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Delivering Test Results Faster to Enhance Patient Care

Laboratory Sciences of Arizona—A Subsidiary of Banner Health



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Salene Slader
Senior Administrative Director of the Clinical Laboratory at Banner Estrella



Delivering Test Results Faster to Enhance Patient Care

As a result of a workflow analysis conducted with Siemens Healthcare, Laboratory Sciences of Arizona, L.L.C. (LSA) implemented changes to workflow processes and instrument configurations that achieved a significant reduction in test result turnaround times at two of its hospital laboratories: Banner Estrella Medical Center and Banner Baywood Medical Center. Siemens also partnered with LSA to present the findings of the analysis and to implement the recommended solutions at the other hospital laboratories in Arizona operated by LSA.

Siemens reviewed instrument data to determine an optimized time for reloading the ready-to-use Flex® reagent cartridges and performing quality control (QC) and maintenance procedures on the labs' Dimension Vista® 1500 Intelligent Lab Systems. Siemens consultants also observed the movement of personnel and specimens around the labs to identify motion and steps that could be eliminated or streamlined. The review included 11 data pulls from February 2013 through January 2014 and three on-site observations from May 2013 through February 2014.

Introduction

Banner Health is one of the largest nonprofit healthcare systems in the U.S., operating 28 hospitals in seven states. Headquartered in Phoenix, Banner Health is Arizona's largest healthcare provider. All of its hospital laboratories in the state are managed and operated by LSA.

LSA had replaced the previous laboratory instrumentation at Banner Baywood Medical Center with two Siemens Dimension Vista 1500 Intelligent Lab Systems and a StreamLAB® Automation Solution. This was followed by installation of two Dimension Vista 1500 systems at the Banner Estrella Medical Center laboratory.

Installation of the Dimension Vista systems came at a critical time for LSA. With healthcare reform and the passage of the Affordable Care Act (ACA) in 2010, organizations across the healthcare sector have been adjusting to new payment structures and incentives for meeting quality, efficiency, and patient satisfaction goals—requiring hospitals to focus on Lean practices, closer collaboration among medical staff, and more efficient use of resources.

The national emphasis on improving patient outcomes and coordinating care, coupled with declining reimbursements, has contributed to a trend toward hospital consolidation and standardization to contain costs and gain economies of scale.

"The ACA has caused challenges for all healthcare facilities," says Mary Acedo, senior administrative director of the clinical laboratory at Banner Baywood. "Decreases in reimbursements, as well as the need to maintain—and improve—our quality of care, have presented us with very specific challenges. We have to be better standardized and better optimized, so we can produce high-quality results while decreasing costs."

"The area of most significance that has changed in the last two years is the number of patients in observation status, which has grown by more than 30 percent each year," says Salene Slader, senior administrative director of the clinical laboratory at Banner Estrella. "When a patient is seen in the ER, the physician must decide whether they need to be further evaluated or admitted. If they go into observation, that is a true outpatient designation, and reimbursement for our services is very different than for inpatient services."

The results and benefits:

- Faster turnaround times for both STATs and analytical testing
- Higher throughput and reduced downtime as a result of rescheduling reagent loading and QC/maintenance procedures to once-daily off-peak times
- Reduction of wasted motion associated with QC/maintenance procedures
- Standardization of testing platform and test values
- Improved patient care and physician satisfaction

"In the lab, any test for a patient in observation is a STAT test, so it's also increased the amount of STAT work that we need to do and requires more resources to do it."

The cost efficiencies of consolidation in the Banner Health system are evident in its laboratories. "As a larger system, we are on the best tier for pricing for reagents and supplies, so we can optimize our spending across our labs," adds Acedo.

Raising standards with standardization

Standardization is a priority for the laboratories—and the selection of the Dimension Vista systems aligned with that goal. “Implementing the Siemens instrumentation, we went from separate pieces of equipment to one integrated system, which was tremendously beneficial,” notes Acedo. “When you have multiple sites, I think it’s even more critical to be standardized. We can share resources and supplies and talk to one vendor when we have an issue. The advantages are increased efficiency, productivity, and cost savings.”

Judy Mumaugh, chemistry technical coordinator at Banner Baywood, was an early advocate for the Siemens solution. “I knew right away I wanted Siemens because of the technology: onboard QC, automatic calibrating, linearity programming, and automated maintenance.”

The LOCI® advanced chemiluminescent technology featured on the Dimension® family of systems was a major differentiator. It features high-performance assays and small sample sizes and requires just three processing steps to deliver patient results.

“I have a lot of confidence in the assays because of the LOCI technology built into the Dimension Vista System,” Mumaugh says. “It enables us to detect very low levels for accurate diagnoses.”

Slader points to scalability and speed as key factors. “The Siemens platform was something that could be offered at



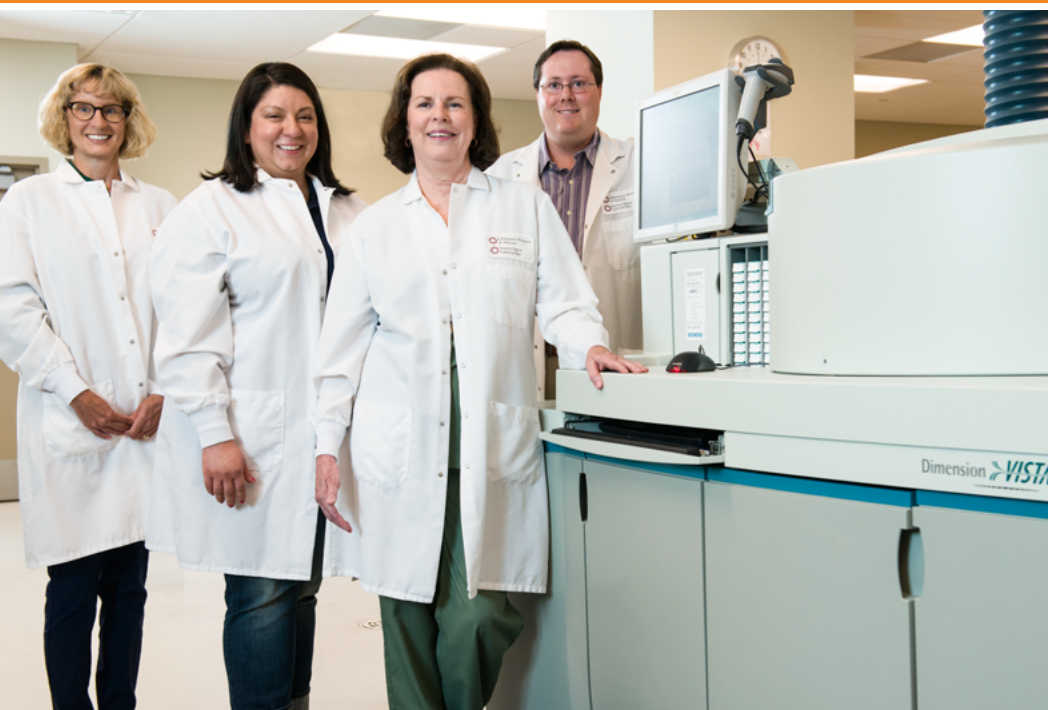
all of our labs in different configurations,” she notes. “And with automation of the pre-analytical phase, we could decrease our turnaround times from when we receive the sample in the lab to when we deliver results.”

Reduced downtime has been an additional benefit of the Siemens solution. “They’ve been such reliable instruments that you just don’t need to worry about them,” says Dr. Holly McDaniel, medical director at Banner Estrella. “That’s been extremely helpful for throughput.”

“We don’t have to spend a lot of time troubleshooting,” adds Nancy Schinderle, medical lab scientist at Banner Estrella. “So we can be more productive and confident in our results.”

“We’ve had the instruments for almost 7 years now, and we run them 24/7, year-round. In that time frame, we have never had to send our work off to another site because the instrument is down. This is phenomenal, and very reassuring,” notes Slader.

The advantages of standardization also directly impact patient care, according to Dr. McDaniel. “What’s really nice about having the Siemens instrumentation is that the doctors can look at the results and see whether the values were derived the same way,” she says. “Since everything is electronic and visible, it just makes sense to have the same instrumentation, so that we’re meeting physicians’ expectations.”



“When the Siemens team approached us about doing the optimization, it aligned perfectly with our Lean initiative.”



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Mary Acedo

Senior Administrative Director of the Clinical Laboratory at Banner Baywood

“Leaning out” the labs

After installation at each lab, Siemens’ service engineers worked closely with LSA staff to get them up and running on the new instrumentation.

Once laboratory personnel had time to become familiar with operating the instruments, Siemens completed a workflow analysis and optimization project to identify opportunities for further improving efficiency and workflow. As the laboratory staff had just embarked on Lean Six Sigma Green Belt Certification, the timing was ideal—and the staff knew where Siemens’ help was most needed. The Banner team had targeted improved turnaround times for basic metabolic panels (BMPs), comprehensive metabolic panels (CMPs), and troponin tests (used to help detect damage to the heart muscle), with the goal of completing 90% of them within 30 minutes.

“We were gradually and consistently improving, and then we reached a point where we weren’t showing further improvements in turnaround times,” says Mumaugh. “In particular, we had a commitment to reduce our troponin results to 30 minutes in order to meet the requirements for our Accreditation for Cardiovascular Excellence.”

“When the Siemens team approached us about doing the optimization, it aligned perfectly with our Lean initiative,” explains Araseli Anaya, chemistry technical coordinator at Banner Baywood. “It was an opportunity for us to see what this instrument is capable of and implement the changes we needed to improve our turnaround times and the quality of care we’re providing.”

After visiting Baywood and Estrella to observe the daily movement of staff and samples throughout the labs, Siemens pulled data remotely from both sites for detailed investigation. The analysis yielded important insights into how staff could optimize their workflow and instrument configuration.

Changes for the better

Siemens presented the results of the workflow and data analyses to the staff at the Baywood and Estrella labs in 2013. At that time, Siemens identified several changes to help the labs meet their goals for reducing turnaround times and improving productivity, efficiency, and quality.

Optimization of testing menus

Using the Dimension Vista system’s intelligent device-management software, the instruments were configured to deliver high-priority test results, such as troponin, ahead of less critical assay values, decreasing overall testing turnaround times.

Rescheduling of QC and maintenance activities

The Dimension Vista system uses a uniform Flex cartridge format for each assay type; the cartridges are ready to use, but require refrigeration and rehydration for specific assay types. Prior to the Siemens workflow analysis, reagent Flexes were reloaded at the beginning of each lab shift—requiring the machine to be down for maintenance every 8 hours. Reagent reloading and QC activities (such as probe tests) were also being performed at different times. These practices resulted in instrument

downtime during various peak test-volume times, resulting in delayed test results and extended turnaround times.

Siemens recommended performing both Flex reloading and QC on a once-daily 24-hour schedule during off-peak hours.

“The Dimension Vista system has the capability of indicating which reagents need to be reloaded pre-emptively for a 24-hour period,” explains Anaya. “So by reloading every 8 hours, we were causing the instrument to take time to prepare reagents we didn’t even need yet.”

“Now, instead of running three different processes at three different times of the day, we run one single process in a 3-hour block of time. This has enabled us to decrease turnaround times and set clear expectations with our units of care, such as the emergency department and intensive-care unit.”

Reagent server reconfiguration

The Flex cartridges are stored within the system’s reagent servers. Siemens’ engineers were able to optimize the configuration and movement of the servers to streamline the Flex reloading process and minimize instrument downtime.

Estrella Chemistry Technical Coordinator Erik Haser saw the benefits of the change immediately. “The longer it takes the server to access the test, the longer it takes for the test to run,” he says. “Siemens figured out the best way for the servers to move, which impacts hundreds of tests every day. Our throughput improved dramatically!”

Opportunities revealed lead to benefits realized

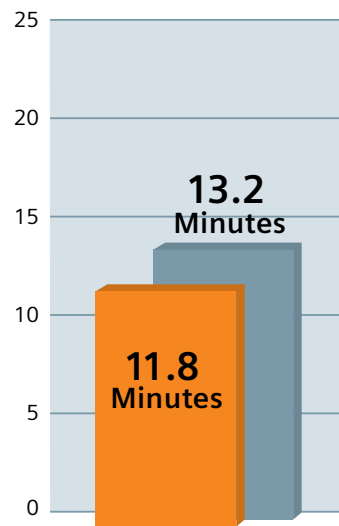
Benefit: Reduced turnaround times, higher throughput, increased productivity.

By optimizing testing menus and adjusting the reagent servers, Siemens enabled the instrument to process at full-throughput capacity and alleviate potential method-to-method interferences. Moving reagent reloading and QC to a once-daily off-peak schedule saved additional time for lab staff and increased overall productivity. Collectively, both labs experienced an average decrease in turnaround times of 31% for analytical testing and an average decrease of 11% for STAT testing (urgent tests required by the emergency department). The result: faster test results on a consistent schedule, with less instrument downtime.

Benefit: Reduction of wasted motion/unnecessary steps in the lab

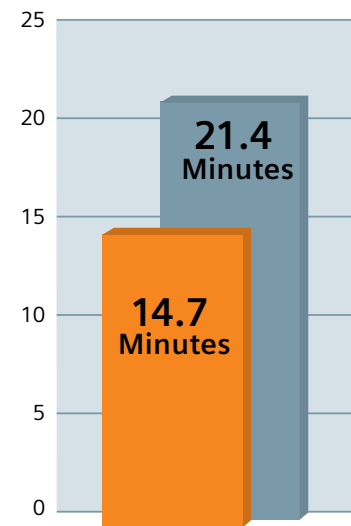
As a result of rescheduling QC, LSA was able to reduce the number of trips to each refrigerator to retrieve reagents that require refrigeration by 1095—a total of 21,900 feet or 4.2 miles of travel saved each year. Laboratory staff now visit each refrigerator only once a day, instead of three times on the previous reloading schedule. Not only does this save time, but it supports LSA's Lean initiative, which includes eliminating wasted motion.

STAT Testing Turnaround



11% Average Decrease in STAT Testing Turnaround Times after Optimization

Analytical Testing Turnaround



31% Average Decrease in Analytical Testing Turnaround Times after Optimization

Benefit: Improved physician satisfaction, patient care

"There has definitely been an increase in patient and customer satisfaction," says Acedo. "In our annual physician satisfaction surveys, we are always most concerned about our turnaround times—and our scores for the past few years have exceeded our goals!"

"In addition, our employees can spend more time focusing on high-priority tasks, thanks to the way we've streamlined their workflow," she adds. "That has improved their satisfaction as well."

Partnership pays off

The Siemens and LSA teams agree: The positive results of the workflow analysis and optimization project would not have been possible without the mutual trust and respect they have built over the years.

"This is the first experience I've had with a company directly; usually they install, train, and that's the end of the relationship," comments Haser. "With Siemens we have 24/7 support and same-day responses. I've never seen that before. That's groundbreaking for me."

"What's really nice about having the Siemens instrumentation is that the doctors can look at the results and see whether the values were derived the same way. Since everything is electronic and visible, it just makes sense to have the same instrumentation, so that we're meeting physicians' expectations."

Dr. Holly McDaniel,
Medical Director at Banner Estrella



Siemens' service engineers made a particular impression on Anaya. "They have provided us with the skills we need for us to be as self-sufficient as we need to be, but they also share things that are outside the advanced training provided, things that are being newly discovered—so we can understand issues that come up and how to prevent them in the future, or how to work around them."

"The field service engineers can make or break a partnership," explains Slader. "The Siemens engineers are fantastic. It's not only their knowledge of the instrument and ability to fix it—it's their ability to work together with our tech on the bench, and their availability. When we need them, there's never a delay. Those professional relationships are very important."

And both sides see that collaboration continuing into the future.

"Siemens and Laboratory Sciences of Arizona have had a long and positive partnership," says Acedo. "They are always there to help. That builds trust."

In 2014, Siemens performed an additional data analysis for the other Arizona laboratories and presented the results to the laboratory staff. As a result, the remaining laboratories have implemented Siemens' recommended best practices for instrumentation configuration and workflow optimization.

"Siemens has been innovative, professional, and very responsive every step of the way," says Slader. "This project was an opportunity for us to work together, optimize our resources, and leverage the best technology to improve patient care. I appreciate that from a company."

"And when it comes time to look at new equipment in Siemens' portfolio, I trust that we will get that same level of quality and service in the future."

IN BRIEF

Banner Health, headquartered in Phoenix, AZ

- One of the largest nonprofit healthcare systems in the U.S.
- 28 acute-care hospitals and healthcare facilities in 7 states (Alaska, Arizona, California, Colorado, Nebraska, Nevada, and Wyoming)
- 47,000+ employees

Banner Baywood Medical Center, Mesa, AZ

- 342 beds
- Accredited Chest Pain Center
- Provides orthopedic surgery, stroke care, cancer care, cardiac services, neuroscience services, rehabilitation services, and emergency care

Banner Estrella Medical Center, Phoenix, AZ

- 305 beds
- Provides heart care, emergency services, general surgery, weight-loss surgery, medical imaging, orthopedic surgery, and maternity services

Laboratory Sciences of Arizona

- Laboratory Sciences of Arizona, L.L.C. Was formed in August of 1996 by an integration of Sonora Laboratory Sciences, an independent reference laboratory providing services to the Medical Community throughout Arizona, and the hospital laboratories of the Samaritan Health system, a predecessor by assignment to Banner Health. LSA is a wholly owned subsidiary of Banner Health.
- Provides management oversight for all of the Banner Health hospital laboratories in the state of Arizona

The Siemens Solution

- Dimension Vista 1500 Intelligent Lab System delivers throughput of up to 1500 tests/hour; unique integration of four technologies supports simultaneous processing of tests for multiple disease states on a single platform from a single tube; 100+ assays processed simultaneously; 166 onboard reagent slots
- StreamLAB Automation Solution automates manual steps and reduces the number of sample tubes required, with highly flexible, scalable configurations for efficient space utilization

Key Benefits: Banner Estrella and Banner Baywood

- Reduced turnaround times for test results: 31% analytical, 11% STATs
- Reduced wasted motion: 1095 trips to refrigerator (4.2 miles) annually
- Reduced analyzer downtime: Maintenance/QC/reagent loading reduced from every 8 hours to every 24 hours
- Improved customer/hospital staff satisfaction at Banner Estrella:
 - From 2013 to 2014, overall survey scores increased in the categories of "overall quality of the hospital lab," "STAT testing turnaround time," and "prompt notification of critical results"
 - In 2013 and 2014, overall customer satisfaction scores exceeded lab goals

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