Introduction
Many swab transport systems have been developed to stabilise clinical bacterial and viral material prior to downstream microbiological testing. Increasingly downstream testing is represented by a rapid syndromic multiplex molecular assay. The adoption of liquid collection devices raises the question of compatibility with these molecular platforms. One such platform is the FilmArray® from Biomerieux. It is an FDA, CE-IVD, and TGA certified multiplex PCR system that integrates sample preparation, amplification, detection, and analysis. The FILMARRAY® system enables simultaneous testing for bacteria, viruses, yeasts, and/or antimicrobial resistant genes. It is designed to be used with comprehensive panels that each offer testing for sets of pathogens. The validation of a wide spectrum of liquid swabs is clinically beneficial as it allows the medical examination process multiple swabs are frequently collected simultaneously and mix-ups are not uncommon. The general prescriptive approach of devices being validated for one collection device is also counter-intuitive. The broader the validation spectrum of collection devices, the simpler the process becomes for taking the specimen and builds in contingency if there are supplier issues with the collection devices.

The collection of Medical Wire and Equipment (MWE) liquid collection devices (Fig.2) are a convenient system for collecting samples and transporting specimens in small instrument-ready tubes, making it easier to transport the specimen to the laboratory.

This investigation looks at the potential use of various liquid transport systems for the detection of bacterial and viral pathogens and the effect of bacterial contamination on the detection of viral RNA/DNA utilising the Biomerieux FilmArray® platform (Fig.1) in routine clinical practice. It was the validation of the MWE collection device as gastro-intestinal is one of the leading causes of morbidity and mortality in young children where it is not always possible to get a bulk sample within a reasonable time-frame, particularly for outpatients and/or in resource limited settings. This inability to obtain a stool specimen at the time of the patient visit can delay the diagnostic process and contribute to inappropriate treatment (Schlenker and Strewicz, 2009).

Methods
FilmArray® platform manufactured by BioFire Diagnostics and distributed by Biomerieux.
- FilmArray® Blood Culture Identification panel
- FilmArray® GI Panel
- FilmArray® Respiratory panel
- Controls obtained from HHC were:
  - NATrol GI Panel (BioFire) (product code NAC-NAT2-BIO)
  - NATrol RI Multiplex Control Pack (product code MDZ001)
  - Streptococcus agalactiae ATCC® 12867™ (Cult-Loops™ from Thermo-Scientific)

The controls are purified intact organisms chemically modified to be non-infectious and mimicking clinical samples. Controls were vortexed for 10 seconds and utilised to seed a range of liquid swabs.

The targets of each panel are displayed below:

### FilmArray® Panels

<table>
<thead>
<tr>
<th>Panel Name</th>
<th>Swab Description</th>
<th>Sample</th>
<th>Results</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal panel</td>
<td>Faecal swab</td>
<td>10.50</td>
<td>100</td>
<td>None detected</td>
</tr>
<tr>
<td>Gastrointestinal panel</td>
<td>Faecal swab</td>
<td>3.50</td>
<td>100</td>
<td>None detected</td>
</tr>
<tr>
<td>Gastrointestinal panel</td>
<td>Faecal swab</td>
<td>1.50</td>
<td>100</td>
<td>None detected</td>
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Results

- All swabs collected with NATrol RI Multiplex Control Pack detected all targets.
- Both types of Faecal Transwab seeded with the NATrol GI Panel detected all targets.
- The Sigma GBS swab seeded with an ATCC strain of Streptococcus agalactiae detected the target.

Conclusion

All MWE liquid swabs demonstrated compatibility with the FilmArray® system. This is of particular clinical use for the diagnosis of gastrointestinal disease as a simple rectal swab enables the rapid collection of a sample coupled with diagnostic power of the FilmArray®. The faecal swab system option for liquid collection and transport of GI pathogens with the rapid diagnosis of gastrointestinal diseases. The liquid collection swab system from MWE, particularly Focal Transwab®, is a great example of where two solutions meet in the middle, picking up where the other left off, to get to the right result fast. It provides a more sensitive and compact workflow solution. Additional research on improved sensitivity and specificity of rectal swab liquid collection utilising the MWE faecal device would be of interest. Previous studies have shown to offer superior test accuracy for bacterial pathogens as compared to bulk stool testing on other multiplex PCR assays (Goldfarb et al., 2014).

There was no indication of inhibitory substances being present in the swab types tested. Temingly sampling is critical to take advantage of rapid diagnostic testing of the FilmArray®; especially should targeted antimicrobial therapy be indicated (if available). This study has shown that a wide range of liquid collection devices can be used for the FilmArray® giving more flexibility within the patient to diagnostic pathway.

References: