**A Cloud Based Medical Device “Internet of Things” to Track Gastro Intestinal Pathogens in Real Time**

**Introduction:** Real-time surveillance of gastrointestinal (GI) infectious disease (ID) across the United States (US) benefits public health with potential for early detection of pathogen outbreaks. Efficient tracking of ID requires: 1) broadly distributed, comprehensive, diagnostic testing and 2) rapid collection, analysis and distribution of data. The first condition has largely been met- several FDA approved diagnostic platforms are used in clinical laboratories, detecting infectious agents known to cause diarrhea. BioFire’s FilmArray® (FA) is one such system with the capability of detecting 22 GI pathogens in a single test. The second condition is unmet; there is no comprehensive automated mechanism for aggregating GI test results across the US in real-time. Existing GI ID surveillance is limited to several pathogens, slow manual processes, complex implementation, or geographically localized.

**Methods:** We have implemented a medical device “Internet of Things”: **FATrend**. **FA Trend** connects FA® systems directly to a secure, HIPAA-complaint, cloud-based database, bypassing hospital information systems, and automatically exports electronic de-identified GI test results. Dashboards of aggregated FA® data are accessible to various users via a website, allowing clinical users to track institutional, local, and national trends of circulating GI bacteria, viruses, and parasites. This approach eliminates labor-intensive manual data processing or extraction from various hospital information systems.

**Results:** Five US sites are participants in the **FA Trend** pilot study: Medical University of South Carolina (SC), Northwell Health Laboratories (NY), Primary Children’s Medical Center (UT), Tampa General Hospital (FL), UC San Diego Medical Center (CA), NYU Langone Medical Center (NY), with a total of an X FA® instrument cohort. With automated export of test results and archival data, the group will collectively contribute over 4,000 test results this year. GI surveillance results include: 1) aggregate pathogen prevalence, including fluctuations in diarrheagenic E. coli/Shigella and other organisms; 2) polymicrobial detection, identifying over- or under-represented co-detections, and; 3) rotavirus-specific trends compared to CDC NREVSS observations.

**Conclusions:** With the implementation of **FA Trend,** barriers to real-time, enhanced monitoring of GI pathogens are no longer technical nor scientific, but administrative. By connecting FA® systems to the cloud and exporting de-identified results, privacy concerns involving protected health information are overcome. The resulting data stream is an efficient mechanism that has a positive influence on GI surveillance.