Legionnaires’ Disease Outbreak in the South Bronx – July-August 2015

Presented by Keren Landman, MD on behalf of the NYC Department of Health and Mental Hygiene, the NYC Public Health Laboratory, and the NYS Laboratory at Wadsworth

About Legionella pneumophila

- Ubiquitous in environment, thrives in biofilms in man-made water systems
  - Transmitted by aerosolization of water in these systems
- Causes pneumonia in adults >65 or with comorbidities/smoking histories
  - Incubation period 2-14 days
- Difficult to culture
  - Culture is gold standard for environmental detection
  - NYS lab also uses PCR → rapid decision-making
- Usually clinically diagnosed by urine antigen
  - However, no isolate → no clinical-environmental link

Legionnaires’ disease surveillance at NYC DOHMH

- Case-reporting by clinical laboratories and health care providers
- Daily algorithms:
  - Cases with same Building Identification Number (BIN) over past year
  - Unusual disease clustering in space and time (SaTScan)

First signal

July 8
First case in cluster*

July 20
Investigation initiated due to SaTScan report of 8 cases in 1-mile radius

*Cases are presented by onset date.
First signal

July 20
Investigation initiated due
to SaTScan report of 5 cases
in 1-mile radius

Contact from hospital infection control staff

July 21
Hospital A calls
re: increased
diagnoses of LD

Additional hospitals’ staff reach out

July 21-28
Three other local hospitals
call with increased
diagnoses of LD

Distribution of cases on July 28th

Geographically widespread outbreak → outdoor dissemination → cooling tower likeliest source
**Distribution of cases on July 28th**

Geographically widespread outbreak → outdoor dissemination → cooling tower likeliest source

**What is a cooling tower?**

**Definitions**

- **Outbreak zone**
  - 7 contiguous South Bronx ZIP codes in initial SaTScan cluster

- **Case definition**
  - Clinical/radiologic diagnosis of **pneumonia**
  - **laboratory test** +ve for **Legionella** after July 9th, 2015
  - residence in outbreak zone

**Case/Source Finding**

**Human case-finding**

- Press conferences
- Town halls
- Community outreach to organizations that serve high risk populations
- Telephone calls, in-person visits to Bronx Hospitals
- City-wide conference calls with hospitals
- Collaboration with Chief Medical Examiner
- Epi-X
- Health Advisory Network notifications (HANs)

**Environmental source-finding**

- No registry of all city CTs
  - Partial list/canvassing from city/state agencies
- Old-fashioned epi
  - Notified of OOI case with hotel stay at center of outbreak zone
End of outbreak

Patient Characteristics
(n=133)

- 16 (12%) died
- Median age 55 (range, 29-90 years)
- 54% Black
- 87% with chronic health condition: diabetes, alcoholism, asthma, COPD
- 17% HIV-infected

Cooling tower testing

- 42 towers tested
- Testing algorithm:
  - PCR
  - Culture
  - Immediate remediation

Cooling tower testing
Linking clinical and CT isolates by PFGE
[list all origins or anonymize?]

<table>
<thead>
<tr>
<th>PFGE pattern with SfiI</th>
<th>Origin of isolate</th>
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<tr>
<td></td>
<td>Patient isolates</td>
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<tr>
<td></td>
<td>Opera House Hotel</td>
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<tr>
<td></td>
<td>1201 Lafayette (A)</td>
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<tr>
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<td>Bronx Hall of Justice</td>
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<tr>
<td></td>
<td>Concourse Plaza</td>
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<td></td>
<td>Conway Store</td>
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<tr>
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<td>1201 Lafayette (B)</td>
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<td>Lincoln Hospital</td>
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Outbreak Strain: Patients and Opera House Hotel Cooling Tower match
Non-outbreak Strains

Policy change

- No major U.S. city regulated CTs before this outbreak
- August 11th, 2015: New York City Council hearing on proposed CT legislation
  - Proposed law enforces registration and regular maintenance, testing, and remediation of CTs
- Legislation passed and signed by NYC mayor on August 19th, less than 1 month after the outbreak was declared

Acknowledgments

- NYC DOHMH Bureau of Communicable Diseases
- NYC Public Health Laboratory
- NYS Laboratory at Wadsworth