Novel pattern *E. coli* O103 cluster resulting in a fatality, associated with travel to Mexico

Madhura Sundararajan, MPH
In July 2017, the Ohio Department of Health was notified of a death in a previously healthy 17-year-old male from Indiana due to septic shock and pancolitis without post-diarrheal hemolytic uremic syndrome (HUS) in an Ohio hospital. Laboratory testing identified E. coli Shiga toxin 1 (STEC) by polymerase chain reaction (PCR)
Exposure History: Activities

• History of recent travel to Puerto Vallarta, Mexico, 10 days prior to illness onset
  – Vallarta Adventures; zip lining, sail boat excursion, dolphin swim
  – Ocean: paddle boarding, snorkeling, banana boat ride; inner tubes
  – Swimming at pool and beach at hotel resort

• King’s Island, Ohio, 2 days prior to illness onset
  – Rides, no animal contact, no water exposures
Exposure History: Food

• Food History:
  – Food provided at resort
    • Steak tacos, eggs (scrambled or omelet), fish tacos, steak
    • Nothing reported to be raw or undercooked
    • No food items unique from family members
  – Food served at excursions
    • Zip line tour: bottled water provided by tour company, drank water from jug stations
    • Sailboat excursion: catered lunch- salad, salami lunch meat, pasta
  – Restaurant downtown Zoo Club and Margarita Grill (items unknown)
    – Chips and salsa
• Other domestic items:
  – Buffalo Wild Wings, McDonald’s, Perkins, various snack foods
  – King’s Island: Chicken Shack- chicken tender basket with fries, water, Icee
Timeline of Events

- **Patient traveled to Puerto Vallarta, Mexico**
  - July 3-8, 2017

- **Date of illness onset**
  - July 9, 2017

- **Date of death**
  - July 17, 2017

- **Autopsy Completed**
  - July 18, 2017

- **Epi Interview conducted with family**
  - July 22, 2017

- **Rectal swab indicated Shiga Toxin 1 by PCR**
  - July 15, 2017

- **Date of Diarrhea Onset**
  - July 13, 2017

- **Patient visited King’s Island**
  - July 12-13, 2017

- **Extended stay in Ohio**
  - July 11-14, 2017

- **Typing completed at ODHL indicated E. coli O103**
  - July 25, 2017

- **CDC received pathology specimens**
  - August 15, 2017

- **CDC assigned cluster code 1707MLEXW-1. Case isolates match E. coli O103 PFGE pattern combination EXWX01.3146 and EXWA26.2879 or EXWA26.2919**
  - July 28, 2017

- **CDC closed Cluster 1707MLEXW-1**
  - August 22, 2017

- **AST data received**
  - August 30, 2017

- **Final report released by CDC confirming identification, serotype, and virulence**
  - September 21, 2017

**Specific to initial case-patient**

- Laboratory testing (stool)
- Cluster-specific epidemiological information
- Epidemiological dates of note
Methods

• **Case definition:**
  – Infection with *E. coli* O103 with a PFGE pattern matching the initial case-patient (EXWX01.3146 and EXWA26.2879 or EXWA26.2919)
• Additional cases were identified in other states using PulseNet
• Case-patients (or proxies) were interviewed about exposures in the week before illness onset
Cluster 1707MLEXW-1; E. Coli O103

- 8 cases identified [AL, CA (2), CO (2), CT, MO, WA]
- Case ranged from March 5, 2017-July 13, 2017
- Age: 17-83 years (Median: 20 years)
- 63% female
- No additional hospitalizations or deaths
- All cases reported travel Mexico in the week preceding illness onset
Travel History: Mexico

Image courtesy of Google Maps
Shared Exposures

• Ground beef or steak (3)
• Leafy greens or salad (3)
• Recreational water exposure (4)
• Drinks with ice (2)
• Case-patients did not stay at common resorts or visit common restaurants
• No food vehicle was identified.
Conclusions

- Strain is new to the United States’ surveillance system
- Likely circulating in Mexico during time of illness identification
- Small sample size
  - Risk of severe outcome cannot be quantified
- Reasons for necrotizing colitis and subsequent sepsis in previously healthy youth are unknown
  - Further study is warranted
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