SHIGA TOXIN-PRODUCING SHIGELLA SONNEI IN SOUTHERN CALIFORNIA, 2014

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**BACKGROUND**

- **Shiga toxins**
  - Cytotoxins produced by Shiga toxin-producing *E. coli* (STEC) (Stx1 and Stx2) and *Shigella dysenteriae* type 1 (Stx)
  - Involved in severe gastrointestinal illness
  - Related to severe complications: hemolytic uremic syndrome (HUS)
  - Antimicrobial treatment associated with increased risk of HUS

- **STEC and Shigellosis**
  - Similar illness: diarrhea, frequently bloody
  - Differing antibiotic recommendations

- **Recent instances of other *Shigella* serotypes producing Stx**
CLUSTER DETECTION

- Late August 2014: 2 case reports
  - Shiga toxin-positive stool by EIA
  - Within 2 days, received culture results showing *Shigella sonnei* from the same clinical specimens
  - False positive Shiga toxin EIA? Co-infection?
- By September 16: 8 cases
- Raised many questions
  - Follow up – clearance, interview form, reporting
  - Clinical – treatment recommendations
- Late September 2014: Launched investigation
  - Consulted California Department of Public Health
  - Retrospective review – 2 previous cases
METHODS

- Re-interview all suspect cases
  - Shiga toxin and *Shigella sonnei* detected in same clinical specimen collected June-December 2014

- Structured supplemental questionnaire
  - Demographics, risk factors, exposures
  - Clinical attributes: symptoms, treatment, outcomes

- Specimens submitted to California Department of Public Health Microbial Diseases Laboratory (CDPH MDL)

- Confirmed case: Stx1-positive *S. sonnei* isolated from a clinical specimen collected June-December 2014
CDPH MDL confirmed 25 cases

- *Shigella sonnei* by agglutination in group D antiserum and/or biochemical identification
- $stx_1$ gene positive, $stx_2$ gene negative by RT PCR
- Active Stx1 production by vero cell assay

PFGE following standard CDC protocol

- Multiple PFGE patterns
- J16X01.3287 most frequent $XbaI \rightarrow 12$ (48%) isolates
- 20 San Diego County cases
- 5 cases associated with other Southern California counties
- Onset dates 6/26/2014 - 12/18/2014
DEMOGRAPHICS

AGE
- Median: 10 years
- Range: 2-64 years

GENDER
- Male: n=12 (48%)
- Female: n=13 (52%)

RACE/ETHNICITY
- Hispanic/Latino: n=15 (60%)
- White NH: n=5 (20%)
- Black NH: n=4 (16%)
- Asian NH: n=1 (4%)
OUTCOMES

- ED Visit: 56%
- Hospitalization: 16%
- HUS: 0
- Deaths: 0

Median duration of acute illness: 4 days (range 1-10)
ANTIBIOTIC TREATMENT

- 88% treated with antibiotics
- Commonly used antibiotics:
  - Ciprofloxacin
  - Azithromycin
  - Metronidazole
- Median days from onset to start of antibiotics: 2.5 (range 0-32 days)
- 64% started antibiotics within 4 days of onset
Results from clinical laboratories available for 19 cases

18 of 19 resistant to Trimethoprim Sulfamethoxazole (TMP-SMX, Bactrim, Septra, Sulfatrim)

1 also resistant to Tetracycline

All susceptible to all other antibiotics tested
EXPOSURE SUMMARY

- Secondary cases = household transmission (64%)
  - 7 secondary to another confirmed case (4 household clusters)
  - 9 secondary to a contact with undiagnosed diarrheal illness
- Epidemiologic link to Mexico (56%)
  - 5 of 9 primary cases reported travel to Mexico
  - 9 of 16 secondary cases had contact with someone who lived in or visited Mexico
  - Primarily Baja California
  - No cases with onset after mid October (n=8)
- No common exposures identified in California or Mexico
CHALLENGES

- Public health challenges
  - Detection
  - Follow up: interviews, clearance testing
  - Reporting, tracking

- Clinical challenges
  - Detection and awareness
  - Treatment, risk for HUS?

- Limitations
  - Not able to reach all cases for re-interview
  - Possibility of adverse outcomes post-interview
  - Excluded undiagnosed cases
CONCLUSIONS

- 1\textsuperscript{st} U.S. cases and cluster of Stx1-producing \textit{S. sonnei}
- Clinical
  - Typical shigellosis presentation
  - No known severe outcomes
- Laboratory
  - Multiple PFGE patterns
  - Significant resistance to TMP-SMX
- Epidemiology
  - Considerable household transmission
  - No common exposures identified
  - May have been introduced from Mexico
  - Evidence of sustained domestic transmission

\textgreater Continued surveillance, investigation, education
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THANK YOU!

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