MANAGING NEW WORKFLOWS
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OVERVIEW OF EPI/LAB PERSONNEL

- 1 enteric/vectorborne/zoonotic disease epidemiologist

- 1 laboratorian fully trained in PFGE and WGS

- 1 laboratorian fully trained in WGS and for PFGE of *E. coli* O157 gel only
CASE REPORTING

- ELR
  - Some facilities consider CIDT results preliminary, don’t report until confirmatory results are received from NDDoH

- Online disease report form

- Calls from physicians/ICNs
INVESTIGATION PRIORITIES

- Immediate priority
  - *Salmonella* Typhi

- First priority (daily)
  - STEC
  - *Listeria*
  - *Shigella*
  - *Vibrio cholera*

- Second priority (weekly)
  - *Campy*
  - *Salmonella*
SNAPSHOT OF STEC CASES IN ND

**STEC Cases in ND**

<table>
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<tr>
<th>5-Year Average</th>
<th>2018 Case Count</th>
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<td>44</td>
<td>66</td>
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**2018 Culture Confirmation of STEC CIDTs**

- **22**: CIDTs confirmed by culture
- **33**: CIDTs not confirmed by culture
SNAPSHOT OF SALMONELLOSIS CASES IN ND

Salmonellosis Cases in ND

- 5-Year Average: 113 cases
- 2018 Case Count: 118 cases

2018 Culture Confirmation of *Salmonella* CIDTs

- CIDTs confirmed by culture: 30
- CIDTs not confirmed by culture: 5
CURRENT CLUSTER DETECTION METHODS

- **Epi data**
  - Analyzing exposure data and reviewing foodborne illness complaints
  - Reviewing case locations

- **Lab data**
  - Reviewing PFGE data in SEDRIC
  - Looking up isolates in the NCBI Isolates Browser, searching for related isolates in SEDRIC
  - Checking the PulseNet SharePoint message boards
LAB OVERVIEW

- 1 MiSeq for sequencing
- 2 laboratorians fully trained in WGS
- Average yearly numbers
  - 100 – 150 *Salmonella* species
  - 50 STEC
  - 150 *Campylobacter* species prior to 2018, 50 starting in 2018
  - 0 – 10 *Shigella* species
  - 0 – 5 *Vibrio* species
- Currently sequencing all *Salmonella*, *Shigella*, STEC, *Vibrio*, and *Campylobacter* if we need to fill runs
ISOLATE RECEIPT AND PROCESSING

Specimen Received at NDDoH

Unique sample number given to specimen

TAT: 1 day

Specimen to Enteric Bench

• CIDT – Isolation attempt made
• Isolate – Confirmation via MALDI

TAT: 1 - 5 days

Specimen to PFGE/WGS

• Plugs made for PFGE
• Isolate extracted for WGS

TAT: 3 - 7 days
PFGE AND WGS WORKFLOW

PulseNet
Metadata entered by microbiologist

PFGE happens in “real time”
Gel analyzed and uploaded to National Database

WGS is batched
V2 300 and 500, Micro and Nano kits used

Serotype and PNUSA# given to Epi
NCBI
SEDRIC

National Database
Outbreak and pattern names downloaded
ISSUES AND CONSIDERATIONS

- CIDT specimens not always sent to PHL
- Communicating results
  - Serotypes are not sent to Disease Control electronically
  - Lag time for specimens to appear in NCBI/SEDRIC
- No fragment analyzer
- Problems meeting coverage with Micro (7 samples) and Nano (2 samples) kits
- Optimal kits are V2 300 (12 samples) and 500 (16 samples)
  - Not ideal for small states because it can take 2-4 weeks to fill a run
  - DNA flex to run STEC on V2 300?
A FEW SMALL VICTORIES

- Using the NCBI Pathogen Detection Pipeline to link some of our cases to multistate clusters
- Forming an internal epi-lab workgroup
  - Goals
    - To improve the efficiency of lab testing by doing weekly WGS runs
    - To better understand our current workflows and develop a new workflow for cluster detection
    - To improve communication between the lab and epi
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