California Department of Public Health’s Transition from PFGE to WGS for PulseNet

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2018 Enteric Testing Volume

- Salmonella: 4424
- STEC: 2034
- Shigella: 958
- Vibrio: 40
CDPH-MDL PulseNet Workload – PFGE and WGS

• PFGE performed on:
  • All *Salmonella*
  • All STEC O157
  • Non-O157 STEC and *Shigella* for outbreak investigation only

• WGS performed on:
  • All *Listeria*
  • All STEC O157
  • *Salmonella* as funding permits
  • Non-O157 STEC, *Shigella*, and *Vibrio* for outbreak investigation only
CDPH-MDL PulseNet Workload – PFGE and WGS

Number Uploaded to PulseNet

- **PFGE**
  - 2015: 4208
  - 2016: 3918
  - 2017: 3836
  - 2018: 4107

Legend:
- **Shigella**
- **Listeria**
- **NonO157**
- **E. coli O157**
- **Salmonella**
CDPH-MDL PulseNet Workload – PFGE and WGS

<table>
<thead>
<tr>
<th>Year</th>
<th>PFGE</th>
<th>WGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>4208</td>
<td>31</td>
</tr>
<tr>
<td>2016</td>
<td>3918</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>3836</td>
<td></td>
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<tr>
<td>2018</td>
<td>4107</td>
<td>1185</td>
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</tbody>
</table>

- Shigella
- Listeria
- NonO157
- E. coli O157
- Salmonella

California Department of Public Health
CDPH-MDL: PulseNet Transition

- Personnel and training
- BioNumerics upgrade
- Laboratory space and equipment
- Financial considerations
- Traditional testing
- Communication lab/epi
- Turn-around-time

https://www.cdc.gov/pulsenet/participants/international/wgs-vision.html
Personnel & Training

Foodborne Waterborne Diseases Section
Genotyping Unit (PFGE)
Supervisor – Dr. Varvara Kozyreva

Core Laboratory (WGS)
Supervisor – Dr. Rituparna Mukhopadhyay
Personnel & Training

CDPH-MDL

Foodborne Waterborne Diseases Section
Genotyping Unit (PFGE)
Supervisor – Dr. Varvara Kozyreva

Core Laboratory (WGS)
Supervisor – Dr. Rituparna Mukhopadhyay
Personnel & Training

To do:

- WGS training
- CDC PulseNet certification – wet lab (4 staff)
- CDC PulseNet certification – data analysis (4 staff)
BioNumerics 7.6 Upgrade

To do:

✓ Purchase software upgrade
✓ Database cleaning (over \textbf{36,000} entries!!!)
✓ Software install
✓ WGS data analysis in BioNumerics

http://www.applied-maths.com/
Laboratory Space

**To do:**

- [x] Identify space
- [ ] Laboratory renovations  **In Progress**
- [ ] Purchase and install additional equipment  **In Progress**
- [ ] Purchase more equipment (automation, MiSeq)
To do:

- Identify space ✔️
- Laboratory renovations □ In Progress
- Purchase and install additional equipment □ In Progress
- Purchase more equipment (automation, MiSeq)

Current equipment:
- Two MiSeq instruments
- TapeStation
- Nanodrop
- Qubit
- QIAcube (not yet in use)

Equipment wish list:
- Two MiSeq instruments
- Automation
Financial Considerations

To do:

- Secure sufficient funding to support WGS for PulseNet

- Reagent costs:
  - PFGE - $8 to $25 per isolate
  - WGS - $150 per isolate

- Equipment maintenance costs:
  - Chef-Mapper – less than $1,000 per year
  - MiSeq - ~$16,000 per year
Financial Considerations

To do:
- Secure sufficient funding to support WGS for PulseNet
- Redirect money that supported PFGE
- Work to secure additional state funding
- Work with other California Public Health Laboratories
Financial Considerations

- Redirect money that supported PFGE
- Work to secure additional state funding
- **Work with other California Public Health Laboratories**

Traditional Testing

- Continue traditional testing
  - Typing (*Salmonella*, STEC, *Shigella*)
  - Toxin detection

- CLIA-validate predictive
  *Salmonella* serotyping
Communication Lab/Epi

- Continue communication systems used for PFGE
  - Shared databases
  - Email alerts for potential matches
  - Weekly calls (cluster status, *Listeria* line list)

- Develop new systems
  - More detailed *Salmonella* database to facilitate “strategic randomization”
  - Lab/epi PulseNet transition meetings
  - More calls
  - California PulseNet member laboratory workgroup
Turn-Around-Time

• To be determined......

https://rgpic.com
Thank you!

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MDL Program Chief: Zenda Berrada