Cryptosporidiosis Outbreak Among Mission Trip Volunteers – Tennessee, 2012

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- 3 people ill with gastroenteritis
- Mission trip to Tennessee, July 16-19
Cryptosporidium

- Most common parasitic enteric disease in US
- Causes human and animal illness
- Outbreaks associated with contaminated water, unpasteurized milk, animal contact
Mission Trip

- 95 high-school aged participants and trip leaders from FL, IA, KY, MA, MI, MS
- Contact information obtained from trip organizers
  - Phone numbers of participants
  - Emails and phone numbers of trip leaders
Mission Trip Activities

- Yard work
- Sorting shoes
- Farm work
- Working with the elderly
- Sorting medical supplies
- Cleaning houses
- Sorting food at food bank
Methods

- Cohort study initiated
- Online survey emailed to group leaders
  - Further distributed to participants
- FoodCORE telephoned non-respondents
Case Definition

- At least 3 loose stools in 24 hours beginning on or after July 19
Results

- Of 95 participants,
  - 70 (74%) completed survey
  - 9 (13%) reported illness
# Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>No. (n=70)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working with elderly</td>
<td>22</td>
<td>31%</td>
</tr>
<tr>
<td>Sorting medical supplies</td>
<td>13</td>
<td>19%</td>
</tr>
<tr>
<td>Cleaning houses</td>
<td>12</td>
<td>17%</td>
</tr>
<tr>
<td>Farm work</td>
<td>11</td>
<td>16%</td>
</tr>
<tr>
<td>Sorting food at food bank</td>
<td>9</td>
<td>13%</td>
</tr>
<tr>
<td>Yard work</td>
<td>6</td>
<td>9%</td>
</tr>
<tr>
<td>Sorting shoes</td>
<td>6</td>
<td>9%</td>
</tr>
</tbody>
</table>
Acute Gastroenteritis Among Mission Trip Volunteers (n=9)

Number

Mission trip

Illness Onset Date

7/16 7/17 7/18 7/19 7/20 7/21 7/22 7/23 7/24
### III Volunteers (n=9)

<table>
<thead>
<tr>
<th>Age, years</th>
<th>Mean 21</th>
<th>Range 16-47</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex, no. female (%)</td>
<td>6 (67)</td>
<td></td>
</tr>
<tr>
<td>Visited doctor, no. (%)</td>
<td>4 (44)</td>
<td></td>
</tr>
<tr>
<td>Visited ER, no. (%)</td>
<td>1 (11)</td>
<td></td>
</tr>
</tbody>
</table>
### Symptoms

<table>
<thead>
<tr>
<th>Symptom</th>
<th>No. (n=9)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhea</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Nausea</td>
<td>7</td>
<td>78</td>
</tr>
<tr>
<td>Abdominal cramps</td>
<td>7</td>
<td>78</td>
</tr>
<tr>
<td>Fatigue</td>
<td>6</td>
<td>67</td>
</tr>
<tr>
<td>Fever</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>Vomiting</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>Bloody stool</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>
## Illness Associated with Volunteering at Farm

<table>
<thead>
<tr>
<th></th>
<th>Ill</th>
<th>Not Ill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volunteered at farm</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Did not volunteer at farm</td>
<td>0*</td>
<td>59</td>
</tr>
</tbody>
</table>

RR = 28.9  
95% CI: 7.3 – 113.8

*Cell value inflated to 0.5 to calculate RR
Farm Volunteers

- Activities
  - Building pens, bathing calves, feeding calves, cleaning barn
- Calves reportedly ill with diarrhea
- No appropriate hand washing facilities in barn
Farm Owner

- Annually hosts volunteers throughout summer
- Regularly buys/sells calves
## Relative Risk

<table>
<thead>
<tr>
<th>Performed Activity</th>
<th>Did not perform activity</th>
<th>Relative Risk</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ill</td>
<td>Total</td>
<td>Ill/Exposed (%)</td>
</tr>
<tr>
<td>Building pens</td>
<td>7</td>
<td>9</td>
<td>78</td>
</tr>
<tr>
<td>Bathing calves</td>
<td>6</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>Feeding calves</td>
<td>6</td>
<td>7</td>
<td>86</td>
</tr>
<tr>
<td>Cleaning barn</td>
<td>9</td>
<td>10</td>
<td>90</td>
</tr>
<tr>
<td>Contact with bottle-fed calves</td>
<td>8</td>
<td>9</td>
<td>89</td>
</tr>
<tr>
<td>Poor hand washing after animal contact</td>
<td>9</td>
<td>10</td>
<td>90</td>
</tr>
<tr>
<td>Poor hand washing before eating</td>
<td>8</td>
<td>9</td>
<td>89</td>
</tr>
</tbody>
</table>

*Cell value inflated to 0.5 to calculate RR
Laboratory Results

- 4 stool specimens collected
  - 4 (100%) culture negative
    - 1 received no further testing
    - 2 positive for *Cryptosporidium*
    - 1 negative for *Cryptosporidium*
Discussion

- Illness strongly associated with farm
- Likely transmitted via animal contact
  - Inaccessibility of hand washing facilities
  - Poor hygiene practices of volunteers
Limitations

- Timely collection of stool specimens difficult
  - Participants had returned home
  - Calves not available for testing
- No environmental testing
  - Farm owner thoroughly cleaned barn
  - TN state public health lab unable to test environmental samples for Cryptosporidium
Interventions

- Mission trip organizers reassigned groups
- Notified ill participants of etiology
- Farm owner
  - Compendium of Measures to Prevent Disease Associated with Animals in Public Settings
Thank You

- Tennessee Department of Health
  - Heather Henderson
  - John Dunn
  - FoodCORE Team
- Michigan Department of Community Health
- Kentucky Department for Public Health