saving storage space.

Specifying the optimal way to perform each task

After standardizing supplies, the Lean team standardized the work. With input from the staff, they specified the optimal way to perform each task. "Before Lean," the director of laboratory operations observes, "we'd hear things like, 'Things always run well when Wally's on third shift at the chemistry bench.' That means when Wally's not there, you're worried, right? When you follow standard work, you get the same high quality regardless of what shift it is and regardless of who's working it." The team trained operators to process one or two samples at a time.

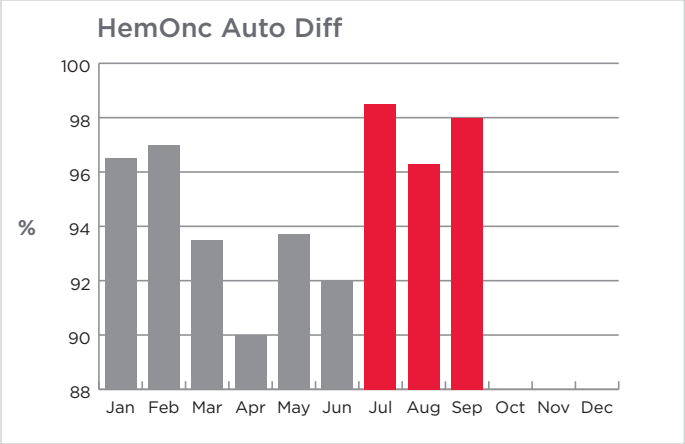
As part of standard work, the lab instituted a policy of staggered breaks to lessen the impact on staff coverage. The team revised the lab's scheduling to increase staffing during peak work periods.

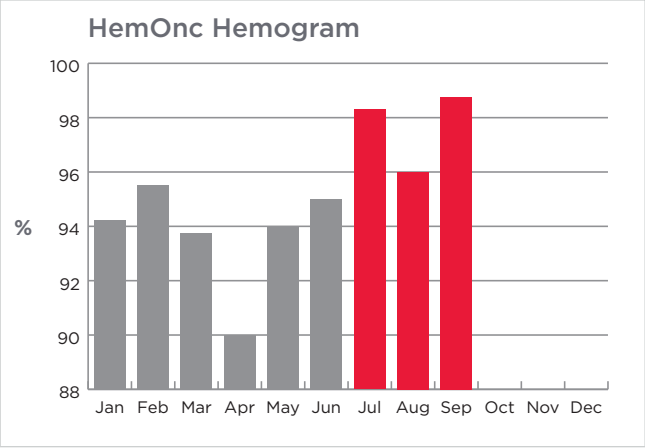
To reduce the amount of walking, the Lean team moved frequently used equipment closer together. The centrifuges were moved from a separate processing area to a spot right next to where specimens arrived.



Pre-Lean vs. Post-Lean:
As average turnaround time dropped, so did the standard deviation. This indicates steadier, more predictable service to clinicians. The control chart covers August and September 2007; standard work was implemented on August 10.

% of CBCs resulted in 30 minutes or less



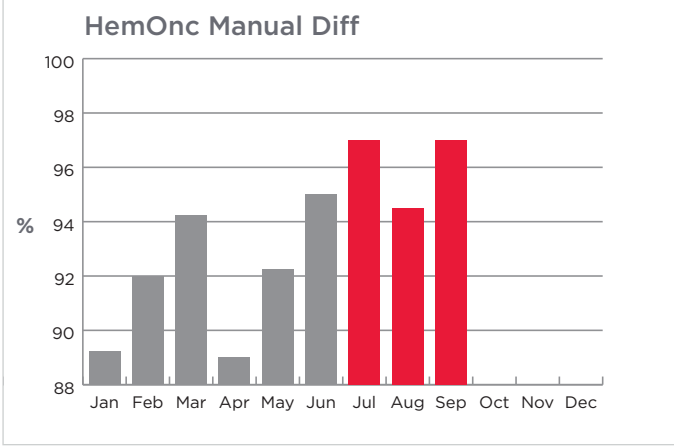


"For years, we had tried to have 95% of our CBCs out in 30 minutes. In the first month after the Lean changes, we were at 98%."

Throughput goals reached, for the first time ever

As soon as the Lean changes were put in place, the lab began to see dramatic improvements. "For years, we had tried to have 95% of our CBCs out in 30 minutes," says the laboratory manager. "We were in the high 80s, or 90% maybe, but we never made 95%. In the first month after the Lean changes, we were at 98%."

Lean changes in mid-July enabled the lab to exceed all three hematology/oncology turn-around time goals **for the very first time.** These gains have since been maintained.



Before the lab began Lean standard work, its turnaround time for prothrombin time (PT) was 36.9 minutes for all categories, and 25.8 minutes for STATs. This improved almost immediately after the lab began standard work, and today it averages 21.3 minutes for all PT tests. In other words, the average PT TAT is 4.5 minutes faster than STATs used to be.

Not only did turnaround get shorter, it became more predictable. "If you want doctors to count on you," the chief of pathology states, "you can't have outliers even 5% of the time. That's one in 20 patients who has to stay an extra 20-30 minutes because we didn't turn around our tests. We've got to be reliable."

In addition, inventory levels of common use items in the lab are down by approximately 70%.

A process for ensuring ongoing improvement

Part of the Lean project was to establish a process that would ensure ongoing improvement at the medical center. At the beginning of each shift, staff members hold a 5- to 10-minute standup meeting to review performance measures and trouble-shoot problems. A "Kaizen Wall of Fame" documents and celebrates employee solutions to problems. "It can be incredibly empowering for a bench tech to come up with an idea that changes the way the entire laboratory does its work," notes the Vice President of Ancillary Services. "This is the kind of thing that makes sure these changes are sustainable rather than just a flash in the pan."

To further protect the gains, supervisors conduct daily audits to make sure technologists are keeping to the standard work. But don't these audits create additional work? "It's one extra step that takes less than five minutes," the laboratory manager responds. "But supervisors have been freed from fighting fires all the time, from answering the calls with complaints about 'Where are my results?' It's also a great opportunity for them to interact with the staff, for the staff to point out problems and make their suggestions."

"I think the lab's project served as a catalyst for the rest of the organization."

"You avoid workarounds and get rid of the quick fixes."

Why did Lean yield improvements where previous efforts failed? "When you grow fast, you have to make quick fixes. You just do," the chief of pathology explains. "Organizations tend to get stuck in the quick fixes. Lean is the philosophy of continuous process improvement on a long-term basis. You avoid workarounds and get rid of the quick fixes."

AFTER Lean:

This employee suggestion resulted in a faster and less costly way of safely discarding pipette tips.

Area: STL	Kaizen Wall of Fame	Date: 5/31/07

What was the Problem?
For disposal of pipette tips, the only containers we had were "sharps" containers. This Adds extra disposal cost, as the tips are not sharp. The container hole was also Hard to get tips into.

What was changed, improved, implemented?
Create biohazard bag holders out of urine jugs, cut the tops off.

Photo/Diagram:

What were the benefits? Safety? Quality? Time? Waste? Cost?
Reduces cost since we aren't doing unneeded sharps disposal and we aren't throwing the containers away each time. No safety risk.
Easier to get tips into container (less motion and less arm strain, since the Container is lower and easier to get into). Tips can be dumped into a larger Biohazard bin or we can replace the bag.

Who was Involved?

Gretchen, Beth, Janie, Franke

"After the ValuMetrix® consultant is gone, we will have the knowledge base and the skills to implement Lean in other areas of the hospital and to keep refining what we are doing in the laboratory."

Extending the gains beyond the lab

The Lean cycle of improvement promises to extend beyond the lab. Two subsequent Lean initiatives will focus on the radiology and pharmacy departments. Members of the Lean team have been asked to consult in the ED as well. "I think the lab's project served as a catalyst for the rest of the organization," says the Vice President of Ancillary Services. "We've had a lot of folks from other departments come and do rotations through the laboratory to see what's going on here. I think it's really invigorated them."

And thanks to the ValuMetrix® approach, the children's hospital staff is equipped to continue with Lean on its own. "The ValuMetrix® consultant teaches the principles, the processes, and the tools," the director of laboratory operations explains. "So after the ValuMetrix® consultant is gone, we will have the knowledge base and the skills to implement Lean in other areas of the hospital and to keep refining what we are doing in the laboratory."

He adds that, "The learning curve is much shorter when you have a mentor who can train your staff and show them how it's done. You get tangible results that much sooner."

ValuMetrix® SERVICES

PROCESS EXCELLENCE SNAPSHOT

CLIENT

A large children's medical center in Texas

VITALS

- Serves a 400+ bed hospital and 32 outpatient clinics
- 1.5 million billable tests per year
- 159 FTEs

GOAL

- Increase patient and physician satisfaction by reducing testing turnaround time
- Reduce errors
- Establish a new culture with an increased focus on quality
- Decrease overall cost per test

PROCESS

A four-person Lean team videotaped the flow of specimens and operator activity. Batch processing was identified as the key cause of slow processing time. Other sources of waste included poor scheduling, lack of standardized work, and poor inventory management. The team standardized the work and instituted a formal inventory management process. A plan was developed to rearrange the equipment layout to support single piece flow and to reduce the amount of walking.

RESULTS

- For the first time ever, the lab achieved its goal of completing 95% of CBC tests within 30 minutes.
- Turnaround on prothrombin times, a coagulation test, reduced to 21.3 minutes, compared with 36.9 minutes just 10 months prior. An improvement of over 42%.
- Lean initiatives have spread to radiology, the pharmacy and the emergency department.

RESPONSE

"Our people are fully engaged now. They actively look at what they're doing and make great suggestions for ways to improve on a day-to-day basis."

Vice President of Ancillary Services

Healthcare institutions of any size can reduce expenses and enhance their revenue with ValuMetrix® Services. To ensure permanent gains, we work closely with your management and staff to institutionalize the changes. Best of all, we train, mentor, and certify your personnel, giving them the knowledge, tools, and skills to make further improvements on their own.

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1001 US Route 202, Raritan, NJ 08869-0606
1-800-523-6911, Ext. 3821 | www.orthoclinical.com