



C-064

# Evaluation of bioMérieux's PREVI™ Isola, an Automated Microbiology Specimen Processor: Improving Efficiency and Quality of Results

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## ABSTRACT

**Objective:** The purpose of this experiment was to compare manual and automated microbiology specimen processing, with respect to colony isolation and time savings. Specimens were compared on two criteria, inoculation time and quality of colony isolation on culture. The goal was to determine whether the introduction of automation could reduce the amount of time required for specimen processing while also providing standardized results and improve the number of isolated colonies per plate. An independent workflow study by LAH Consulting was used to determine timesaving per specimen type. **Methods:** Manual: To obtain well-isolated discrete colonies with a manual method, the quadrant streak technique was used. This allowed sequential dilution of the original microbial material over the entire surface of agar media plate. Automated: The PREVI Isola is an automated system developed by bioMérieux, through a licensing agreement with LabTech Systems, Kent Town, Australia. This system inoculates media by dispensing a specified quantity of a liquid specimen onto the plate, streaks the specimen on the surface of the plate in a circular motion with a patented plastic applicator, labels the plate, and sorts the plates by culture atmosphere. **Results:** The equivalent of 2 weeks of routine specimens were tested to evaluate time saving efficiency and quality of results offered by an automated method when compared to the manual method for each specimen type. Three types of specimens were reviewed; urines, swabs and stools. The following results were found when comparing number of isolated colonies and time to set up:

It was also found that due to the instrument's ease of use, additional cost savings are possible by redirecting labor resources and utilizing specimen-receiving personnel to manage the Isola instead of technical staff. **Conclusion:** The data obtained demonstrates that by implementing the PREVI Isola users can receive benefits in three areas; reduced time to set up, improved quality of results and ability to utilize non-technical labor resources.

## INTRODUCTION

With the number of experienced Microbiologist dwindling it is necessary to improve laboratory productivity and workflow by freeing experienced staff from tedious specimen preparation and plate inoculation. This will allow experienced staff to perform more important tasks where human expertise is required. A standardized plate streaking method is also necessary to maximize colony isolation and reduce rework. The Previ Isola employs an original applicator using high precision technology to standardize and maximize inoculation and colony isolation. In addition it utilizes the maximum agar surface during inoculation, maintains optimum pressure-controlled contact with the agar while inoculating and applies a standard quantity of inoculum every time. The Previ Isola uses a novel streaking method and streamlines the pre-analytical process by automating specimen inoculation, specimen streaking, plate labeling and plate stacking/sorting by culture atmosphere.

## MATERIAL AND METHODS

**Manual:** In order to obtain well-isolated discrete colonies with a manual method, the quadrant streak technique was used. This allows sequential dilution of the original microbial material (broth culture or colonies on a plate or slant) over the entire surface of a fresh plate. As the original sample is diluted by streaking it over successive quadrants, the number of organisms decreases. Usually by the third or fourth quadrant only a few organisms are transferred on the inoculating loop and these produce a few isolated colonies.

**Automated:** The Previ Isola, an automated system, inoculates the PPM by dispensing a known quantity (10 $\mu$ l or 20 $\mu$ l) of a liquid specimen onto the plate, streaks this sample on the surface of the plate in a circular motion, with a patented plastic applicator, labels the plate, and sorts the plates by environment.

Multiple techs were involved in reading the cultures. For comparison the number of isolated colonies was based on a visual examination of the number of isolated colonies quadrant in 4 of the manual plate vs the number of total isolated colonies from plates set-up on the Isola.

Table 1. Setup Time and Colony Isolation Results

Culture Type	Number of specimens tested	Time (sec)	Equal number of isolated colonies	Greater number of isolated colonies
<b>Urine</b>	<b>531</b>			
Manual		157.2	71%	
Isola		127.2		26%
Savings (sec)	15930	30		
<b>Swabs</b>	<b>174</b>			
Manual		230.4	82%	
Isola		188.4		18%
Savings (sec)	7308	42		
<b>Stools</b>	<b>51</b>			
Manual		264	82%	
Isola		130.2		18%
Savings (sec)	6823.8	133.8		
Seconds saved/ week	30061.8			
Hours saved/ week	8.3505			
<b>Total % savings</b>		<b>Time savings per 40hr w week= 21%</b>	<b>Average increase in isolated colonies= 21%</b>	

Figure 1. Streaking Comparison: Previ Isola vs Manual

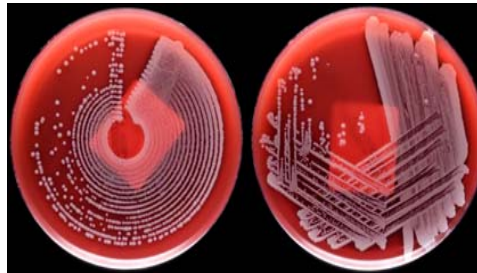


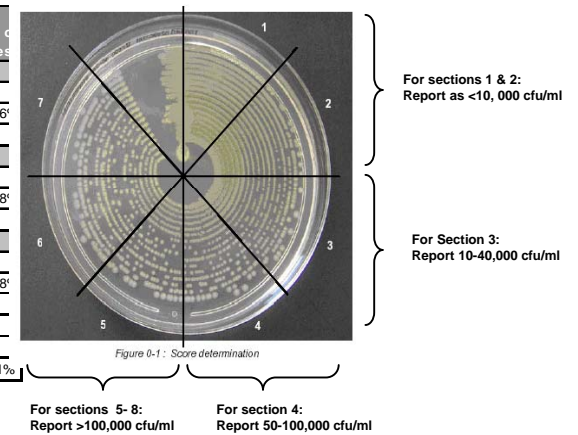
Figure 2. Previ Isola Applicator



Figure 3. Previ Isola System



Figure 4. Urine Quantification Guide



## RESULTS

The goal of study was to test a weeks worth of samples for each specimen type

**Urines: N = 570**

**Swabs: N = 174**

- All specimens included under this heading arrived on dry culturettes.
- These dry swabs were emulsified in 2.5 ml of standard .45% saline in a 12 x 75 ml polypropylene tube and labeled with a barcode before placement on the Isola.
- This time was added into the set-up comparison.
- When comparing results from a dry swab plated directly onto the media verses those where the swab was emulsified and the liquid applied to the media, a large number of colonies were found.

**Stools: N = 51**

**Total: N = 795 specimens tested**

**Time saved: 8.35 hours per week**

**Avg % of cultures with superior colony isolation: 21%**

## CONCLUSION

The Previ Isola provides:

- Reduced time to set up
- Increase in isolated colonies
- Improved quality of results
- Ability to utilize non-technical labor resources
- Standardization of specimen processing and streaking