

Ergonomic Analysis Comparison of bioMérieux’s VITEK® 2 and VITEK® 2 Compact to Dade Behring Microscan WalkAway® 96 and BD Phoenix™ For Work Flow Efficiency and the Likelihood of Distal Upper Extremity Strain

Alison Heller-Ono MSPT, CIE, CMC
Worksite International
Monterey, CA

Objectives: Using ergonomic analysis, the set up processes were compared for the bioMérieux VITEK 2 and VITEK 2 Compact, the Dade Microscan WalkAway 96 (MS96) and the BD Phoenix to identify the number of steps in card or panel set-up, work cycle time and the “Strain Index”, a tool to evaluate the exertional demands and predict increased risk of distal upper extremity strain to end-users.

Methods: The study involved 19 clinical laboratory scientists (CLS) and 4 laboratory assistants (LA), from different facilities, to compare the Identification (ID) and Susceptibility (AST) testing instruments as to the number of steps to perform the panel set-up for each and the time to complete one work cycle. The data collection included a detailed time and motion (MTM) study of the typical set-up routine for the VITEK 2, VITEK 2 Compact, Microscan WalkAway 96 and the BD Phoenix work cycles. This included an analysis of the cycle time needed to complete the patient cultures identified for testing at the time of the study. Furthermore, the work cycles were broken down into each component to allow comparison between the instruments to determine efficiency relative to the actual number of steps to perform each work cycle. The data was then applied to the “Strain Index” to determine if the typical work cycle for each instrument was safe or hazardous as it pertains to developing a musculoskeletal disorder from a hand-intensive task. The “Strain Index”, an ergonomic assessment tool developed by Steve Moore (Medical College of Wisconsin) and Arun Garg (University of Wisconsin) was used to assess the relative risk of developing a distal upper extremity strain often occurring with selected manual tasks. Scores below 5 are desirable to minimize the risk of strain.

Results:

Table 1. Results of Ergonomic Analysis comparing 4 ID/AST Instruments for set up steps, work cycle time and Strain Index for Clinical Lab Scientists (unless indicated).

	VITEK 2	VITEK 2 Compact	BD Phoenix	MS96
#CLS/LA Observed	11 CLS, 0 LA	3 CLS, 0 LA	3 CLS, 0 LA	2 CLS, 4 LA
Average # steps in set-up	9	11	18	21*
Average time to complete a work cycle	60 seconds	64 seconds	72 seconds	90 seconds*
Average Strain Index Score:				
0-1 hour use	2.25	.75	7.5	Not assessed
1-2 hours use	4.5	2.25	26.5	6.75 (CLS portion)
2-4 hours use	6.75	Not assessed	Not assessed	60.75(LA portion)

* Cumulative results for both Clinical Lab Scientist (CLS) and Lab Assistant (LA) performing the set-up.

Conclusion: The VITEK 2 and the VITEK 2 Compact are significantly more efficient in the number of steps required to set up the test cards prior to placing them into the instrument. Results demonstrate 40-50% fewer steps compared to the BD Phoenix and MS96. This efficiency is also reflected in the average time to complete a typical work cycle showing an average productivity savings of 8 to 30 seconds per cycle or 12%-30% using the VITEK 2 and VITEK 2 Compact. Finally, the risk of straining the distal upper extremities, including the wrist and hands is substantially higher for the BD Phoenix and the MS96, especially if use exceeds one or more cumulative hours of repeated work cycles in a typical work day.