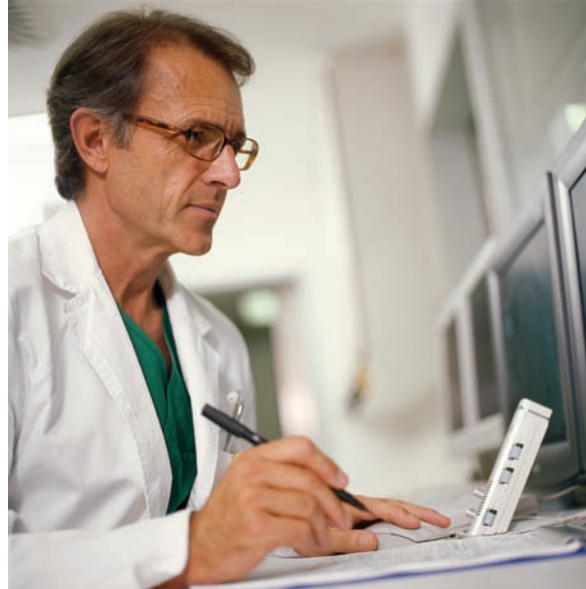


Comparison of MicroScan® WalkAway® and VITEK Legacy Systems for a High-Volume Reference Laboratory

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Introduction

A retrospective analysis was accomplished to compare the performance of a newly adopted microbiology automation platform (MicroScan WalkAway) against a previously employed methodology. Key outcome indicators included workflow, overall system capability and results quality.

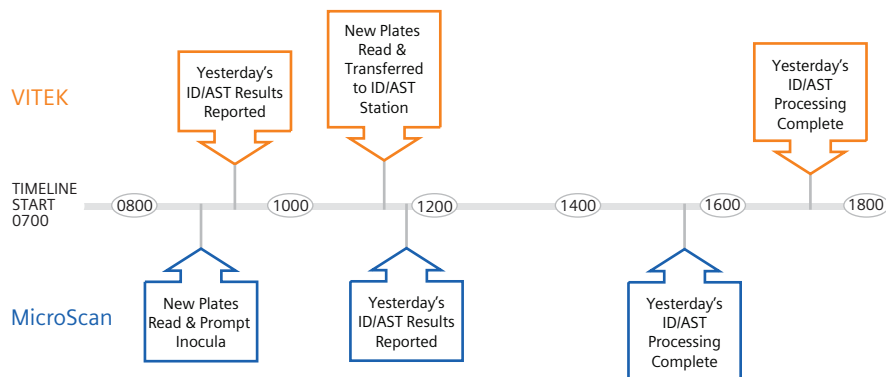


Figure 1.
Comparative Workflow Timeline
VITEK vs. MicroScan

MPL Background

Memphis Pathology Laboratories Laboratory (MPL), headquartered in Memphis, TN, was formed in the 1960s to serve as a central laboratory for Baptist Memorial Healthcare Corporation. The Baptist Memorial Healthcare Corporation consists of 17 hospitals, more than 2,900 affiliated physicians, and numerous subsidiaries. In 2006, MPL was acquired by Sonic Healthcare Limited of Sydney, Australia. Today, MPL serves four states (MS, AR, MO, TN) and thousands of clients. The clinical microbiology laboratory staffs 22 medical technologists, 12 medical laboratory technicians, eight non-licensed clinical technicians and three rotating students from the University of Tennessee's medical technologist program and Southwest Community College's medical laboratory technician program. Most staff are scheduled for first shift, where the majority of samples are processed and all routine results are reported.

For many years we used the VITEK Legacy system (bioMérieux, Durham, NC) for our identification and susceptibility (ID/AST) testing. However, in early 2006, our laboratory made the switch to the MicroScan WalkAway system (Siemens Healthcare Diagnostics, West Sacramento, CA). Our parallel and 30 day QC testing gave excellent correlation and no QC failures. MPL went live with the MicroScan WalkAway system in May 2006.

Comparative Workflow

Key aspects of departmental staffing, reporting and processing workflow were evaluated and compared between the two systems (see Figure 1). The extended inoculum stability using the MicroScan Prompt™ Inoculation System (up to four hours, per manufacturer's instructions) was instrumental in allowing our laboratory to effectively streamline and simplify specimen processing. Although we initially assumed the change from a rapid technology to an overnight technology would adversely effect turnaround time, we found an overall improvement with MicroScan.

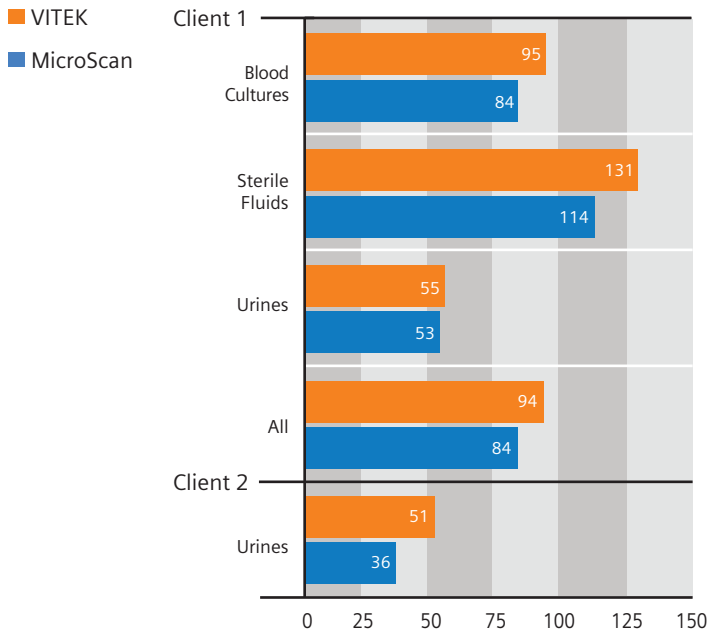


Figure 2. Comparative Workflow Turnaround Time (hours) from Sample Receipt to Final Report VITEK vs. MicroScan

VITEK

With the VITEK System, ID/AST results from cultures tested in the previous 24 hours were released by 10:00 am from the culture benches. New culture plates were subsequently read, noting on the primary plates which isolates should be worked up for ID/AST. All primary plates for positive cultures were transferred to the setup station for ID/AST testing, where plate order was maintained for eventual return to the culture benches. The setup station was primarily responsible for manual ID testing (spot ID and API), manual susceptibility (D-test, Kirby Bauer and ETEST purity plating and VITEK card processing. Once the 0.5 McFarland standards were prepared, VITEK

cards were immediately inoculated (within 20 min., per manufacturer's instruction) and introduced into the VITEK unit. The setup station was staffed by one to two technologists, but as the shift progressed, up to six bench technologists were needed to help complete the day's ID/AST test workload. We organized our laboratory workflow in this way to allow us to perform test setup within time allowances specified for the products. The routine transfer of such large volumes of plates from station to station was a considerable challenge, which often resulted in a hectic environment. Our continually increasing workload exacerbated this situation and frequently resulted in extending the shift into the evening.



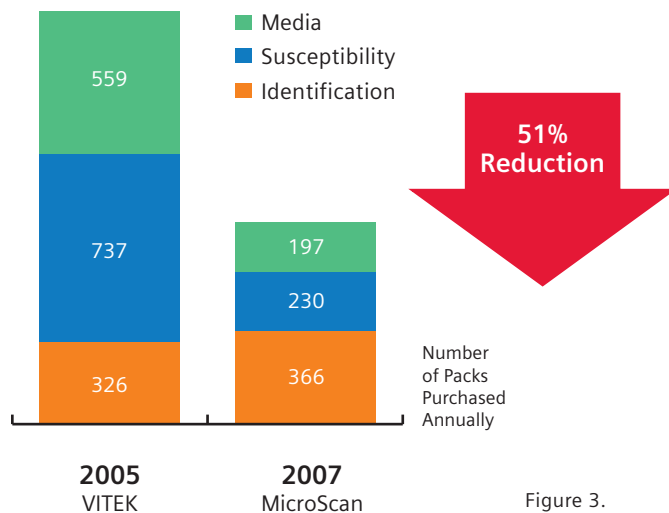


Figure 3. Comparison of Non-Automated Tests Usage

MicroScan

New culture plates are now read at shift start in order to streamline processing of *Staphylococcus* specimens which require a full 24 hour AST incubation per CLSI. MicroScan Prompt inocula, purity plates, D-tests and spot IDs are now executed at the culture benches, eliminating the need to sort and transfer an abundance of plates between stations. The setup station staff remains at one to two technologists who systematically collect the Prompt inoculum bottles throughout the day to inoculate and begin processing of MicroScan panels. Overall, we have been able to eliminate an average of eight steps in the panel set-up process with MicroScan’s menu of ID, MIC and Combo panels. By processing only *Streptococcus*, *Haemophilus*, yeast and anaerobe specimens at the setup station, we have reduced inter-station plate transfers by 75%. This new workflow has effectively alleviated the need for cross-functional support.

The majority of ID/AST results from the previous 24 hours are now reported and released between 11:00 am and 2:00 pm. Although we suspected the couple hour delay in released results might be problematic for some providers, it has been readily integrated. We continue to provide presumptive, spot identifications for gram-positive isolates for

our infectious disease physicians who appreciate the advance notification. Moreover, despite the shift in ID/AST releases and the change from a rapid technology to an overnight technology, our overall turnaround time from receipt to final report has improved over 11% (see Figure 2).

MicroScan has also enabled us to reduce 51% of non-automated tests performed on our microbiology isolates despite the fact that our volume has grown by nearly 100,000 test orders (19%) from 2005 to 2007 (see Figure 3). Because we still continue to use non-automated tests like oxidase, indole, catalase, *S. aureus* latex, PNEUMOSLIDE, X&V, and yeast/anaerobe API tests as aids for identifications, we anticipated these tests to increase proportionally with our volume increase, but they have increased only 12%. The most important savings have been in the area of non-automated susceptibility tests. The volume of manual oxacillin and vancomycin agar screens declined over 80%, because we do not have to confirm results we obtain from the MicroScan panels. ETEST and Kirby Bauer tests were reduced by 38% and 47%, respectively, and have yielded reductions in media purchases as well. The change to MicroScan has had a positive impact not only on workflow but on laboratory expenses and average turnaround time.

System Informatics

Although we utilized VITEK Legacy as an integral component of our microbiology laboratory for many years, we found their sample tracking and “Expert” informatics to be less robust than MicroScan. MicroScan technology is one based on traditional microbiology techniques, rules and safeguards. The LabPro Alert system of flags and notifications are clear, intuitive and essentially foolproof. Suspect results require technologist review and release prior to LIS transfer thereby virtually eliminating associated reporting errors. In addition to detailed confirmatory recommendations, organism growth and reactions can be verified visually to rule out spurious answers resulting from processing error. The MicroScan system has also been optimized to identify emerging resistance. This feature has allowed us to report this phenomenon with greater sensitivity, which is a priority in today’s microbiology environment. Moreover, system-wide bar code authentication offers additional assurance of results accuracy by eliminating potential errors resulting from manual labeling and key stroke entry.

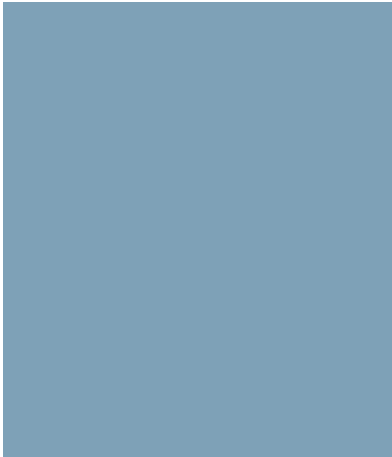
Discussion

When an equipment upgrade became necessary for our microbiology department, our goal was to improve workflow and increase capacity. With no MicroScan familiarity we assumed a Vitek upgrade was inevitable. Nonetheless, out of due diligence, we entertained a demonstration of the MicroScan WalkAway. In addition to a comprehensive methodology explanation, MicroScan representatives and consultants walked us through the entire testing and validation process, patiently addressing each inquiry in a thorough and professional manner. This consultative approach to understanding our present challenges and identifying best-fit solutions resulted in a reassessment of our position. Throughout the course of our validation process and beyond, MicroScan staff representatives have proved themselves supportive, resourceful and uniquely responsive.

In addition to the workflow convenience of extended Prompt inoculum stability, the MicroScan system has allowed our laboratory to work more efficiently and report results more confidently. Increased gram-positive speciation and the expanded capability of the MicroScan overnight method versus the VITEK rapid method has reduced send-out volume, cost and time to result. Reductions in off-line and repeat testing have also been instrumental in streamlining the process. Finally, because MicroScan utilizes traditional ID/AST methods and provides clearly comprehensible support based on established guidelines, our technologists are more engaged in the process and more in tune with the clinical aspects of the results we are reporting.

Conclusion

The MicroScan WalkAway has provided us both the means to optimize our workflow, as well as the tools to ensure the highest quality results. In addition to improvements we see day-to-day, MicroScan's advanced administrative training will allow us to capitalize on the extensive epidemiology and custom reporting capabilities. Clearly, both the capacity and capability of the system are poised to meet our needs as we expand our services into new markets.



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