**Implementation of an**

**Instantaneous Pathogen Specific Surveillance (iPaSS) System**

**Background:** Real-time monitoring of infectious disease (ID) across the United States benefits public health. Tracking ID requires 1) comprehensive, diagnostic testing and 2) rapid automated collection, analysis and distribution of this data. The first requirement has been met. Several diagnostic platforms are available for testing large groups of infectious agents causing similar syndromes. BioFire’s FilmArray® (FA) Instrument is one such system. The FA® Respiratory Pathogen (RP) panel detects 20 organisms. However, the second requirement for ID tracking has not been fully addressed; there is no general mechanism for exporting test results and integrating the information across time and space. Existing ID surveillance systems are limited to a small number of pathogens, labor intensive and slow, complex to implement, geographically localized or based only on symptoms.

**Methods:** We have implemented an iPaSS system: **FA-Trend**. It automates the flow of test results from FA instruments to a secure, HIPAA-compliant, database in real time. Specific views of this information can be presented to different audiences: source laboratories can track local trends and the public will have an up-to-date view of viruses and bacteria currently circulating. This approach does not require data extraction from hospital information systems that vary between hospitals, and does not need labor intensive manual data extraction.

**Results:**  **FA Trend** software was installed on 55 FA instruments at 14 US sites. Most IRBs ruled this study exempt. Greater than 50,000 runs were uploaded to the database. Data presented will include plots of: 1) Pathogen prevalence by institution and in aggregate, displaying annual fluctuations of influenza and seasonality of organisms; 2) Polymicrobial detection to look for over- or under-represented co-detections; 3) Pouch testing rate fluctuations, comparted with the CDC Influenza-Like Illness trends; 4) Comparison of the onset and duration of specific pathogens making up the respiratory season at different sites.

**Conclusions:** **FA Trend** is easily scalable (number of sites and different panels) and the lessons learned will make it easier to bring the next 100 to 500 laboratories on board. As the participants and scope of FA-Trend expands it will be possible to demonstrate, in real time and in high resolution, the spread of various IDs across the US.

**Aimie’s ideas for figures:**

1. Pathogen prevalence by institution and in aggregate, displaying annual fluctuations of influenza and seasonality of organisms
   1. Organism prevalence over time: All organisms
   2. Organism prevalence over time: FluA, FluB, RSV, Coronas, PIVs
   3. Organism prevalence all time Pareto (collapsed) – All data
   4. Organism prevalence all time by Region Pareto (collapsed) – Midwest and Northeast
   5. Organism prevalence all time by Population Pareto (collapsed) – Peds and Mixed
2. Polymicrobial detection to look for over- or under-represented co-detections
   1. Lindsay’s co-detection chart
3. Pouch testing rate fluctuations, comparted with the CDC Influenza-Like Illness trends
   1. Normalized burn rate vs. ILI
4. Comparison of the onset and duration of specific pathogens making up the respiratory season at different sites
   1. Comparison with NRVESS data at lowest level of regional granularity available