Introduction. The detection of microorganisms in blood samples has been improved with automation of the blood culture systems, however, identification of the agents still requires culture based methods which can take several days. Faster identification of limited types of organisms is possible through FISH methods and a few organism targeted PCR assays. The ability to identify a large number of the most common pathogens would improve patient management by allowing greater ability to target antimicrobial therapy. The Idaho Technology FilmArray Blood Culture Identification (BCID) system is a multiplex PCR assay that targets 20 bacteria, 5 yeasts and 4 antimicrobial resistance genes. This assay is able to provide results in approximately 1 hour from the time a positive blood culture is flagged by the instrument.

Methods. Blood was collected into BacAlert FAN (Biomérieux) bottles on standard of care and incubated in the BacAlert instrument. When a bottle was flagged as positive it was processed for gram stain and subculture. Next a 500 ul sample was collected by syringe, added to the BCID FilmArray diluent and transferred to the sample port of the pouch. The pouch reagents were rehydrated using the provided reagent solution. The pouch was scanned by the instrument and placed in the BCID FilmArray processor. Sample information was entered and the assay run was started. The instrument performed the extraction and nested PCR on board.

Results. A total of 196 positive blood cultures have successfully been processed to date. The FilmArray correctly identified the pathogen(s) in 158 (81%) of the samples however all of these were organisms not included in the panel. The only misidentifications (3 agents) in which no other agents were identified occurred with Enterobacter cloacae, Acinetobacter species and Pseudomonas species which are known to be problems with this system. The FilmArray did not detect probable pathogens in 38 (19%) of the samples processed to date. The FilmArray correctly identified the pathogen(s) in 100% of the organisms included in the panel and 100% of the cases with antimicrobial resistance factors that were included in the panel a no pathogen detected would indicate the presence of an organism not included as a target.

Antimicrobial Resistance:

- mecA
- VanA/B
- KPC

Discrepants:
- Culture: Enterobacter absurae, FilmArray: E. cloacae (1) – awaiting sequencing for differentiation
- Early pouches had occasional issues with false positive for Acinetobacter sp (6), Enterobacter cloacae (18) and Pseudomonas sp (7) – all at high CT values and other true positive pathogens were detected.

Conclusions.

1. The beta version of the BCID FilmArray was able to accurately detect and identify 100% of the 25 pathogens and 4 antimicrobial resistance factors in positive blood cultures with a time to result of about 1 hour.
2. There were 25 instances, especially with early pouch lots, where false positive results for some targets were detected in addition to other pathogens that were positive by FilmArray and culture. Less of an issue with more recent lots and is being addressed further by Idaho Technology.
3. Since the BCID FilmArray was able to reliably detect the targets included in the panel a no pathogen detected would indicate the presence of an organism not included as a target.

The Beta version of BCID FilmArray was able to detect and identify 100% of the 25 pathogens and 4 antimicrobial resistance factors that were included in the panel within 1 hour. Once available for routine testing this system promises to provide significant improvement in managing patients with bloodstream infections.