BSC/OID Infectious Disease Laboratory Workgroup

Summary of May 7th Meeting: The CDC AMD Initiative

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Overview of CDC's Activities

Core Bioinformatics Program has made considerable progress in development of IT infrastructure and expertise

- Hub-and-spoke organizational model
- Research Grade Network
- Data management policies and practices
- Training opportunities

Advances in laboratory-based programs

- Food-borne diseases, e.g., collaborative *Listeria* surveillance project
- Developing a set of reference microbial genomic sequences
- Evaluation of uses of WGS in multiple infectious disease programs, including metagenomic approaches

Updates from Federal Partners

FDA

- Establishment of Genomics Working Group to evaluate IT and scientific challenges
- Developing WGS-based methods for drug resistance and surveillance of food-borne pathogens
- FDA Genome Trakr Network for Salmonella surveillance

NIH

- Overview of NIAID's activities supporting research on advanced molecular diagnostics including NIAID Genomic Sequencing Centers
- Trend toward point-of-care diagnostics
- Move to "Personalized Medicine" approach

Update from state partners

- Informal survey to assess activity in state public health labs – some states are already actively evaluating NGS.
- AMD technology needed to support both local and national missions
- Bioinformatics and training are the biggest hurdles
- Many states will be dependent on federal support for AMD technologies

Discussions about access to data

- Federal policies defining need for data sharing
- Data sharing issues that need discussion
  - Data quality
  - Accompanying metadata, especially privacy issues
  - How to share data for maximal effectiveness

Lab WG Observations

Collaborations with Partners

- State Health Departments
  - Some state health departments are already using AMD techniques, most often in partnership with academic institutions or as part of the FDA Genome Trakr network – The CDC needs to be involved in these types or collaborations – the earlier the better.

- NIH
  - Supporting the developing of new cutting edge AMD tools, and should work with the FDA to develop a framework to facilitate their evaluation and approval.

- Clinical Laboratories
  - Rapidly moving from culture-dependent to PCR-based tests. In the near future, they are likely to transition to other non-traditional and closed-system technologies and continue to eliminate culture-based testing.

Lab WG Observations

Staying ahead of the curve

- In view of the rapid rate of technologic change, by the end of 2018, CDC needs to be poised to lead into the future (not plateau or become obsolete).

- CDC should
  - Work with academic, clinical, state and industry partners who are also working with this evolving technology
    - These interactions would provide additional opportunities for CDC to partner with other entities
    - Collaborate with appropriate partners so CDC Core Bioinformatics Program can benefit from experiences of others and avoid obstacles that have already been addressed by others
  - Consider staggering hardware purchases to ensure that each purchase involves the most current technology that will not outdate rapidly.

Lab WG Observations

Future Directions

- We will continue to have a more accurate knowledge of the "universe" of microbes, through the use of AMD testing
- We must keep in mind that data standards and reference databases developed today may still be useful in a few years, but they will certainly have evolved
- Cloud bioinformatics are in the near future if not already here (may supplant the purchase of new software/hardware)
  - e.g., Cloud-based surveillance data on reportable diseases may be able to identify disease clusters much sooner by automatically flagging possible outbreaks.
- The AMD field may include additional types of metadata to draw from—science of immunology, microbiomes, the environment, and others . . .