Shiga Toxin-producing *Escherichia coli* Surveillance in New York City, 2008-2011

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**BACKGROUND**

- Shiga toxin-producing *Escherichia coli* (STEC)
  - Bacteria that cause gastrointestinal illness
  - Diarrhea, cramps, bloody stool, and in some cases hemolytic uremic syndrome (HUS)
- STEC can be divided into two groups: *E. coli* O157 and non-O157 STEC (over 150 serotypes)
- Diagnostic methods
  - Shiga toxin immunomaps and EIA tests routinely used by clinical laboratories to identify STEC
  - Culture available for O157 only
  - Non-O157 STEC serotyped using antisera
- Reportable by law in NYC

**OBJECTIVES**

- Evaluate STEC laboratory and surveillance data reported to NYC DOHMH from 2008-2011
- Examine trends of O157 and non-O157 rates and compare to FoodNet (national foodborne disease sentinel surveillance network)
- Analyze differences in demographic and clinical data between O157 and non-O157 STEC
- Compare clinical data of patients determined confirmed and unconfirmed
- Assess laboratory capacity and timeliness of specimen confirmation

**SURVEILLANCE METHODS**

- Clinical labs and providers report STEC cases
- DOHMH attempts to interview all STEC cases to obtain symptom and exposure information
- Clinical labs submit specimens or isolates to Public Health Laboratory (PHL) for confirmation, serotyping, and PFGE

**SURVEILLANCE RESULTS**

- Confirmed and Unconfirmed STEC Cases in NYC
  - *E. coli* O157 trends:
    - Slight decrease in cases from 2008 to 2011
    - NYC 2008-2010 trends similar to FoodNet
    - NYC 2008-2010 average incidence rate lower than FoodNet: 0.41 vs. 1.01 cases/100,000 person-year
  - Non-O157 STEC trends:
    - Increase in cases from 2008 to 2011
    - NYC 2008-2010 trends similar to FoodNet
    - NYC 2008-2010 average incidence rate lower than FoodNet: 0.40 vs. 0.70 cases/100,000 person-year

**Case Investigation Results**

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<th>Demographic Information</th>
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<td>Majority of STEC cases are female</td>
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<td>White Non-Hispanic patients are most reported</td>
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<td>Non-O157 patients significantly younger than O157 patients (p&lt;0.01)</td>
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**Clinical Information**

- O157 cases more severe than non-O157 cases
  - More bloody diarrhea (p<0.001), HUS (p=0.046), and hospitalization (p<0.001)
  - Unconfirmed and confirmed non-O157 patients report similar symptoms

**LABORATORY RESULTS**

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<th>2008-2011: 468 Tests Performed at PHL for 413 Patients</th>
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<td>273 Patients STEC Positive</td>
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<td>135 Patients STEC Negative</td>
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**Conclusions**

- O157 decreased while non-O157 increased
- Consistent with national trends
- Increase in non-O157 reports may reflect change in testing practices at clinical labs
- STEC rates much lower in NYC than FoodNet
- Food and animal exposures may be different in NYC than nationally
- Testing practices may be different in NYC than nationally
- O157 cases more severe than non-O157 cases
- Consistent with national findings
- Further studies needed to evaluate if virulence of non-O157 STEC varies by serotype
- Confirmation testing reveals that 1/3 of patients test negative for Shiga toxin at PHL
- As many clinical laboratories only test for presence of Shiga toxin without attempting to isolate organism, it is important that they continue to send specimens to PHL for confirmation
- As clinical labs identify more non-O157, there is an increased burden at PHLs due to need for confirmation and serotyping

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