The State of CIDTs in Minnesota

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Molecular Epidemiology Supervisor

MDH Minnesota Department of Health
Submission of clinical materials required. If a rapid, non-culture assay is used for diagnosis, we request an isolate, if that is not possible then a specimen, if that is not possible then nucleic acid

Mandatory submission:
Campylobacter, Cryptosporidium, Cryptococcus, Enteric E. coli (STEC, ETEC, EIEC, EPEC, O157), Salmonella, Shigella
CIDT Assays on Specimens Received at MDH

- Nanosphere
- Biofire
What’s Up with EPEC?

• Symptoms-diarrhea, fever, vomiting
• Important pathogen for children and cause of persistent diarrhea worldwide
• Is it really a pathogen? What is EPEC?
### EPEC Characterization

<table>
<thead>
<tr>
<th></th>
<th>eae</th>
<th>stx</th>
<th>Sorbitol</th>
<th>bfp</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPEC (typical)</td>
<td>+</td>
<td>-</td>
<td>F</td>
<td>+</td>
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<tr>
<td>EPEC (atypical)</td>
<td>+</td>
<td>-</td>
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<tr>
<td>Location</td>
<td>Sample ID</td>
<td>E. Coli O157</td>
<td>Shigella</td>
<td>Salmonella</td>
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<tr>
<td>1(1,1)</td>
<td>M2014016196</td>
<td>POS</td>
<td>NEG</td>
<td>NEG</td>
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| 1(1,1)   | M2014016196 | E. coli O157 POSITIVE stx 1 and 2 negative

1. E. Coli O157:
   - Positive
2. stx 1 and 2:
   - Negative
<table>
<thead>
<tr>
<th>Panel</th>
<th>Target</th>
<th>Analyte</th>
<th>Call</th>
<th>Signals (MFI)</th>
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<td><strong>Internal Control</strong></td>
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<td>150 / 0x</td>
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<td></td>
<td>Vibrio cholerae</td>
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<td>Yersinia enterocolitica</td>
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</table>

**Analyzed using:** xTAG® GPP (RUO) v.1.10
## FilmArray™ GI Panel

### Run Summary
- **Sample ID:** M2014016196
- **Run Date:** 29 Oct 2015 1:21 PM
- **Controls:** Passed

### Result Summary

#### Bacteria
- **Not Detected:** Campylobacter, Clostridium difficile toxin A/B, Plesiomonas shigelloides, Salmonella, Vibrio, Vibrio cholerae, Yersinia enterocolitica
- **Detected:** Enteropathogenic E. coli (EPEC)
- **Not Detected:** Enterotoxigenic E. coli (ETEC)
- **Not Detected:** Shiga-like toxin-producing E. coli (STEC) stx1/stx2

#### Diarrheagenic E. coli/Shigella
- **Detected:** Enteropathogenic E. coli (EPEC)
- **Not Detected:** Shiga-like toxin-producing E. coli (STEC) stx1/stx2

#### Parasites
- **Not Detected:** Cryptosporidium, Cyclospora cayetanensis, Entamoeba histolytica, Giardia lamblia

#### Viruses
- **Not Detected:** Adenovirus 40/41, Astrovirus, Norovirus GI/GII, Rotavirus A, Sepsivirus

### Run Details
- **Pouch:** GI Panel v2.1
- **Run Status:** Completed
- **Serial No.:** 02751444
- **Lot No.:** 208515
- **Instrument:** 2FA00371
- **Protocol:** Stool FA v3.3
- **Operator:** Molecular Molecular (Molecular)
Characterization at MDH

• Picked colonies-identified eae+, stx-, serotyped as O157:NM
• Sorbitol fermenter
• Bfp neg
# EPEC Characterization

<table>
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<td>-</td>
<td>O157:H16</td>
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<tr>
<td>EC O157</td>
<td>+</td>
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<td>NF</td>
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Who Cares?

- Stx- EC 0157:NM found in patients with HUS and diarrheae*
- Recent paper from the Netherlands**
  - Developed 0157 EC PCR
  - 1 year period
    - 34 O157 positive
      - 16 STEC
      - 18 EPEC (4 H7, 8 H16, 2 H26, 4 H39)
    - Stx – isolates thought to lost stx phage or a progenitor of STEC O157:NM

**Ferdous et al. Nov 2015 Jour Clin Micro.
What is EPEC (Biofire)

- Typical EPEC
- Atypical EPEC
- Bill (and stx- cousins)
- *E. albertii*
- *S. boydii*
- *Citrobacter sp.*
- Others??
Recent MN Outbreak

- Restaurant associated outbreak with catering (22 cases)
- Diarrhea: 22/22 (100%)
- Cramps: 17/21 (81%)
- Fever: 4/18 (22%)
- One reported temp at 99F
- Vomiting: 2/22 (9%)
- Bloody Stools: 1/21 (5%)
- Lack of temp abuse
Outbreak Continued

- 0/12 Noro neg
- Ran 1 on the Biofire-EPEC positive
- 11/12 aEPEC positive (stx-, bfp-, eae+)
- 3/4 C. perfringens toxin positive, unable to culture
- Isolated eae positive colonies-O167 (expired reagent)
- Same/similar PFGE patterns
- More testing needed-food testing, ETEC, EIEC..
Conclusions

• Use of molecular CIDTs increasing in MN
• Concern about resources to respond
• Several pathogens with poor isolate recovery
• High amount of EPEC
• Some CIDT identified EPECs may be O157
• EPECs may be clinically significant and warrant additional investigation
Acknowledgements

- Elizabeth Cebelinski, MDH
- MDH enteric and PFGE lab
- MDH foodborne epidemiologists