RECURRENT LEGIONELLA CLUSTERS IN A LARGE MANHATTAN HOTEL

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Aim
- Brief background on Legionella
- Describe what we do
- Describe recurring cluster
- When do we stop thinking about Legionella?

Legionella
- Family of Gram-negative bacteria in water and soil
- *Legionella pneumophila* Serogroup 1 (Lp1): 80% of illness
  - 10s of species and serogroups
- Legionnaires’ disease
  - Pneumonia, cough, fever
  - Age >50 years, smoker, lung disease
  - Onset 2-10 days after exposure

Environmental Sources
- Cooling towers
- Fountains
- Showers
Legionellosis Surveillance in NYC

- It is a reportable disease
- Investigate all positive
  1. Urinary Antigen (UA)
  2. Culture
- Chart review and a case interview
- Case definition for confirmed LD: a radiographic or clinical pneumonia and laboratory diagnosis

Cluster Investigation

- Bureau of Communicable Disease
  - Surveillance
    - Notified of cases through ECLRS
    - Database
  - Chart abstraction and patient interview
  - 2 cases in a building within 1 year or 1 case in a high risk setting
    - Home and work address
    - Weekly automated reportable disease cluster analysis
    - SaTScan
  - Manage contact with building owners and consultants

Investigation Partners

- Bureau of Environmental Sciences and Engineering
  - Public Health Engineers
    - Remediation, permits, guidance
- NYC Public Health Laboratory
  - Environmental samples
  - Serogroup
  - PFGE
Investigation - Hotel

- Midtown Manhattan
  - Tourism – short term stay
  - Local attractions – year round
  - 24 hour
- 32 floors, 1331 guest rooms
  - Opened in 1920s
  - Several owners – name changes
- Shaped like “E”
  - Cooling tower 3rd floor in nook of “E”
  - Bordered on 3 sides by hotel walls - rooms

Investigation - Hotel

- 1997 3 travel cases reported by CDC
- Hotel closed 2009-2011 for renovation
  - 85% of hot and cold water risers changed
- 08/2013 3 cases – 35-62, 66% male
  - Onsets 6/2/2013-8/1/2013
  - 2 travel – France, U.S.A.
  - 1 employee

Investigation 2013 - Hotel

- 2013
  - Potable water system, hot water tanks and cooling tower
    - positive for Lp1 and Lp6
- Legionella Reduction plan
  - Resulted in installation of Cu-Ag disinfection system
    - Installation, calibration and sampling for Cu and Ag
    - Follow up sampling for Legionella
  - Removal of hot water tanks – instantaneous heaters
  - Disinfection of Cooling Tower
  - Flushing of room fixtures

Investigation 2013 - Hotel

- Cu-Ag disinfection System
  - Installed March 2014 – Operational May 2014
  - Quarterly sampling
    - 4/20/2015
    - 11 locations <1CFU/ml and 1 location 1CFU/ml
Investigation 2015 - Hotel

- 05/28/2015 CDC U.K. resident with stay at hotel
- 8 cases – all UAT
  - 4 U.K.
  - Germany, France and the Netherlands
  - California
- Check in 05/06 - 06/20
- Onsets 05/16 – 06/28

Sampling of potable water system and cooling tower by
- Hotel consultants
- European consultant for European travel agents
- NYCDOHMH
- 179 samples taken (water and swab)

Remediation 2015 - Hotel

- Building:
  - Follow up on hot water complaints
  - Check valves throughout potable water circulation system
  - Clean cold water tanks – stagnant water?
  - Monitoring of Cu-Ag system
  - Real time
- Cooling tower
  - Disinfect
  - Mechanical cleaning
  - Mechanical part inspection
  - Follow up sampling for Legionella

Investigation 2015 - Hotel

Building water system and cooling tower positive Lp1:
- 2 sink faucets 3 – 30 CFU/ml
- Water dispenser
- Cooling tower >3000 CFU/ml Lp1
- Cu and Ag levels below recommended
When do we stop thinking about *Legionella*?

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<thead>
<tr>
<th>Building plumbing and water supply</th>
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<tr>
<td>Tracking of complaints and maintenance issues -&gt; dead legs?</td>
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<th>Building disinfection systems</th>
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<td>Properly maintained and monitored</td>
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<td>Cost?</td>
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<td>Training?</td>
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<tr>
<td>Maintenance plan</td>
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<td>Process control</td>
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<td>pH, temperature, biocide (Cl), conductivity, HPC, <em>Legionella</em> testing</td>
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<td>Mechanical integrity</td>
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<td>Multiple parties – build, biocide treatment, maintenance</td>
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