UHS gains flexibility for the future with VITROS® Systems and enGen™ Laboratory Automation

New systems boost quality, confidence and productivity -- in a compact space

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UHS Snapshot

LABORATORY GOALS

- Replace existing chemistry analyzers and go live with automation within three months
- Standardize test menu and integrate on one platform
- Optimize inventory management process; minimize manual tasks
- Increase capacity and menu to bring new testing in-house
- Improve quality of results, boost productivity to cope with looming staff reductions

KEY RESULTS

- Automation track installed, start to finish, in just 45 days
- Eliminated high volume send out tests; decreased costs by $100,000 per year
- Downtime due to Maintenance and QC reduced by 50% per day
- Eliminated 100% manual inspection; reduced pour-offs from 33% to <5%
- Increased auto-verification from 60/70% to 80% - impacting over 500,000 tests a year
- CMP/BMP Average TAT reduced by 10%; STAT Troponin TAT unchanged, even though on-analyzer time for VITROS® Systems was twice as long
- Reduced space required for supplies by 65%; variation in monthly spend reduced by 50%

The bottom line from United Health Services (UHS) executive management was familiar for most of us who manage laboratories: do more with less. The organization had engaged an outside consulting group to evaluate costs and improve departmental workflow and efficiency. As with all hospital laboratories, they were faced with an aging staff and fewer qualified staff entering the field.

UHS is a regional health system serving upstate NY, with a broad range of specialties and over 500 physicians from 60 locations, including four hospitals. Under a prior arrangement that ended mid-2015, we had contracted the management of the laboratories out to a national company that managed all aspects of testing and operations, including analyzer selection and reagent purchasing.

Challenge Meets Opportunity

In the past 5 years UHS has had two different chemistry vendors, and staff members were wary about moving to a third. But with everyone agreeing our current state was not workable, we reached out to a number of chemistry vendors with a list of high-level goals:

- Improve the quality and timeliness of reported results
- Standardize analyzers across all laboratories for the core testing disciplines
- Boost productivity to neutralize the impact of attrition
- Optimize lab space to create a layout that improves specimen workflow
- Expand menu to reduce send out testing and associated costs

The hospitals' existing integrated system lacked a full infectious disease menu, the ability to back up critical assays, and had extensive daily downtime due to maintenance and QC. This forced UHS laboratories to off load tests to other platforms and send out high-volume tests, such as Vitamin D.

Even more troublesome was the need to inspect many samples for issues such as sufficient specimen volume, endogenous interferences, and clots and fibrin. Like most labs that process a high volume of outpatient samples, we could not rely on doctors' offices to send quality samples. With a wet system, the common probes are susceptible to clots, at times requiring the system to be taken out of service in order to clear the probe, and sometimes replace the tubing. At times, clots would not be detected until several samples had already been processed and results questioned.

In addition, when sample volume in primary tubes was insufficient for testing, staff needed to pour off samples into cups. The uncertainty and potential for errors of this process created another process bottleneck, forcing us to inspect 100 percent of chemistry tubes before analysis.

While our initial Request for Information did not include automation, we soon modified our plan for UHS Wilson Medical Center to include it, seeing it as essential for meeting customer physician needs, improving workflow, and offsetting our staff reduction. The ValuMetrix consulting arm of Ortho Clinical Diagnostics (Ortho) helped us identify additional opportunities by conducting workflow assessments at the Wilson Medical Center and Binghamton General Hospital labs. In addition to identifying inventory and sample flow improvements, they assessed our space and blueprints to propose more effective layouts.

Site visits illuminate next steps. . .

The search quickly narrowed to two vendors. After conducting site visits to see each vendor's solution in action, we were able to better visualize automation and its impact on operations. Facilities that continue to manually load samples on the analyzers versus the track were not using the automation systems to their maximum potential; something we would train staff to minimize. While we did opt for adding the de-capper and re-capper modules, we decided to steer away from putting centrifuges on the track, avoiding cost and a potential bottle neck inherent with all automation solutions.

In the end, UHS selected ORTHO. Four factors were critical in choosing the VITROS® systems. First was improved quality of results – with dry slide and disposable tips, we no longer faced the elevated concerns regarding clots and endogenous interference as we did with the wet system we replaced. Second was increased standardization - consistent interfaces, low maintenance, and common reagents between analyzer models to meet different needs

across the four laboratory facilities.

Third, a dedicated ORTHO support team works with you to create a road map for the implementation, providing layout consulting and lean training for both lab management and staff.

Lastly, the lab's small physical space demanded a compact, configurable solution; competing vendors' automation solutions required both more space and plumbing changes. Wilson Medical Center laboratory, the core lab for our system, sits within a hexagonally shaped building, giving us only a rectangle of space and numerous structural poles to navigate around. ORTHO was the only vendor that gave us the flexibility to fit the necessary solution into the space given, without drains and plumbing – just 'plug and play.'

Phased implementation facilitates transition; boosting morale and operations performance

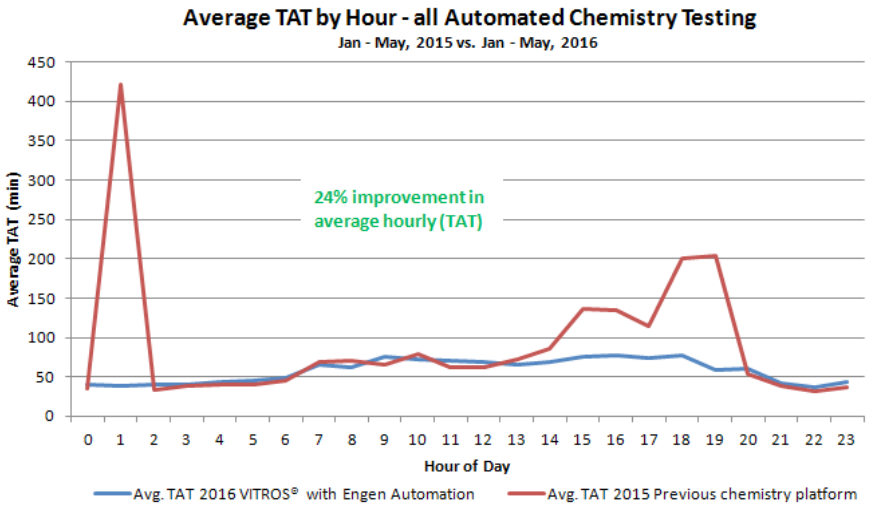
The project moved forward in phases, to give the staff time to acclimate themselves to the new VITROS® Integrated Chemistry Systems and minimize disruption. Technologists had seen equipment from three different vendors over a span of just five years. So, in phase one, UHS Wilson Medical Center installed the VITROS® Systems, to give the staff a chance to learn the new equipment before the automation system was added. The goal was aggressive: get the new analyzers installed and fully operational within two months, before the current wet systems were removed.

In phase 2, we installed and went live with the enGen™ Laboratory Automation system in just 45 days! Phase 3 brought the remodeling of the Wilson Medical Center core area -- with hematology, coagulation, urinalysis and the manual bench for microscope work – into a layout that enabled a consolidated area for storage and supplies. The VITROS® System's flexibility to be positioned either parallel or perpendicular to the track allowed us to create the space necessary, and the available u-turns and t-turns enabled the design to move around poles and load bearing walls.

Opportunity embraced! Improved workflow, TATs, and scheduling agility

The new layout enabled workflow improvements that have virtually eliminated the backlog of samples waiting for analysis.

The higher efficiency has produced significant improvements in turnaround times for the highest-volume tests. For STAT results, the lab is meeting its goal of 60 minutes from receipt to verified 97 percent of the time. Average CMP/BMP STAT turnaround time (TAT) have fallen from 39 to 35 minutes, and variability has been significantly reduced – especially for evening and night shifts.



Another pivotal factor in the lab's increased efficiencies is the Instrument Manager software from Data Innovations, embedded in the automation solution. Instrument Manager ensures balanced loading of analyzers to optimize utilization levels. With concerns about clots and endogenous interference minimized, UHS now trusts the accuracy of test results enough to allow higher levels of autoverification by the Instrument Manager software -- from 65 to 80 percent, removing a manual review of as many as 500,000 tests per year.

The software also displays assay-specific flags that alert technologists to the presence of hemolysis, icterus, and turbidity, enabling lab staff to address potential issues before results are released to caregivers. And improved sample tracking allows lab assistants to quickly locate stored samples for add-ons, saving additional time.

Yet more than just increasing productivity and throughput, the new lab systems and processes have boosted the confidence of our technologists and client services staff. Technologists no longer need to inspect every sample for adequate volume and clots, which has boosted productivity and will allow the lab to meet a goal of reducing staff by up to four FTEs through attrition. The new analyzers also have cut maintenance and quality control time by 50 percent, increasing our uptime. Even unexpected service visits have declined, thanks to the proactive approach of ORTHO's e-Connectivity technology. e-Connectivity allows ORTHO to monitor equipment remotely and schedule a field engineer visit before issues impact the lab with unscheduled downtime. It also enables inventory management as well; reducing errors caused by manual inventory tasks as well as variation in monthly spend.

All of these improvements have resulted in a more satisfied internal customer base. We used to get complaints often from physicians, but now complaints are few and far between.

In the future, we may connect hematology and coagulation analyzers to the lab-automation track. This will complement our plan to cross-train technologist to further increase our efficiency. Because of standardized processes and technology, UHS can scale quickly to meet our changing patient and community needs throughout the healthcare system and facilities. Ease of use has enabled more generalists, assuring that scheduling within and between facilities is optimized to meet changing demands.

Ortho Clinical Diagnostics