Evaluation of Flocked Rectal Swab Specimens For Use with the Biofire FilmArray® Gastrointestinal Panel in Children with Severe Gastroenteritis in Botswana

Kwana Lechiile[1], Jeffrey M. Pernica[2], Margaret Mokomane[3], David M. Goldfarb[4]

[1]Botswana-Upenn Partnership, Gaborone, Botswana; [2]McMaster University, Hamilton, ON, Canada; [3]Botswana National Health Laboratory, Gaborone, Botswana; [4]University of British Columbia, Vancouver, Canada

Introduction

Gastroenteritis is one of the leading causes of morbidity and mortality in young children. If diagnostic testing to identify the causative pathogen is desired, bulk stool is the specimen type that is typically requested.

The bioMérieux BioFire FilmArray® Gastrointestinal Panel (GIP) is a closed, automated system that allows rapid and accurate testing for pathogens that cause infectious diarrhea. It can detect up to 22 pathogen targets including viruses, bacteria, and parasites in just over an hour. Its use with bulk stool samples has been extensively validated.

Unfortunately, bulk stool is not always obtainable within a reasonable time-frame, particularly for outpatients and/or in resource-limited settings. We sought to evaluate the anatomically designed flocked rectal swab samples for use with the BioMérieux Biofire FilmArray® GIP.

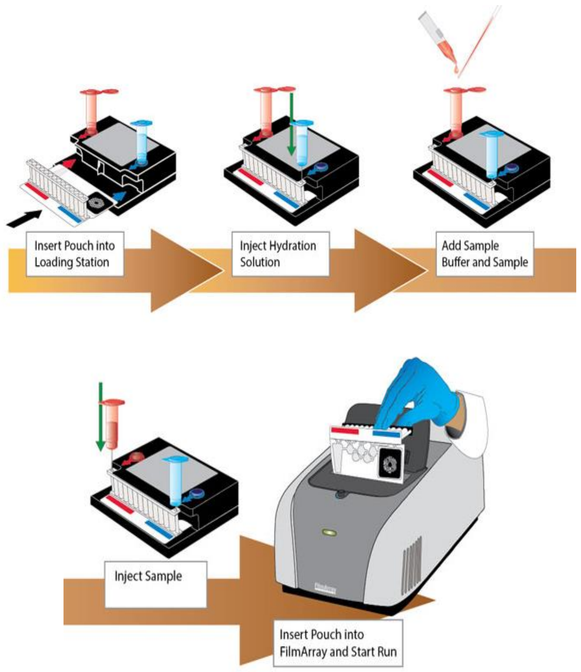
Methods

- Study participants were children aged 2-60 months hospitalized with community-acquired non-bloody diarrhoeal illness lasting <7 days

- study sites: Princess Marina Hospital (Gaborone), Scottish Livingstone Hospital (Molepolole), Bamalete Lutheran Hospital (Ramotswa), Deborah Retief Hospital (Mochudi)

- All participants had both a flocked rectal swab (FecalSwab®, Copan Italia S.A.) and bulk stool specimen collected at enrolment
  - swabs eluted in 2ml Cary Blair medium
  - 132mg aliquot of bulk stool placed in 2ml Cary Blair medium
  - samples vortexed at max speed x 30 sec.

- FilmArray GIP was used according to manufacturer's instructions:



Results

- 60 samples (30 pairs) were tested, and a total 153 pathogens were detected

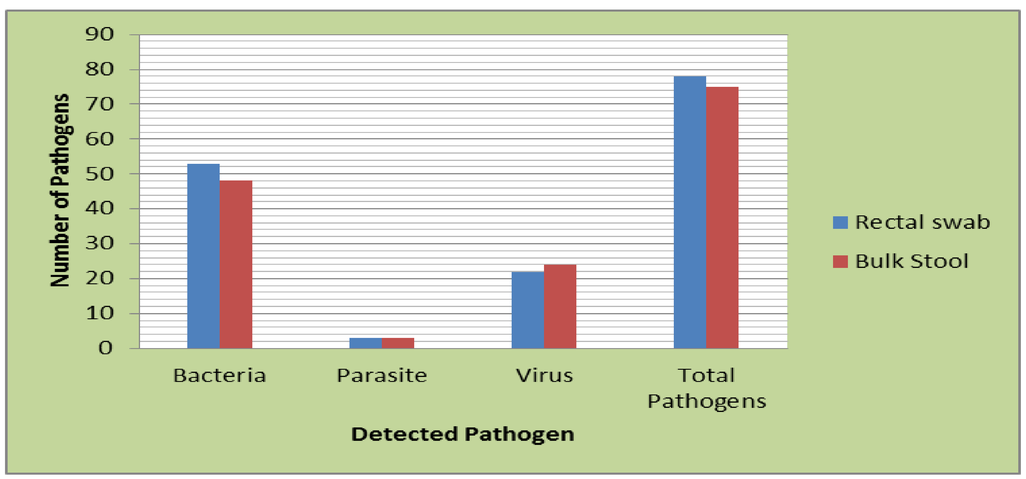


Table 1: Comparison of Pathogen Detection in Rectal Swab and Bulk Stool Specimen

•78 pathogens detected in rectal swabs
- •68% bacteria-positive
  - ➢ EAEC most common bacterial pathogen (n=14)
- •28% virus-positive
  - ➢ rotavirus A most common viral pathogen (n=16)
- •4% parasite-positive
  - ➢ all isolates were *Giardia* (n=3)

•75 pathogens detected in bulk stool
- •64% bacteria
  - ➢ EAEC most common bacterial pathogen(n=14)
- •32% virus
  - ➢ rotavirus A most common viral pathogen(n=17)
- •4% parasite
  - ➢ all isolates were *Giardia* (n=3)

Discussion

- This initial evaluation suggests that rectal swab specimens have similar performance to bulk stool when tested with the FilmArray® GIP

- The use of rectal swabs is likely to offer benefit in terms of timeliness of sampling for patients in a number of different clinical scenarios

- Timely sampling is critical to take advantage of rapid diagnostic testing, especially should targeted antimicrobial therapy be indicated (if available)

- Rectal swab sampling has been previously shown to offer equivalent or superior test accuracy for bacterial pathogens as compared to bulk stool testing on other multiplex PCR assays (Goldfarb et al.)

References

1. Goldfarb DM, et al. Evaluation of anatomically-designed flocked rectal swabs for the molecular detection of enteric pathogens in children admitted to hospital with severe gastroenteritis in Botswana. J Clin Microbiol. 2014 Nov;52(11):3922-7
2. Biomerieux. FilmArray Info Sheet GI Panel. Nov 2014
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