

Oklahoma University Medical Center Discovers Automation That Fits

Core Laboratory Profile

Oklahoma University
Medical Center
Oklahoma City, Oklahoma,
USA

- Serves two adult teaching hospitals, a children's teaching hospital and two ambulatory care facilities
- Accommodates three separate emergency departments with Level 1 trauma services
- Performs approximately 3.5 million tests annually
- Integrated Automation System: Power Processor sample-processing system connected to centrifugation units, three SYNCHRON LX®20 Clinical Systems, immunoassay analyzers and 3,020-tube storage unit; COULTER® LH 1500 Series hematology automation system with two COULTER LH 755 hematology workcells; DL2000 Data Manager

Oklahoma University Medical Center (OUMC) faced a number of vexing problems. Old-style manual processes and a shortage of qualified medical technologists prevented the lab from keeping up with growing test volume demands. Meanwhile, the lab needed to consolidate lab services for five separate patient facilities. Lab automation not only addressed these challenges immediately, but also produced substantial cost savings and new revenue opportunities.

Investing in Lab Automation

Over a period of several years, OUMC invested in technological upgrades to consolidate testing into one core lab. But the consolidation had produced little tangible gain. Sample batching and manual processes – which involved up to 18 steps – led to sluggish turnaround time (TAT). Many non-urgent tests had to be outsourced – at significant expense – to reference labs.

“We were getting relatively little value out of all of that technology because we weren't processing those samples as rapidly as we could,” explains Ken Blick, Ph.D., ABCC, NACB, Director of Clinical Chemistry and Information Systems at OUMC.

The lab's aging workforce posed a major problem, as well. Staff members were hard to replace, due to a shortage of trained technologists in the labor market. Plus, current work processes were stressing staff and wasting their skills on mundane tasks.

OUMC lab managers submitted a plan to hospital administration that called for automation at the institution's core laboratory. Lab administrators maintained that automation would pay substantial dividends to the hospital by delivering productivity gains and other improvements.

OUMC selected Beckman Coulter as its automation vendor. With more clinical lab automation installations than any other company, Beckman Coulter offers “open” automation systems that can connect to other manufacturers' instruments, providing OUMC with more flexibility.

Automation of the chemistry line went live in March 2004. The automation line includes a Power Processor, which performs sample sorting, centrifugation, tube decapping and recapping. The system integrates three SYNCHRON LX®20 PRO Clinical Systems, an immunoassay analyzer by another manufacturer and a 3,020-tube stockyard.

Financially Exceeding Expectations

From both a clinical and financial standpoint, the performance of the system has already exceeded expectations, says Dr. Blick.

Take automation's impact on OUMC's three emergency departments (EDs). Dr. Blick's research had demonstrated that slow TAT outliers or variations contributed significantly to patient

Laboratory Goals	Laboratory Results
Reduce labor requirements	Decreased staffing needs by five FTEs, saving more than \$291,000 per year; reduced overtime pay by 60 percent
Accommodate growing workload	Increased total tests per month by 6 percent while decreasing FTEs
Lower costs and increase revenue	Closed satellite lab due to increased efficiency of core lab, saving \$1.5 million per year; reduced need for send-out tests, saving \$240,000 annually; increased outreach service, netting \$80,000 in one month alone
Improve test turnaround time and reduce variability	Meets TAT targets 95 percent or better, helping to reduce patient length of stay in EDs from up to four hours to an average of two hours

logjams in the ED. In the pre-automation days, that meant patients who needed immediate care often couldn't get it in a timely manner. The same research suggested the hospital was bearing needless expense and stress on its human resources, because up to 93 percent of ED patients were eventually released after the results arrived.

These problems were virtually eliminated through automation, which has reduced both TAT and outlier results dramatically. The core lab now meets TAT targets



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Ken Blick, Ph.D.

at least 95 percent of the time. In fact, TAT is now so dependably fast that OUMC closed a satellite lab it was operating for one of the EDs, saving the institution roughly \$1.5 million per year. Meanwhile, most patients are moving through the ED in about two hours, reducing length of stay significantly. In the pre-automation days, it would take six to eight

hours for some patients' rule-out protocols to be completed.

In a similar vein, the improved patient care afforded by automation has enabled the lab to reduce its staffing needs. Before automation, doctors placed so many calls to the lab about the tests they'd ordered that the lab had to dedicate staff to answering the phones. "We don't have those people anymore. The phone rarely rings because results get to the doctors so quickly," says Dr. Blick. Ultimately, faster TAT made it possible for the lab to eliminate 1.5 FTEs for telephone support.

Overall, automation has eliminated five FTEs – a savings of more than \$291,000 per year – and reduced overtime pay from 3.5 percent to 1.4 percent.

CFO Jim Watson judged OUMC's automation business plan mainly on the numbers. And the numbers show that the plan was right on point. "As a CFO, I'm always skeptical," he admits, "but they said they were going to achieve five FTEs of savings and, sure enough, they got them."

In addition, automation has eliminated the labor-intensive aspects of add-on testing for most tests, as well as the related work stress on staff. "Physicians can get on the computer and order additional tests on the specimens we've already collected," says Dr. Blick. "These add-on

tests are handled in most cases without any technologist intervention, just like the other routine testing."

Dr. Blick also points to DL2000 Data Manager as further improving his institution's test result management and reporting. The software, which consolidates information from multiple Beckman Coulter analyzers into one database, helps medical technologists focus on critical patient results for rapid response to clinicians.

Raising Revenue through Higher Capacity

Automation has provided the lab with new opportunities to generate revenue. "Automation gives us the low-cost platform to grow business from customers outside this campus cost-effectively," says Watson. "It's very efficient. Our per-unit cost is very low, and that gives us a competitive advantage in the marketplace that we didn't have before."

In one month, the lab took in an additional \$80,000 of referred testing without adding FTEs or overtime. In total, the lab has increased its testing volume by 6 percent without adding any additional staff. Before automating, it would have taken 4.2 additional FTEs (at an annual cost of about \$244,000) to handle the same volume growth. In fact, the lab has actually brought in-house 15 tests that it had previously referred out. This by itself has a potential savings of \$20,000 per month.

As another indicator of greater capacity, productivity – that is, total tests per month divided by total paid hours – has increased by 25 percent, from 0.17 to 0.23. This brings it to a level that leads all other HCA-affiliated laboratories.

None of the above advantages were unexpected, since Beckman Coulter's automation systems have delivered similar results in scores of labs worldwide. But what did surprise Dr. Blick and his colleagues was just how successful the project was right out of the box. "We saw almost immediate benefits," he says. "We got immediate relief from the stress of trying to deal with all of these batch processes. The system worked virtually immediately."

Having done so well on the first round of automation, OUMC recently added the COULTER® LH 1500 Series hematology automation system. The system includes two COULTER LH 755 hematology workcells – which feature integrated SlideMaker/SlideStainer modules – and offers automated sample tracking, sorting, cassette loading and unloading, and repeat and reflex testing.

"Beckman Coulter has a track record here now," says Watson. "I'm real confident that this next investment will show the same kinds of returns."



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