Together: Addressing Challenges in Genomics for Food Safety Communications

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Interagency Collaboration on Genomics for Food and Feed Safety (Gen-FS)

• Formed in 2015 to strengthen federal collaboration on use of WGS in foodborne pathogen analysis and investigation

• Multiple Federal Agencies participating
  • Food and Drug Administration (FDA)
  • Centers for Disease Control and Prevention (CDC)
  • National Institutes of Health (NIH)
  • Food Safety and Inspection Service (FSIS)
  • Agricultural Research Service (ARS)
  • Animal and Plant Health Inspection Service (APHIS)
Our Approach

Interagency collaboration which:

- Builds on a history of collaborative programs
  - Interagency Food Safety Analytics Collaboration (IFSAC)
- Applies advances in technologies
- Leverages knowledge, expertise and data among agencies
- Builds an efficient structure guided by strategy
- Prioritizes communications and stakeholder input
Gen-FS

- Supports implementation of a shared vision of coordinated networks for genomic sequencing
  - Flexible to encompass multiple tools, analyses, and communications needed by the respective agencies
  - Harmonizes procedures and standards
  - PulseNet
  - GenomeTrakr
Gen-FS

Targets for development, coordination, and harmonization:

- System tools, data pipelines, and methods
- Analytic procedures, protocols, and standards
- Data sharing and availability
- Harmonized proficiency testing and training
- Use in surveillance, investigation, and research
- External communication and partnerships
Gen-FS Governance

- Charter

- Steering Committee

- Workgroups
  - Data Standards, Analytics, Comparisons and Interpretation
  - Interagency Training
  - GenomeTrakr-PulseNet workflow harmonization
  - Communications
Gen-FS Priority: Build a Shared Structure and Strategy

- DNA sequence and metadata publically available
  - Data uploaded to NIH/National Center for Biotechnology Information public database (GenBank)
  - All organisms undergoing WGS in PulseNet and GenomeTrakr
  - Clinical, food, environment
  - Identity protected (commercial, personal)

- Tools and methods publically available
  - Open source or commercially available software
  - Publication of methods and validation analyses
Gen-FS Workgroup Activities: Standards and Validation

- Quality standards monitored for all submissions
- Develop and publish benchmark datasets
- SNP and wgMLST validation studies
  - Individual pipeline and cross validation
- AMR genotype/phenotype comparison
Gen-FS Workgroup Activities: Harmonization Across Networks

- **Training**
  - Training provided for public health and regulatory program partners in PulseNet and GenomeTrakr networks
  - CDC and FDA sponsored courses
  - Staff from each agency participate as training faculty
  - Training certification applicable to both networks

Done, well….maybe…

Continuous improvement
Gen-FS Workgroup Activities: Harmonization Across Networks

- **Laboratory SOPs for WGS**
  - Sample and DNA library preparation
  - Sequencing procedure
  - Data management and upload to NCBI
  - Incorporate new and changing technologies

- **Proficiency testing**
  - Standard panel, analysis and reporting
Gen-FS Workgroup Activities: Communications

- Industry collaborative forums
- Food safety and scientific conferences
  - International Association for Food Protection
  - Food Safety Summit
  - American Society for Microbiology
  - Global Microbial Identifier
- Publication (drafting stage)
  - Use and interpretation of WGS in food safety
  - Peer reviewed journal
Interpreting Results and Communicating Findings

- Routine “Cluster” and outbreak calls among agency epi and lab SMEs – looking at the “trees”
- Agreement that one size doesn’t fit all re “cutoffs”
  - WGS is only part of the story, other information used to interpret results and determine “relatedness”
  - Still using the 3-legged stool – epi, lab, environment
- Cross review of public communications on outbreaks
- More to come in “print” from Gen-FS collaborations and application and interpretation of WGS
Now and Looking to the Future

- Public communications on food safety alerts includes **WGS** (ex. outbreaks)

- **WGS** replacing traditional methods for routine microbiologic characterization of foodborne pathogens – affects communications
  - Surveillance, Investigation, Action

- **Gen-FS**: increased web presence, new workgroup on Genomic Biomarkers, increased internal information exchange on metagenomics, more external engagement
Looking to the Future

- **Shared tools, standards and data for all stakeholders**
  - Public health, regulatory, Industry, Academic, International

- **Continued Sharing of Lessons Learned**
  - Simplified WGS analyses
  - Efficiencies gained
  - Communicating about the science in a meaningful way to multiple audiences

- **Increased harmonization and standardization through collaboration and coordination leading to more consistent and clearer communications**
  - but remember we’re in transition…
Acknowledgements: Gen-FS members and the Communications Workgroup

Thank You!