“If you look at our turnaround time and error rate statistics, you can see how we’ve worked with the automation line, leaned out our processes and improved things with ADVIA CentraLink [Networking Solution]. We save so much time in resulting and manual processes. We’ve reduced the number of reporting errors, and we’ve been able to consolidate our blood draws.”

– Sue Stern, Administrative Healthcare Manager, Chemical Pathology

At a busy tertiary care academic center where the clinical lab churns out 8 million test results a year—7 million just in chemistry and immunodiagnostics—effective deployment of automation and information technology to maximize productivity and cost efficiency is a given. Such is the case at the University of Michigan Hospital (UMH). According to Sue Stern, Administrative Healthcare Manager of the Chemical Pathology Department, productivity gains are only part of the story. Indeed, the lab has been able to almost double its volume over a period of almost four years, without adding staff or instrumentation. Just as important are quality improvements that have made a

**Chart 1. The ADVIA LabCell Solution**

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**Elevating Patient Care at the University of Michigan Hospital**

**Winning with Diagnostics IT**

**Answers for life.**
positive impact on patient care. Turnaround time (TAT) dropped: 97.3% of inpatient stat samples are delivered within the targeted TAT of 45 minutes, while 99.8% routine samples meet the 120-minute goal. The lab has reduced the number of SST tubes per patient by 60% in the outpatient area—a welcome change that benefits patients and their caregivers.

Chemical Pathology at UMH provides chemistry, special chemistry, immunology and toxicology testing services for all three hospitals on campus, with a total of 865 beds and 1,600 physicians. The laboratory also provides services to 30 health centers and 120 outpatient clinics within a 60-mile radius.

To accommodate annual growth rate of 3 to 5%, a mix of inpatient and outpatient, stat and routine testing needs, the lab designed and implemented a new automation line in 2006: the ADVIA® LabCell®. The configuration consists of three ADVIA Centaur® Immunoassay Systems, three ADVIA® 2400 Chemistry Systems, two centrifuges and two sample managers. It handles 100 chemistry assays and immunoassays, all managed by ADVIA CentraLink™ Networking Solution. The six instruments took over the workload of eight analyzers used prior to the redesign and have supported the volume growth over the last four years. Today, the automation line runs 24 hours a day, seven days a week.

“Auto-verification Streamlines Results Reporting.
With auto-verification, ADVIA CentraLink classifies each result based on criteria programmed into the system, flagging only those results that require technologist review. This means there are fewer results to review—at UMH, 80% of test results are reported directly without technologist review. It also means that the same rules are applied consistently to review the results.

*Individual laboratory’s system productivity, throughput and associated TATs may vary.
Measurable Gains in Quality Care

Even more important than the improvement in productivity is the impact of automation and information technology on patient care.

Improved Turnaround Time Expedites Clinical Decisions.

Routine samples classified as “on time” based on the 120-minute goal increased from 98.4% in August 2007 to 99.8% in August 2009. Using a 60-minute benchmark for all stat samples, on-time stat sample TAT increased in the same time period from 89.9% to 99.8%. Furthermore, inpatient stat samples meeting a 45-minute goal advanced from 66.7% to 97.3% in the same period, while 95.6% of outpatient stat samples were reported within the 45-minute goal, compared to 77.6% two years prior. TATs such as these support timely clinical decisions and specific clinical guidelines in some cases.

Reduced error rates enhance patient safety. Error rate is an important benchmark of quality and safety. At UMH, standardization of the results review process, automation of error-prone manual tasks (e.g., locating specimens for add-ons) and the reduction of the number of results requiring staff review have contributed to a reduction of the number of reported errors. The monthly error rate at UMH has dropped from 26 per month, with a monthly volume of 356,557 in 2005, to 13 per month, with a monthly volume of 663,235 in 2009.

Fewer Blood Draws.

The consolidation of more than 100 different tests on the automation line has significantly reduced the number of SST tubes required. In the past, for example, a basic profile, lipids and thyroids might require three different blood tubes. Now, only one tube is needed.

Pointers for Middleware Evaluation

For labs looking into lab informatics solutions, Stern suggests that the starting point is a list of what the lab wants to accomplish. In the case of UMH, considerations such as reducing staff stress and handling the ever-increasing volume were the primary concerns. She also suggests looking at middleware needs in the context of the current LIS.

Chart 3. Reduction in Error Rates

“I haven’t seen on other systems the algorithms that ADVIA CentraLink has for hepatitis and HIV reporting.”

“In the outpatient group, we figured that we have cut our number of SST tube draws down by 60%.”

“Consider how the system handles auto-verification. How easy is it to write rules? You need to have ways to build rules for special circumstances… delta checking by both absolute value and percentage is important—not all of the systems can do both a percentage and an absolute value for delta checking… You want to be able to look at QC, whether QC is in or out, and have it stop results based on that… What kind of support can you expect from the company offering the middleware? Are they continuing to make improvements?”

– Sue Stern, Administrative Healthcare Manager, Chemical Pathology
Siemens Healthcare Diagnostics, the leading clinical diagnostics company, is committed to providing clinicians with the vital information they need for the accurate diagnosis, treatment and monitoring of patients. Our comprehensive portfolio of performance-driven systems, unmatched menu offering and IT solutions, in conjunction with highly responsive service, is designed to streamline workflow, enhance operational efficiency and support improved patient care.

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