CLINICAL COMPARISON OF GREAT BASIN CORPORATION'S PORTRAIT TOXIGENIC CLOSTRIDIUM DIFFICILE ASSAY AND TOXIGENIC BACTERIAL CULTURE

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BACKGROUND

Clostridium difficile is a commensal bacterium of the human intestine present in 2-5% of the population over the age of 2 years, with a higher prevalence in children under 2. Treatment with certain antibiotics or anti-neoplastic agents can disrupt the normal flora and allow *C. difficile* to become the predominant bacteria in the colon. When toxigenic strains overgrow, *C. difficile* infection (CDI) results, and can lead to debilitating diarrhea and occasionally death. *C. difficile* typically produces two toxins: Toxin A (tcdA), an enterotoxin, and Toxin B (tcdB) a cytotoxin. Detection of *C. difficile* toxin A or B can be used to make the diagnosis of CDI. Prompt diagnosis, especially in a pediatric setting, allows for appropriate patient care.

Great Basin Corporation's Portrait Toxigenic *C. difficile* AssayTM is a DNA amplification test for the rapid qualitative detection of the *C. difficile* tcdB gene in human fecal samples collected from patients suspected of having CDI. The Portrait Dx Analyzer is a fully automated system that includes the analyzer, controller laptop PC, and single use *C. difficile* test cartridges. The analyzer is designed to perform automated sample preparation, blocked-primer helicase-dependent amplification (bpHDA), and chip-based detection with integrated data analysis in approximately one hour.

OBJECTIVE

The objective of this study was to establish the performance of the Portrait Toxigenic *C. difficile* AssayTM (sensitivity, specificity, positive and negative predictive values) for in Vitro use as an aid in the diagnosis of CDI in children. Performance of the Portrait Toxigenic *C. difficile* AssayTM was compared to Toxigenic Bacteria Culture (TBC) in a clinical setting.

METHODS

96 stool specimens from children ≥2 years of age who were suspected of having CDI were tested using both Portrait Toxigenic *C. difficile* AssayTM and TCB. The Portrait Toxigenic *C. difficile* AssayTM procedure is as follows:

• The Portrait Toxigenic C. difficile AssayTM kit (pouch) is brought to room temperature.

• An aliquot of stool is mixed in sample diluents and passed through a filter. 180 µL of filtered stool specimen is then pipetted into the Portrait Toxigenic *C. difficile* AssayTM cartridge and the Sample Port Tab is locked to prevent leakage. *(see figures 1-6)*

• The Assay Cartridge is then placed in the instrument and the analyzer door is closed. *(see figures 7-9)*

• Pertinent patient and cartridge information is entered into the Portrait Dx Analyzer Interface and the run is started. *(see figures 10-11)*

• Upon completion of the Portrait Toxigenic *C. difficile* AssayTM, the User Interface screen will indicate the test is completed and the blue light will flash on the Portrait Analyzer front panel. Open the door and remove the test cartridge.

• Discard the used test cartridge into the biohazard trash in accordance with your laboratory's established biohazard waste disposal procedures.

• Once a test is completed, the "End Session" button is highlighted. Click the "End Session" button to begin another test.

All 96 specimens were tested using Toxigenic Bacteria Culture as the "Gold Standard" and the illumigene® as an alternate PCR method.
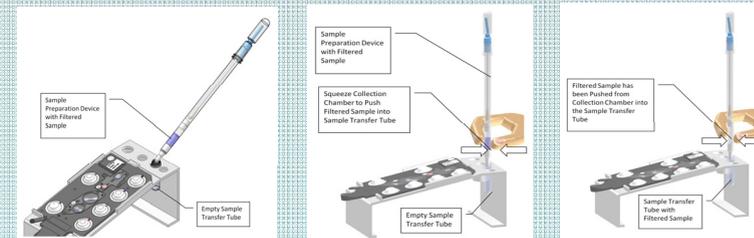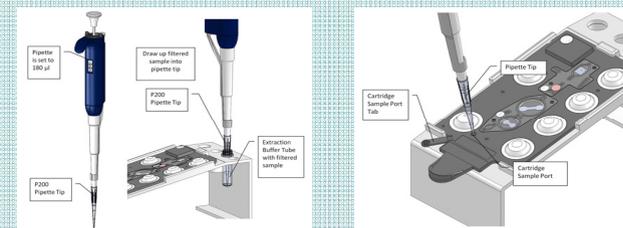

Figure 1

Figure 2
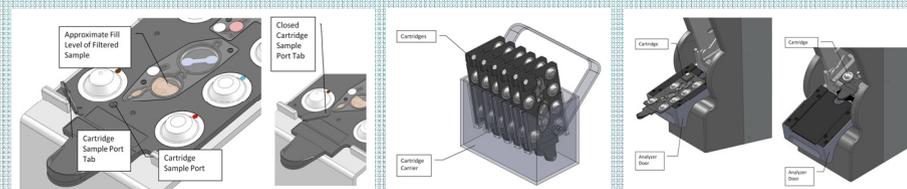

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

RESULTS

Table 1

# of Specimens	Portrait	TBC	Interpretation
15	Positive	Positive	True Positives
72	Negative	Negative	True Negatives
9	Positive	Negative	False Positives
0	Negative	Positive	False Negatives

Specificity	Sensitivity	Positive Predictive Value	Negative Predictive Value
89%	100%	62%	100%

Table 2

# of Specimens	illumigene®	TBC	Interpretation
14	Positive	Positive	True Positives
77	Negative	Negative	True Negatives
4	Positive	Negative	False Positives
1	Negative	Positive	False Negatives

Specificity	Sensitivity	Positive Predictive Value	Negative Predictive Value
95%	93%	78%	99%

▪ As can be seen by the tables, both the Portrait and the illumigene® had higher positivity which shows increased assay sensitivity over the Toxigenic Bacterial Culture. This is a common theme with molecular assays versus cultured results.

▪ The illumigene® also had one false negative as compared to no false negatives in the Portrait data. More comparative PCR testing would need to be done in order to resolve the disparity of false positives between the Portrait Toxigenic *C. difficile* Assay™ and the illumigene®.

CONCLUSIONS

▪ The Portrait Toxigenic *C. difficile* Assay is a straightforward and easy to use.
▪ The Portrait Dx Analyzer is fully automated once the assay cartridge is placed into the analyzer.
▪ The cartridge is self-contained for all reagents, sample and waste.
▪ The Assay takes less time from setup to result than traditional PCR.