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Rapid, reliable results help enhance patient care  
in a rural hospital

Dimension EXL with LM Integrated Chemistry System  
Case Study

Answers for life.



# An analysis of workflow leads to improved productivity

“The Dimension® EXL™ system with the LOCI® module helps us contribute to better patient care because it’s faster and more accurate. The technology is the best you can get right now. I feel very confident about the results that we send out. I trust the instrument explicitly.”

Donna Hartsell, MT (ASCP)  
Section Head of Chemistry, Caldwell Memorial Hospital

Caldwell Memorial Hospital is a 110-bed public hospital in Lenoir, North Carolina, a rural area between the cities of Boone and Hickory. Their mission is to provide safe, effective, compassionate care and to promote healthy lifestyles to its small, rural community. In keeping with this mission, the hospital has grown and changed. It currently provides a variety of sophisticated services to the population in the surrounding area, including:

- 24-hour emergency services
- Radiation, medical, and surgical oncology
- Computer-assisted orthopedic surgery
- Outpatient surgery
- Carotid artery stenting
- Cardiovascular and endovascular care

In addition to a very demanding inpatient workload, the hospital’s laboratory has seen its test volumes grow due to an expanding outreach effort. “We stay busy all the time,” says Donna Hartsell, Section Head of Chemistry at Caldwell Memorial. “We have four or five major outreach accounts where couriers deliver samples every day from six hospital-owned physician practices, plus five or six additional private physician practices, and at least a half dozen nursing homes in the area. As a result, we do 776,200 clinical chemistry and immunoassay tests per year.”

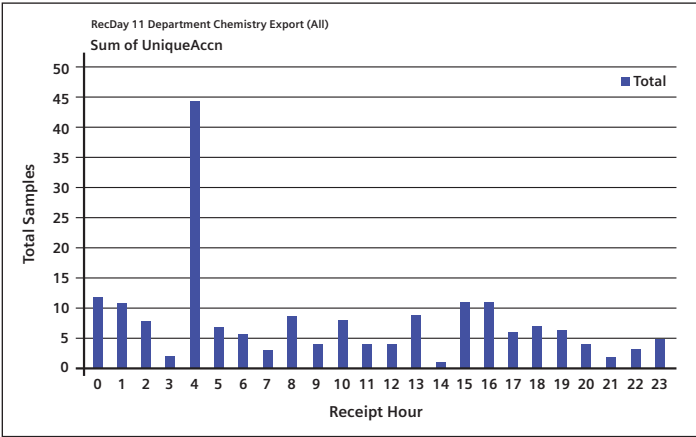
To handle the volume of chemistry and immunoassay testing, the staff at Caldwell Memorial Hospital has used Dimension® systems for nearly 20 years. While their Dimension® Xpand® and Dimension® RxL Max® Integrated Chemistry Systems had served them well for years, they were aging. That drove the lab to consider upgrading their instrumentation.

In an effort to maximize efficiency and productivity, the lab commissioned a workflow analysis and identified a number of areas that could be improved, including:

- Pre-analytical process observations
  - Shift from manual access process to bar-code scanning
  - Handle large sample flow batches by processing ten samples at a time
- Analytical process observations
  - Shift a number of non–value-added tasks such as calibration and maintenance to non-peak times
  - Consolidate testing
- Post-analytical process suggestions
  - Auto-release results

The analysis showed that the lab had a significant influx of volume early in the morning. “Other times in the day,” Hartsell says, “we really don’t have anything but STATs. I call it a STAT lab, which we’re not supposed to be, but that’s the way we feel. This happens most around lunch time, and then about 4 o’clock when we’ve got a major rush from the outreach accounts and from our ED, but there are times when we’re doing more STATs than routine work.”

24-Hour Workflow by Accession (n=188)



The workflow analysis also examined the lab’s current turnaround times (TAT) and then illustrated how the TAT of critical Troponin I tests could be improved using LOCI technology on the Dimension EXL system.

“The number one test ordered from the emergency room is Troponin I,” Hartsell says. “That first troponin is very important to have done. They usually hold the patients for at least 12 hours to make sure that all the troponins are negative before the patient can go home. But that decreases the hospital stay. The quicker you can get the results, the quicker we can get the patient out of here.”

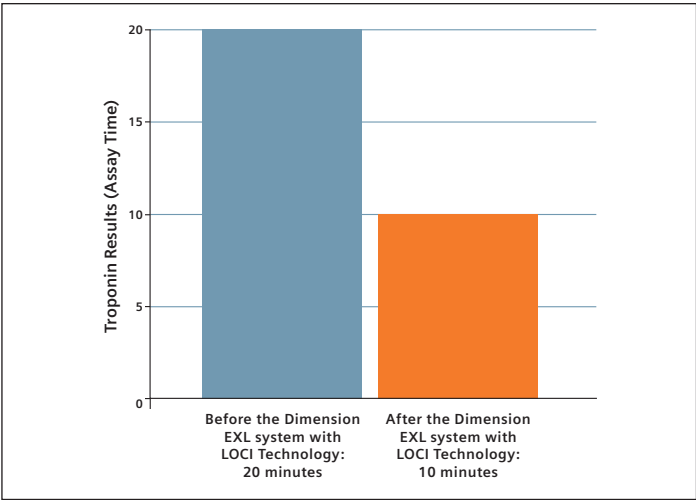
The laboratory also receives many requests for TSH and HCG from the emergency department, as well as quantitative HCG requests from surgery that require speedy results. “Rapid results for these tests can also impact patient care and even save someone’s life,” Hartsell says.

Because Caldwell’s laboratory needed instruments that could process their time-sensitive testing quickly and accurately to improve the standard of care, the staff installed one Dimension EXL system in 2008, then added a second two years later.

The Dimension EXL systems with LOCI module made the lab’s sample flow goal a reality. As soon as technologists put samples on one instrument, then on the other, the samples on the first instrument are finished processing. “Throughput has improved with the Dimension EXL system,” Hartsell says. “We get the work done faster. We have two instruments and we can get the work done in no time at all. You always have work coming off, so you’re never at a lull waiting on an instrument to send out results. It has helped a lot just doing that.”

They also improved their turnaround times. “What’s so impressive about LOCI technology compared to what we’ve had in the past for immunoassay testing is the speed,” she says. “They’re so fast, it’s amazing! Before, PSA, Troponin, HCG, all those immunoassay tests took a long time. Now, it’s cut in half because of the LOCI technology, and we can even do our Troponin I testing in 10 minutes! The ER is always fussing about turnaround time, so that’s a big plus. They are the ones you have to keep happy.”

Getting Important Test Results Quicker



“If you get the troponins to the ED within an hour,” Hartsell explains, “that can cut down emergency room stay. Of course, troponins are done in triplicate or a series of four tests, so the patients still have to stay in the ED, but the quicker you get that first troponin in, especially if it’s a cardiac infarction, they can get the patient right upstairs or wherever they need to go for treatment.”



# Enhancing daily operations

The staff enhanced the lab’s efficiency by switching methodologies. “Almost all of our tests are plasma now,” Hartsell says, “So, we don’t have to wait for our specimens to clot before we spin them. If you have to wait 30 minutes on each green tube, that takes up a lot of time.”

Not only is the lab’s testing faster, it’s also more accurate. “LOCI assays have greater analytical sensitivity than other immunoassay methodologies,” Hartsell says. “It’s one of the top technologies I know.”

Because of the impressive analytical accuracy, the staff at Caldwell trusts the results. “You trust the instrument to send out the results,” Hartsell says. “You don’t worry about what your results are going to be because you know they’re accurate. Our QAP is good; our controls are always good. We have no complaints.”

## A comprehensive menu helps consolidate testing

The Dimension systems uniquely integrate technologies on a single platform without compromising quality, turnaround times, or productivity. Because of its expansive menu, the Dimension EXL system is able to run the majority of requested tests. “Integrating chemistry and immunoassay testing on one instrument is very important,” says Hartsell. “The menu on the Dimension EXL system compares to any instruments that other hospitals in the area use. The comprehensive menu allows us to look at the parameters of whole disease states from a single primary tube.”

Hartsell says, “You just have one sample, and I’d say 99 percent of the critical methods are from that one sample. That’s the purpose of having just that one instrument to do everything.”

The Dimension EXL systems also provide the lab the opportunity to do more testing in-house to expand their offering and increase revenue. “Tacrolimus was added to one of the instruments,” Hartsell says. “That’s one of those organ rejection drug tests that we have a lot of patients on.”

Hartsell also described the many other benefits the Dimension EXL systems have brought to her lab:

- **Impressive throughput and productivity**

The Dimension EXL system also has impressive throughput. “We have six sample segments that go on the instrument at a time, and you could put numerous types of tubes on there,” Hartsell says. “We have four different types of samples, so it’s never been a problem for the Dimension systems.”

“Because the second and third shifts are just as busy as the first, our staff keeps the Dimension EXL systems running around the clock,” Hartsell says.

Samples per hour	60
Tests per hour	624
LOCI tests per hour	167

“It requires very little sample to run a test. It’s amazing how much you can do on just a little bit of sample.”

- **Easy processing. Less maintenance**

“There are fewer manual tasks with the Dimension EXL systems,” Hartsell says. Not having to prepare reagents and samples makes processing easier for technologists. “There’s less maintenance. And, with everything we’ve put on one instrument, that’s always a plus.”

“The Dimension EXL analyzer, like the Dimension Xpand system, does not have an IMT probe. That’s one of the big plus factors that made us go with the Dimension EXL system,” Hartsell says. “There is one less probe to mess with.”

- **Flex® reagent cartridge packaging**

“The common reagent packaging couldn’t be more perfect because we have the same tests on both instruments. I calibrate both of them at the same time. We have the same lot numbers on both instruments, so if anything goes wrong, we automatically see it — we can find out what’s wrong very quickly. It’s a blessing to have two instruments that do all the same tests.”

“The big advantage is no reagent preparation and no sample preparation.”

- **Helpful alert system**

“The sample alerts, supply alerts, and those kinds of things have always been impressive. That’s one of the strengths of the Dimension family of analyzers. It automatically repeats high results. It always alerts you when you need a new reagent; it always alerts you when you have a sample problem. The Dimension family of analyzers have always done that.”

- **Automating control and calibration procedures**

The QCC PowerPak® Efficiency Package automates control and calibration procedures with electronic data storage. “Before, we had to go in and look at each method as soon as it finished running,” Hartsell says. “Now, if the QC is good, and the slope and intercept are good, the Dimension EXL automatically sends the results and they print automatically. We don’t have to do anything. It’s amazing and saves a lot of time.”





## Trusted solutions from Siemens, your proven partner

### Excellent service and support

According to Hartsell, service and support from Siemens is excellent. "It always has been," she says. "The call centers get back to you within 30 minutes."

She also credits her service rep's reliability. "When he comes to fix our instrument," Hartsell says, "he knows what parts to order, or they get somebody in here who does know. They always work well together. There's a lot of experience out there, so they always have someone they can call on, even if there's a new service rep."

Since the user interfaces are consistent among the different instruments, Hartsell and her staff did not need training to learn how to use the Dimension EXL system. "We've always had Dimension systems. We haven't sent anybody to training in a long time. The Dimension EXL instrument with the LOCI technology is not much different from the other Dimension systems — it's just faster. The film's a little better, but you do all the maintenance the same way."

### Simplified automation and IT solutions

Siemens has a wide variety of automation solutions that allow a number of platforms to run as a single system, freeing laboratory staff to focus on other value-added tasks. No matter what size or shape the lab, Siemens has a customized, scalable automation solution to fit it based on customer needs today and in the future.

Siemens also has a suite of flexible options to efficiently manage laboratory data.

### The right fit for a busy laboratory

Hartsell says the Dimension EXL system has been invaluable to the lab. "It is the ideal instrument for our laboratory," she says. "The Dimension EXL system with the LOCI technology is impressive. It's the best system I've ever used."

Having been so impressed, she is eager to spread the word. "When a colleague expresses interest in getting a chemistry or an immunoassay analyzer," she says, "I actually tell them we have the best instrument there is. For our size hospital, I don't think you can do better than the Dimension EXL system. I sing its praises all the time."