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VersaCell System: Case Study at a Medium-Sized Hospital Laboratory in the Netherlands

This study compared a VersaCell™ System connected to an ADVIA® 1800 clinical chemistry (CC) analyzer and an IMMULITE® 2500 immunoassay (IA) analyzer to the hospital laboratory’s stand-alone testing systems.

The VersaCell System:

- Reduced routine sample turnaround time by almost 31%
- Reduced STAT turnaround time by 49%
- Reduced the number of operators required for testing

Background

The hospital laboratory at Wilhelmina Ziekenhuis in Assen, Netherlands, averaged about 700,000 CC tests per year on two stand-alone CC analyzers. An additional 90,000 IA tests were performed on a separate IA analyzer. Each of the three analyzers had its own sample loading area, laboratory information system connection, and operator interface. One technician operated the two CC analyzers while a second handled all IA testing (as well as other laboratory tests).

The VersaCell System from Siemens Healthcare Diagnostics allowed the clinical laboratory to process samples faster and reduce the amount of operator time required.

VersaCell System

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Faster Turnaround Time, More Efficient Workflow

Background (continued)

The laboratory used several protocols to optimize turnaround time (TAT), particularly for STAT samples. STAT samples that had only chemistry tests ordered were loaded into an analyzer as soon as they were received. STAT CC results were reported immediately upon test completion. STAT samples that had both chemistry and IA test orders were aliquoted to enable parallel processing.*

Significant delays tended to occur when IA results were required, since the IA technician had other duties and was not always available to load samples. STAT IA aliquots were often run with routine batches, causing significant delays in STAT TAT.

To improve patient care and physician satisfaction, this laboratory wanted to:

- Obtain faster and more consistent TAT, particularly for STAT samples
- Eliminate non-value-added tasks such as aliquoting
- Reduce operating expenses

Laboratory Profile	
Laboratory Type	Medium-sized European hospital laboratory
Yearly Test Volume	700,000 CC and 90,000 IA tests
Baseline Instrumentation	2 CC analyzers 1 IMMULITE® 2000 IA analyzer
VersaCell System Configuration	1 ADVIA 1800 CC analyzer 1 IMMULITE 2500 IA analyzer
Staffing, 9 AM to 4 PM	1 operator dedicated to CC testing 1 operator 50% to 75% dedicated to IA testing
Sample Loading	Patient sample aliquoted to provide separate tubes for CC and IA tests
Samples per Day	~400
% Samples with Both CC and IA Tests	~25

* Aliquots for CC tests used heparin plasma, which could be immediately introduced into the analyzer. Aliquots for IA used serum, requiring 30 minutes to clot prior to processing. Note that many assays on the IMMULITE 2500 can be run using heparin plasma and would not require this additional process step.

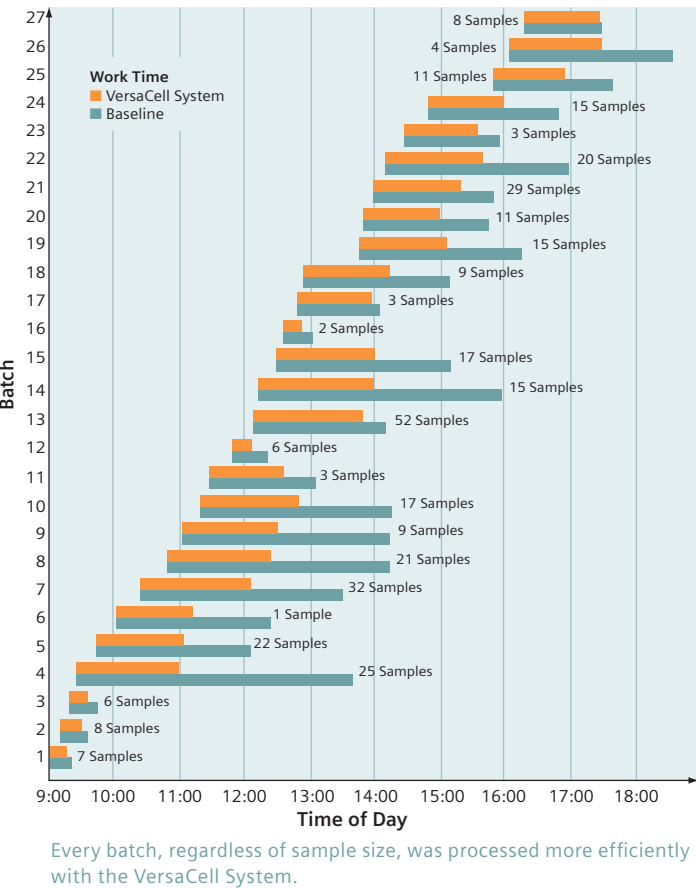
Method

In the first phase of the study, the laboratory measured workflow efficiency and TAT using their existing stand-alone platforms during peak workload times. The steps in the process were timed from the initial loading of samples onto the first analyzer through the end of testing.

Routine samples were loaded in batches, ranging in size from one sample to 52 samples loaded at a time. Some batches required only CC tests, some only IA tests, and some a combination. A total of 371 routine samples and 48 STAT samples were tracked for the study.

In the second phase of the study, the identical workflow was recreated on a VersaCell System installed in the same laboratory. The testing was performed by on-site laboratory technicians. Since productivity, not accuracy of test results, was the primary metric being measured, the samples tested in this part of the study were actually tubes of water assigned with nonspecific identification numbers. Productivity data, excluding STAT samples, is shown in Figure 1.

Figure 1: Comparison of Peak Workflow Routine Samples



Results

Compared to the laboratory’s own stand-alone system, the VersaCell System:

- Reduced the average work time per batch from 122 minutes to 70 minutes (Figure 2)
- Reduced average TAT from 67 minutes to 46 minutes (Figure 3)
- Reduced the average STAT TAT from 49 minutes to 25 minutes (Figure 4)

In addition, all VersaCell System protocols were accomplished by a single technician, raising the number of samples run per technician hour from 26 to 44 (Figure 5).

Figure 2: Average Work Time per Batch

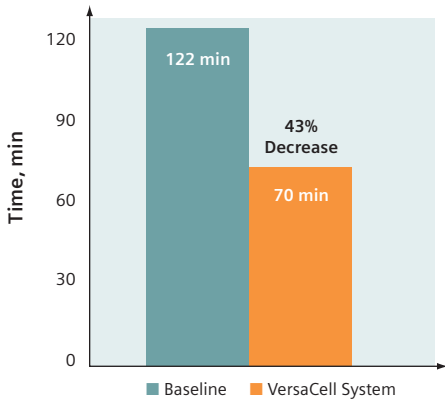


Figure 3: Routine Samples Average Turnaround Time

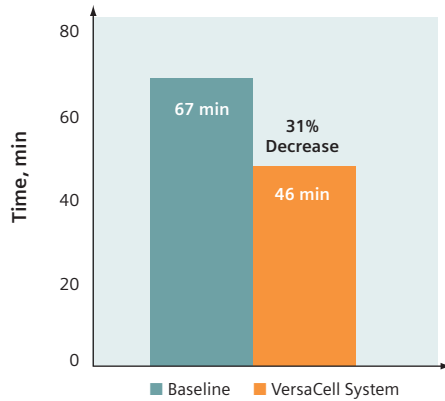


Figure 4: STAT Samples Average Turnaround Time

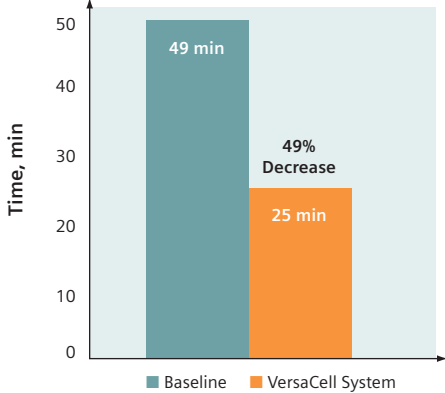
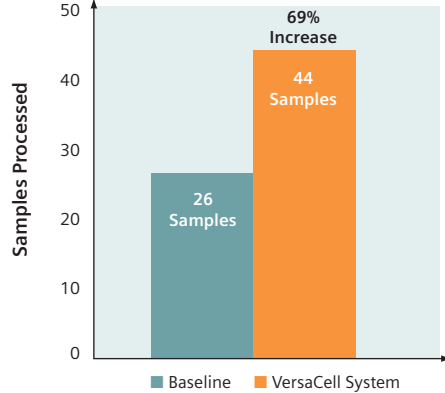


Figure 5: Samples Processed per Technician Hour



Conclusions

The VersaCell System consolidated two analyzers and provided significant productivity improvements over the hospital’s three stand-alone analyzers. By providing a single point of management for both IA and CC testing, the laboratory was able to cut STAT TAT by 49%, reduce routine TAT by 31%, and only require one operator instead of two.

In short, the Siemens VersaCell System allowed the clinical laboratory to process samples faster and reduce the amount of operator time required. Such efficiencies may help to improve patient care and physician satisfaction with laboratory services, as well as reduce costs. The increased productivity also allows the laboratory to increase outreach workload and grow its business.

Given the persistent shortage of trained laboratory technicians, the VersaCell System’s consolidation of workflow frees up testing resources to perform other specialized tasks.

