

Auto Verification

Data Mining

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Regulatory Compliance

A Sample Tracking Story:

Frank Polito, working at a large medical center needed a way to store and, more importantly, find samples in the laboratory. The clinical chemistry lab runs more than 1.4 million tests per year, providing critical testing services to a Level 1 trauma center, a neonatal nursery, a cancer center and transplant services. While realizing an 8 to 10% increase in test volumes annually and a 20% increase in Outreach – the key to handling the increasing demands was working smarter. Using Instrument Manager's™ Specimen Storage and Retrieval, they can focus on providing world-class diagnostics services rather than hunting for samples.

- Saves 2.5 to 3 hours per day – storing and locating samples
- Notifies techs of pending and held tests before a sample is stored
- Tracks each sample's storage location and who checks it in and out
- Single, networkable sample storage and retrieval solution for the entire enterprise

That's working smarter.

Frank Polito, MBA, MT (ASCP) SC
Dartmouth-Hitchcock Medical Center
Lebanon, New Hampshire

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Issue Stories

Labworks

No Monkey in the Middle

by Judy O'Rourke

Dartmouth-Hitchcock Medical Center's clinical chemistry lab plugs gaps with Roche middleware.

The clinical chemistry lab at the Dartmouth-Hitchcock Medical Center, Lebanon, NH, is a regional resource for New Hampshire and Vermont, and provides testing service for a Level I trauma center, tertiary care neonatal nursery, the Norris Cotton Cancer Center, and transplant services. It serves the 372-bed Mary Hitchcock Memorial Hospital, the Dartmouth-Hitchcock Clinic, Dartmouth Medical School, and the Veterans Affairs Medical Center in White River Junction, Vt. The lab ran more than 1.4 million clinical chemistry and immunoassay tests in 2007, and its testing volume has grown 8% to 10% annually. Outreach testing has increased more than 20% and is expected to grow.

The stark realization that a shortage of techs and a graying workforce meant working smarter, not harder, prompted the search for a middleware product to span the gap. The combination of Roche automation and its Middleware Solutions package was the best option available, says Frank Polito, the lab's POC/chemistry supervisor.

The system needed to mimic the complete screening techs perform—to function as auto-tech screening. The lab employs 21 full-time employees. Roche's middleware storage and retrieval function saves 2.5 to 3 hours of tech time daily storing and locating samples through the LIS. The middleware concept was entirely new for the lab, and it instantly filled connectivity gaps between the analyzer and the LIS—and offered full control of the process to push forward with autoverification.

The lab would write hundreds of rules, and the chance to customize them was a big selling point. "It was not an out-of-the-box product," Polito says. "Probably the biggest thing is that what you get out of it is determined by what you're willing to put into it. We chose to do everything."

After the techs grasped the basis of the system, they helped create new rules to improve the workflow and spur a second look at nuances that may have been missed in the first round of rule writing. "We had a situation the other day when a result got verified—the sample may have been contaminated but would not have triggered any of the middleware flags to be held. We had a rule written and in place within 24 hours. That's when you know you've got buy-in!"

Never Too Many Rules

Some 800 rules guide the lab's trio of analyzers, and fine-tuning is nonstop. "Once you write rules you find a way to tweak them, to make them more institution-specific. We initially decided five types of rules we had to write—criticals, delta checks, index checks, less-than and greater-thans, and a miscellaneous group that contains some logic rules and some auto-reflex rules."

The new system helps techs find the needle in a haystack. "With things in the past, we said, 'It's probably OK.' If you have a stack of 500 results to review, you're probably not going to be as careful as if you have stack of 50 in the same time period," Polito says. The lab autoverifies some 90% to 95% of the workload, which frees the vice grip on techs' time and taps their expertise in spotting discrepancies.

"Techs have become aware of more contaminated samples and samples they believe were mislabeled, which did not represent the patient profile," Polito continues. "Now we question them and call the unit. A lot of times they'll say, 'There's no reason for the change; we need to redraw it.' That is the proof in the pudding, because they were given the luxury—in the process of reviewing results—to be able to take a half a second, a half-minute to say, 'This looks a little fishy.' "

The instrument manager allows techs to bypass the LIS and put results into quality control in the Bio-Rad program. "It's superior to the LIS in looking up individual results, charts, in the ability to compare one result to another," Polito says. "It's much faster, and it can review all of the quality control for one instrument at a time instead of each level of quality control, as most LIS systems do. The functionality it adds is tremendous."

Polito began as an evening-shift tech in chemistry before switching to the day shift, when he became a technical specialist. He taught med tech students at the University of New Hampshire during their clinical rotation, and ran the point-of-care testing program. An unexpected chain of events during his pursuit of an MBA propelled Polito into the post of interim, and now permanent, supervisor of clinical chemistry.

Tag, You're IT

IT is what differentiates one vendor from another, he says. Before the transition, autoverification was nonexistent—techs had to eyeball the blizzard of paper churned out by the instruments. With middleware and the modular system, which includes other pieces of equipment, all of the specimens are screened by middleware. Anything not flagged by the middleware autoverifies—techs don't even see it.

Polito says one key feature of the middleware/autoverification system is time saved in specimen storage. Before, techs had to manually handle the rack and sort by number, by Julian date. Now, tubes

are bar coded and are stored with x/y coordinates in a storage rack. Techs scan the bar code to look up a specimen, and they can log specimens out—an improvement from the past when an open slot or hole in a rack could mean a tube was misfiled or taken by persons unknown.

Automation is a boon, but the lab never aimed to be a factory operation. "People talk a lot about Lean processes, trying to reduce the number of steps, trying to make the process as error-free as possible, adding quality checks, eliminating steps for people to do things," Polito says. "Middleware picks up slack between the LIS and the instruments."

Despite some fears and skepticism, it has not rendered tech jobs extinct—two techs even ditched retirement and returned to the lab. "They say they don't know how we ever worked without it," Polito says.

The transition involved a lot of preplanning because the lab wanted to adopt many changes, but it paid off because major glitches were avoided. Polito says techs felt confident they could control the system and change rules on the fly. "When I first started the project 2½ years ago there were other vendors with the same LIS," he explains. "Most were only using it as a black box flow-through interface; they weren't using rules. I was amazed anyone would buy a system and not use it. We were an early adapter."

The biggest challenge facing the lab managers today is reconfiguring its layout. They are in the process of automating the analyzers with a front-end processor—which also is connected to the middleware solution. The process requires some engineering, such as cutting benches and adding utilities.

Polito envisions a future when the lab relies more on the automation of front-end processes and more middleware-type solutions. Automation of functions such as capping, decapping, and sorting/storing tubes is expected to squelch ergonomic issues. "By further developing and refining our middleware processes, we allow the staff to focus on the problem results and get the other results charted in a faster manner," Polito says. "The combination of these two will allow us to do more with less staff while providing better service in test-menu availability and turnaround time."

Other Roche assays have been added since the middleware took up residence: the Modular PPE, the Cobas Integra 800, the Elecsys 2010, and the Cobas 6000CCE.