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Brant Community Healthcare System Reengineers Mid-Volume Lab Using Value Stream Processes to Enhance Automated Multidisciplinary Workflow

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Brant Community Healthcare System Leverages Automation for Value Stream Process Reengineering

> "Running a mid-volume lab can be a challenge. Siemens ADVIA Automation, along with the Sysmex CS-5100 system and ADVIA 2120i Hematology System—all powered by the CentraLink Data Management System—provides scalable cost efficiencies to run fast and lean while maintaining high standards of quality."
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> **Don Manning, Value Stream Leader**
> Brant Community Healthcare System

Mid-volume laboratory achieves lean efficiencies

In April of 2013, Brant Community Healthcare System (BCHS) in Brantford, Canada, launched a Value Stream process to completely restructure the organization. Placing the patient at the center of all processes, the restructuring sets the healthcare system's compass on a "True North" direction toward clinical excellence. It also provides the means to optimize staff time by streamlining workflows and thereby address the ongoing pressures of growing volume and shrinking budgets. In the BCHS core laboratory, the Value Stream vision is realized through an integrated solution from Siemens Healthcare Diagnostics: the ADVIA® Automation Solution, coupled with instrumentation including the Sysmex® CS-5100 Hemostasis System* and the ADVIA 2120i Hematology System—all controlled through the CentraLink™ Data Management System. Lab workloads reached 2.1 million tests in 2014 and continue to grow. At the same time, increasing efficiencies have put the lab on course to save approximately $400,000 a year. Although Siemens is well known in large laboratories worldwide, the BCHS system's experience demonstrates the benefits of Siemens solutions for mid-volume labs as well.

"Being part of a mid-volume lab is a challenge because our services are diverse," says Don Manning, Value Stream leader of BCHS Care Support, which includes the core lab. "Unlike some bigger centers, we don't specialize. We offer a broad menu of tests using a variety of platforms that, without automation, would require a lot of staff. With our integrated Siemens instrumentation, automation, and data-management solution, we link it all together so we have one point of interface. We have the automated system physically move and test the samples without people having to constantly monitor and manage the instruments. We've standardized a high-quality process with a very lean staffing model."

Increasing volume, shrinking budgets demand greater efficiency

The BCHS core lab serves not only the 265-bed Brantford General Hospital but also outpatient clinics, urgent-care facilities, and two hospitals in surrounding communities. Its broad menu of tests includes clinical chemistry, immunoassay, hematology, and hemostasis. Test volume has been growing 3–5% per year for the last decade, driven by the introduction of new tests, increased microbiology testing for influenza and resistant bacteria, and increased emergency-care workloads. In addition to steady year-over-year increases, the lab must accommodate significant seasonal and time-of-day workload fluctuations. Budgets, meanwhile, are shrinking—down 2% in 2014, flat in 2015, and slated for another 2% cut in 2016—due largely to the government shift to quality-based funding. In response, BCHS management has reviewed all of its costs down to a granular level and found significant opportunities to increase lab efficiency through automation.

"One of my top challenges as a Value Stream leader is financial constraint—maintaining appropriate staffing to do more with less and to meet workload fluctuations," Manning says. "We have to use our resources wisely, with the patient at the center."

Brant Community Healthcare System at a glance:

- Serves 265-bed Brantford General Hospital; outpatient clinics (dialysis, oncology, etc.); two hospitals in surrounding communities; urgent-care facilities
- 2.1 million tests in 2014
- Lab volume growing 3–5% annually
- Lab budgets flat or decreasing
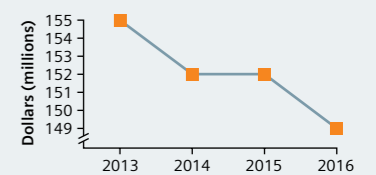
CDB core lab (tests/annual volume):

- Chem/immuno: 570,000
- CBC: 65,000
- PT INR: 25,000
- APTT: 15,000
- D-dimer: 1500
- Fibrinogen: 500

*Under FDA review. Not available for sale in the U.S. Product availability may vary from country to country and is subject to varying regulatory requirements. Please contact your local representative for availability.

3

CentraLink

2x ADVIA 2120i

ADVIA Centaur XP

Sysmex CS-5100

Sample Manager

Centrifuge/ Decapper

2x ADVIA 1800
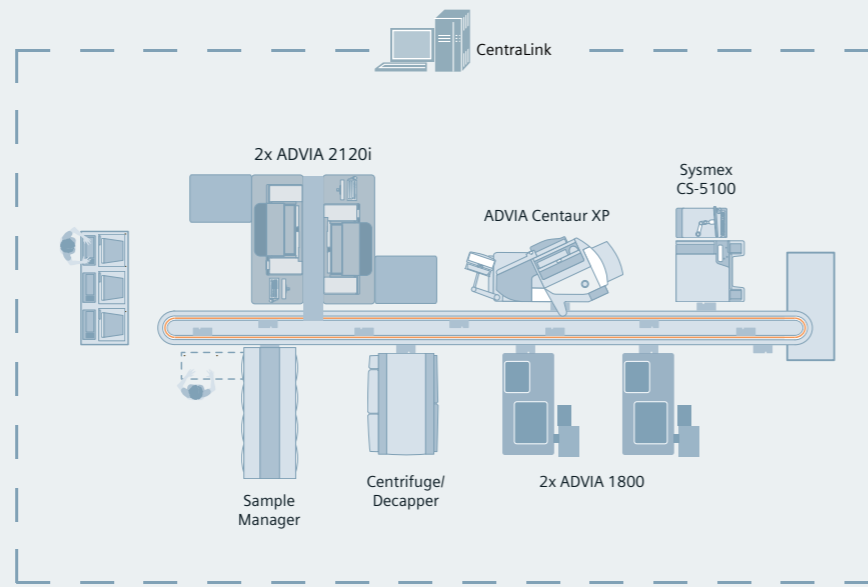
> "We can monitor, run, and administer that analyzer [Sysmex CS-5100 system] in a standardized fashion like everything else on the track. This ensures quality."

Don Manning, Value Stream Leader
Brant Community Healthcare System

Value Stream: Crossing the enterprise to serve the entire healthcare system

As part of the 2013 restructuring, traditional BCHS departments were redefined into seven Value Streams, clustering like services to enable streamlining and standardization. Manning's Value Stream is "Care Support," which encompasses laboratory, imaging, pharmacy, infection control, and reprocessing activities. Like some other Value Streams, such as Finance and People Development, Manning's Care Support crosses the enterprise to serve the entire healthcare system. "Value Stream is a style of management whose purpose is to provide a really good patient experience," he says. "True North is our strategic direction; we'll probably never get there 100%, but it's what we strive for."

In this quest, BCHS turned to its trusted Siemens relationship and leveraged automation to improve workflows.

Automation with CentraLink system delivers full solution

BCHS became a Siemens customer in 2009, after a rigorous request for proposal (RFP) selection showed that Siemens could enable efficient operation, ease lab management, facilitate delivery of timely, accurate results, and minimize training demands—not just for high-volume labs, but for mid-volume labs as well. "It was a highly competitive process with a lot of weightings and gradings," Manning recalls. "Siemens came out on top with a total lab automation solution that let us program our rules into the CentraLink system. Siemens provided a complete package, including middleware."

The ADVIA Automation Solution is a multidisciplinary system that maximizes lab productivity through high capacity and increased throughput, providing full integration with specimen-processing management, centrifugation, and decapping. CentraLink Data Management System software, meanwhile, applies validated rules that ensure high-quality, accurate clinical results and simplifies operations with one integrated solution across automation, systems, and IT. The CentraLink Data Management System enables laboratories of all sizes to improve efficiency by automating, streamlining, and customizing workflows. Laboratories can access information when it's needed and support better patient care.

"We wanted one homogeneous system for everybody to use, as opposed to having to flip to different systems," Manning says.

"We wanted to build all of our auto-validation rules into that centralized system, and manage, control, and release all of the test results from one spot, accessible to users through any available client device as they move from location to location during their workday. This makes it easier to train staff and for our staff to run the system."

Sysmex CS-5100 system with PSI† optimizes integration and throughput

BCHS originally had a STAGO STA-R instrument on the automation line, with a STAGO STA Compact as an offline backup. The STAGO STA-R, however, lacked Preanalytical Sample Integrity (PSI™)† checks and required an additional robotic arm module to move tubes to and from the automation track. "Technicians had to provide extra monitoring for test reruns

or add-ons," recalls Lee-Ann Lambert, a BCHS Value Stream Team Leader. The lab replaced the instrument with the Sysmex CS-5100 system which provided point-in-space sample transfer, implemented sample-quality checks, brought full middleware feature integration, and even saved on maintenance contracts and floor space. The Sysmex CS-5100 system is a random-access, high-volume coagulation analyzer in which multi-wavelength PSI technology identifies unsuitable test samples prior to analysis, helping ensure high-quality results on the first test run. Automated sample-volume checks and qualitative detection of hemolysis, icterus, and lipemia minimize the need for manual sample inspection.‡ The Sysmex CS-5100 system's wide optical spectrum handles a broad range of assays for testing consolidation. Its advanced

workstation capabilities enable high productivity and throughput, while the intuitive user software provides a dynamic, customizable environment. Consistent and powerful connectivity features ease integration.

The very first day the Sysmex CS-5100 system debuted at BCHS, it detected an insufficient sample volume, Lambert recalls. "The system validated itself right out of the gate," she says. The Sysmex CS-5100 system's ability to detect hemolytic samples is another significant improvement. "In the past, sometimes we would see them [hemolyzed samples] when we were taking trays off the sample manager. Or if they had a chemistry specimen we thought was hemolyzed, we would look at the coag[ulation of the sample], but this is much more efficient."

The Sysmex CS-5100 system makes the core lab's system truly homogeneous, Manning adds. "We can monitor, run, and administer that analyzer in a standardized fashion like everything else on the track, he says. "This ensures quality."

† In the U.S., PSI technology helps ensure proper sample fill volume. Outside the U.S., PSI technology helps ensure proper sample fill volume and automates management of hemolytic, icteric, and lipemic samples based on user-defined system settings.
‡ Functionality not available in the U.S.

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> Lee-Ann Lambert, Value Stream Team Leader
> Brant Community Healthcare System

ADVIA 2120i Hematology System slashes differentials

The lab uses the ADVIA 2120i Hematology System to streamline workflows and maximize productivity by eliminating most commonly performed manual steps. The system's technology delivers the gold standard in testing methodology—peroxidase staining in differential testing—while bringing simplicity and flexibility for easy integration into the lab. The system also provides a secondary total white cell count that acts as an internal QC check to monitor sample integrity. The ADVIA 2120i system enables a medium-sized laboratory like BCHS to automate without expensive stains or reflexive testing.

With the ADVIA 2120i system, the BCHS lab cut its differentials by 50%—thereby reducing one of its most labor- and cost-intensive processes, as each manual slide review can take up to 15 minutes. The hematology workload actually decreased after introduction of the ADVIA 2120i system, while elsewhere the chemistry volume was rising.

Total lab automation delivers flexibility, scalability

As a mid-sized lab running diverse tests, BCHS's consolidation onto an automated multidisciplinary platform enables flexibility as well as cost efficiency. BCHS has lab assistants load samples into the automation system. Technologies then can monitor from a distance, leveraging autovalidation to focus on results that require their trained expertise. If needed, technologists can attend meetings or provide staffing in other areas. "If we need to move somebody to blood bank, or if they need to do some troubleshooting somewhere, it doesn't interrupt our regular flow," Manning says. "Automation gives us the flexibility to shift."

What's more, because BCHS currently uses just a fraction of the automation solution's capacity, the laboratory can scale at minimal cost. "As we see an increase in core laboratory testing of 3–5%, we're able to scale as a pure cost of the consumable," Manning says. "I don't need to add any staffing or any more overhead. I've already got that capacity in there."

Siemens helps support change management

When BCHS restructured for Value Stream and automated its lab, the healthcare system knew that astute change management would be critical to its success. Today, hospital staff embraces the streamlined processes. Lab technicians are freed from routine tasks to add value by using their higher-level skills. Clinicians receive reliable test results with consistent turnaround times to support excellent patient care. They even have created a revenue stream by serving as a reference lab for smaller hospitals. As part of the Lean management process, department staff meets every morning for "huddle boards" to review key performance indicators (KPIs) and laboratory results, including the number of test reworks, outpatient surveys, and TAT tracking and comparison versus targets.

Throughout it all, Siemens has been a steadfast partner, Manning and Lambert say, providing everything from readily accessible service technicians to Lunch-and-Learn events and lab staff education. The Siemens Services and Support team provides expertise online, on-site, and over the phone, around the clock.

"Siemens is great at getting the right support in here to help us—whether to tweak instrument performance or to educate staff. It's a true partnership," Lambert says. "I have the serviceman's email, and I can talk to anybody at any time. The Lunch-and-Learn events bring Siemens specialists to deliver hands-on, practical training and especially build our skills and confidence—Siemens usually conducts them back-to-back so all the staff can go. The high quality of Siemens services is a large part of our satisfaction."

To labs upgrading their automation or automating for the first time, Manning offers the following advice: Network with peers to learn what works and what does not. Don't automate a bad process; streamline first, using front-line staff input. Follow up frequently, obtain feedback, and adjust as required. Finally, understand that Siemens automation isn't for giant labs only: "We run our mid-volume core lab very lean, but with scalable capacity to accommodate growth with only the cost of consumables—no need to hire more staff," he says. "With features like autovalidation, our technologists focus on results they need to do something with, be it a phone call or further testing. They're flexible to move around where they're needed and make the best use of their trained expertise. For BCHS, that's an efficient use of technology and human resources to fulfill its healthcare mission."

Core lab automation benefits

Cost savings/sustainability

- Gain revenue stream from reference-lab testing for smaller hospitals
- Reduce waste (tubes and storage space)
- Projected $400,000 annual savings through reduced tubes, consumables, service-contract consolidation

$400,000
PROJECTED ANNUAL SAVINGS

Staff utilization/productivity

- 50% decrease in manual differentials saves staff time and speeds delivery of CBC results to physicians

50%
MANUAL DIFFERENTIALS

- Operators spend less time tending system, freeing them for more value-added tasks
- One medical laboratory technician (MLT) decreased by attrition; three medical laboratory assistants (MLAs) reclassified from full time to part time; no job losses
- Workflow flexibility to adapt to changing lab needs
- Can accommodate volume growth without adding staff

Turnaround time

- Consistent and predictable TAT, with gains in some areas, including STAT

PRODUCTIVITY

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