VersaCell System: Case Study of Operation at a Mid-Volume Reference Laboratory in the US

In this case study, Internal Medical Associates, a mid-volume reference laboratory, compared productivity on a VersaCell™ System in combination with an IMMULITE® 2000 immunoassay (IA) analyzer and an ADVIA® 1800 clinical chemistry (CC) analyzer to its own three-analyzer system.

The VersaCell System:
- Cut the average sample turnaround time (TAT) in half
- Reduced the number of operators required to perform CC and IA testing
- Enabled the laboratory to complete more testing within a single shift, for 15% more same-day reporting of results

Background
This mid-volume reference laboratory processes about 75 samples per shift that require either CC testing, IA testing, or both. The test mix conducted by the laboratory is shown in Figure 1.

Figure 1: Test Mix

Average TAT was cut in half and the number of samples processed by a single operator per hour increased over 70%.
**VersaCell System Improves Productivity and Turnaround Time**

**Background (continued)**

To handle the daily workload, one technician operated the laboratory’s two CC analyzers while a second performed the IA testing along with other laboratory tasks. Each chemistry analyzer had a different suite of tests onboard in order to extend the laboratory’s total test menu. As a result, a certain number of samples had to be manually transferred to all three analyzers before testing was completed. This caused delays because the technicians frequently were working at other stations when one set of tests was completed. In fact, approximately 15% of the day’s samples were not completed until the next day because they arrived late in the shift.

The laboratory in this study wanted to:

- Grow their business without a significant investment in new equipment
- Reduce the time operators spent performing non-value-added tasks
- Deliver rapid turnaround time (TAT)
- Allow same-day reporting of all chemistry and IA tests

**Method**

In the first phase of the study, the laboratory measured workflow efficiency and TAT using their existing stand-alone analyzers over a two-day period. The samples were delivered in batches ranging in size from 2 to 30 samples. For each sample batch, the following was recorded:

- Number and type of test
- Time loaded on each analyzer
- Time the tests were completed and results reported

In the second phase of the study, the identical workflow was recreated using the VersaCell System. It included the same delivery time, number of samples, and tests per sample. 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. A comparison of the two phases is shown in Figure 2. The VersaCell System was installed in the reference laboratory and run by the laboratory technicians.

**Results**

Overall, the VersaCell System reduced the average work time across each sample batch from 133 minutes to 68 minutes as shown in Figure 3. For samples that had been completed within the same shift using the laboratory’s own stand-alone configuration, the average TAT was reduced from the baseline 81 minutes to 37 minutes with the VersaCell System (Figure 4).

Better still, the VersaCell System was able to complete 20 additional samples that the baseline system had left for a second day. That meant that same-day results were available for 15% more patients.

Finally, by consolidating sample loading and result review through the user-friendly VersaCell System interface, the number of samples run by a single operator per hour increased over 70%.

**Conclusions**

Using the VersaCell System from Siemens Healthcare Diagnostics, this reference laboratory achieved substantial productivity improvements. Average TAT was cut in half and the number of samples processed by a single operator per hour increased over 70%.

Unlike the stand-alone environment, where samples were often delayed before transferring to the next analyzer, the VersaCell System automatically moved tubes between analyzers, virtually eliminating the delays that had been common before. This increased the laboratory’s ability to produce same-day results, even for samples delivered late in the shift, increasing physician satisfaction and improving patient care.

Finally, by using the VersaCell System, the laboratory was able to run both CC and IA testing using a single operator and allow technicians to work on value-added tasks.

**Figure 2: Comparison of Laboratory Stand-alone Systems to the VersaCell System**

<table>
<thead>
<tr>
<th></th>
<th>Work Time</th>
<th>Samples Processed per Technician per Hour</th>
<th>Number of Tests per Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>133 min</td>
<td>7.8 Samples</td>
<td>8</td>
</tr>
<tr>
<td>VersaCell System</td>
<td>68 min</td>
<td>14.5 Samples</td>
<td>15</td>
</tr>
</tbody>
</table>

**Figure 3: Average Work Time per Batch**

- **Baseline**: 133 min
- **VersaCell System**: 68 min

**Figure 4: Average Turnaround Time**

- **Baseline**: 81 min
- **VersaCell System**: 37 min

**Figure 5: Samples Processed per Technician per Hour**

- **Baseline**: 7.8 Samples
- **VersaCell System**: 14.5 Samples