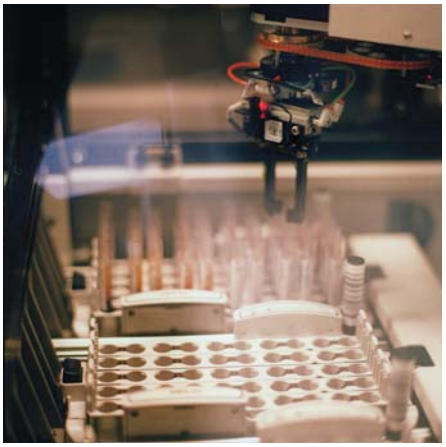
The Lab of the Future – Today

G. Fornaroli Hospital in Magenta was one of the first hospitals in Italy to install the VersaCell solution. Both physicians and staff praise its efficiency, dependability, and flexibility, as it streamlines workflow and reduces risks from human error, all while saving time, space, and money.

By Claudia Flisi, MA

"VersaCell provides total management of the blood sample."

Giulio Vignati, MD, Director,
Center for Endocrinology and Metabolic Diseases,
G. Fornaroli Hospital, Magenta, Italy



The VersaCell system at CMEM is running 50 different tests. It connects the IMMULITE 2000 XPi and one of CMEM's ADVIA Centaur units, significantly reducing operator time.

Although Italy has one of the best healthcare systems in the world (second only to France in the World Health Organization's ranking[1]), it confronts problems common to many such systems globally: rising costs, increased demands from an aging population, limited room for expansion in older facilities, and political pressure for greater productivity.

Magenta is in the Lombardy region of Northern Italy, about 25 kilometers (15.5 miles) from Milan. While Magenta's population is only about 24,000, Lombardy is the most heavily populated region in the country, and the hospital's Center for Endocrinology and Metabolic Diseases (CMEM) handles more than 1.4 million analyses annually. More than half of these – 55 percent – are outpatient tests. CMEM also handles another 400,000 tests from the neighboring town of Abbiategrasso.

So when the head of CMEM, Giulio Vignati, MD, first heard about a new Siemens laboratory system that would help him address his workload challenges, he was eager to learn more. Vignati is both a member of the Italian board of ELAS, the European Ligand Assay Society, and the scientific director of *Ligandassay*, the magazine published by ELAS Italy. And he is very familiar with Siemens: His laboratory has one IMMULITE® 2000 XPi and two ADVIA Centaur® immunoassay systems. "We have been using Siemens equipment for close to two decades," he notes. So when the VersaCell™ system was launched in Italy in 2009, Siemens invited Vignati to try out the technology first-hand.

The VersaCell solution supports a wide range of two-instrument connections and combines unique sample management capabilities that improve a laboratory's workflow. It has four drawers holding up to 50 samples each for loading both routine and short turnaround time (STAT) samples, and a robotic arm that moves the samples from one analyzer to another.

Vignati visited Siemens' systems and software research and development center in Flanders, New Jersey, for five days, and then spent another two weeks discussing the productivity implications of the new technology before it was installed in September 2009. "We were handling 300 tubes a day before VersaCell," he recalls. "That took time and required the manual transfer of tubes from one machine to another, plus the risk of human error in labeling, sorting, and consolidating results."

Track-based automation was not an option at G. Fornaroli. There simply was not enough room. However, the VersaCell system's small footprint of 130 x 178 x 104 centimeters could fit, and it was configured to connect the IMMULITE 2000 XPi system with one of CMEM's ADVIA Centaur units.

A Multifunctional Lab Tool

Compared to total lab automation (TLA), the VersaCell solution is less expensive, takes up significantly less space, and has notable flexibility, according to Vignati. "You can connect two ADVIA Centaur or two IMMULITE systems, you can do clinical chemistry and immunochemistry, and you can run a large number of tests on the system. At present, VersaCell is running 50 immunoassay tests, and it works like a single instrument," he emphasizes.

The doctor's enthusiasm is detailed and documented: "VersaCell provides total management of the blood sample, maps

[1] http://www.who.int/whr/2000/en/whr00_en.pdf. Last accessed Jan. 26, 2011

Apollo Hospital in New Delhi belongs to one of the largest healthcare groups in Asia with more than 8,500 beds across 53 hospitals within and outside India.

Improving Performance in a High-Volume Lab

The telephone used to ring incessantly every morning in the biochemistry laboratory of Apollo Hospital in New Delhi, India. Doctors who had requested blood tests for their patients in intensive care would expect to see the results when they began their rounds at 8 a.m. If the results weren't ready, the doctors called the lab.

"I would sit at my desk and the phone would be ringing constantly from doctors who wanted to know when their results would be arriving," reports Abha Gupta, MD, a senior consultant for the hospital and member of the ethical committee for Apollo's clinical research trial program, who has been leading the lab for more than 15 years.

Dr. Gupta explains that blood samples for the intensive care unit (ICU) are taken between 4 a.m. and 6 a.m., when the lab is less than fully staffed, so technicians would struggle to complete the reports by 8 a.m. That changed completely when the lab installed a Siemens VersaCell™ system in January 2010 and linked it to a newly purchased ADVIA Centaur® instrument and a then one-year-old ADVIA® 1800 instrument. "Today, my phone almost never rings with requests for ICU reports," she says. "More than 95 percent of ICU reports arrive on time, as they should."

Lab head Abha Gupta is proud of the fact that more than 95 percent of ICU reports arrive on time.

Serving more than 19 million patients from 55 countries, the Apollo Hospitals Group is one of the largest healthcare groups in Asia. It is recognized as a leader in bringing medical innovation to the region.

Among the group's 53 hospitals, Apollo Delhi is the first in India to have been accredited by the U.S.-based Joint Commission International (JCI) in 2005 and has since been re-accredited.

The laboratory handles between 5,000 and 6,000 tests per day, about 60 percent of them generated by the hospital's 600 inpatients, and the remainder by outpatient requests. Another 150 beds will be added in 2011. Gupta has been looking at track-based, full automation systems for more than a decade, but has been limited by the physical space available. She says the VersaCell system seemed like a compact way to achieve consolidation, and has since proven its worth.

The multiple benefits are both direct and indirect, says Dr. Gupta, noting that turnaround time has improved by 30 to 40 percent since the VersaCell system was installed. "We can produce the results of special immunoassays the same day now because of the integration of chemistry and immunoassay platforms through VersaCell. No sample segregation is required," she explains. In addition, short turnaround time (STAT) has improved by 50 percent – and even more in the case of the ICU. And last but not least, cost savings also result from the fact that blood does not have to be collected in two separate tubes. Only one tube needs to be labeled and handled. Needless to say, patients are happier because they have to give less blood, and doctors are happier because test results arrive faster and are consolidated.

The operation of the VersaCell system is so simple that only one technician is needed to operate the two analyzers, whereas previously two technicians were required. Human error is also reduced, as the technician does not have to program the tests to be completed. This information is already contained in a bar code on the tubes when they arrive at the lab. Apollo Delhi's satisfaction is evident in its plans for purchasing another ADVIA 1800 instrument to be linked to the VersaCell system.

Due to the lack of space, line automation was not an option at CMEM.

the results, and provides a seven-day history of its movement," he reports. "It integrates the information from the two machines so that their results are visible in one place, on one report, as well as separately. It has reduced operator time by 43.7 percent, reduced the need for blood tubes by more than ten percent, improved speed by almost 25 percent compared to separate machine analysis, and improved our laboratory's relative productivity index (RPI) by 35.4 percent."
The improved turnaround time has made doctors in and outside the hospital very happy. Patients are also happy because they don't have to give as much blood – a benefit for both the squeamish and the time-sensitive.
Neither Vignati nor his staff was nervous about being one of the first hospitals in Italy to install the VersaCell system. Not only was the laboratory well acquainted with Siemens equipment, but Vignati had also studied the potential impact of the new device in detail with Siemens before installation. "Our preparation was minimal, because our technicians were already familiar with the two Siemens machines we linked," he explains. "We 'saved' three-quarters of a person, and that time is being used for other applications such as work in the microbiology lab. This improves the lab's workflow and productivity, and is more stimulating for the employees, so it benefits everyone."

Doing More Without More Space

Vignati and his team are so pleased that they have made another request to Siemens. Vignati has asked Siemens to extend the automatic seven-day histories kept by the VersaCell system to 15 days, a change that Siemens is currently implementing. This modification will further enhance the VersaCell system's contributions to workflow improvement and laboratory management in a cost-effective way. Its performance has been so convincing that Italy has become one of the largest customer bases for the VersaCell system in Europe, with 30 installations – and more scheduled for 2011.

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Summary

Challenge:
- Growing – and aging – populations in countries around the world result in an increasing demand for routine blood tests
- Decreasing number of lab technicians in the workforce to perform tests
- Lack of space in many hospitals to install high-productivity line, or track-based, testing equipment

Solution:
- The VersaCell system drives versatile analytics with unique sample management by connecting two freestanding Siemens laboratory systems used for routine blood analyses, such as those in the IMMULITE and ADVIA immunoassay and chemistry series
- Connectivity in a space-saving unit delivers efficiencies usually found with larger and more expensive line automation systems
- Total management of blood samples, mapping of results, and integration of the information from the two connected machines

Result:
- Improvements in workflow, manpower productivity, and turnaround time
- Efficiency – operator time at G. Fornaroli Hospital's CMEM laboratory reduced by 43.7 percent, and relative productivity index (RPI) improved by 35.4 percent
- Flexibility – easy adaptation of the VersaCell system configuration to a variety of space requirements
- Versatility – ability to reallocate human resources to tests that are more complex and labor intensive
- Simplicity – easy adaptation to new systems by laboratory operators

Further Information

www.siemens.com/versacell