

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





Image: CDC Public Health Image Library


Environmental Sources



Cooling towers





Fountains

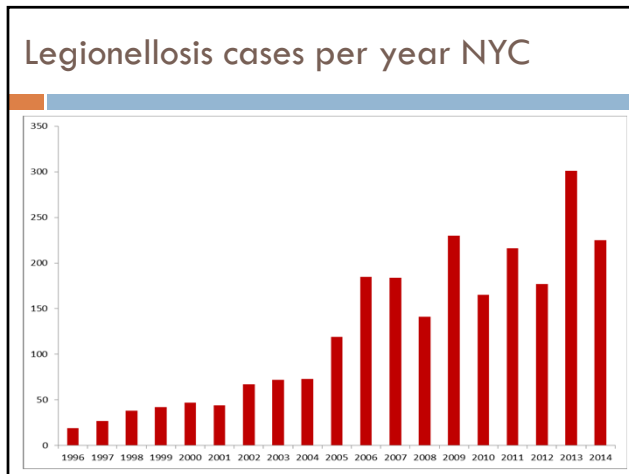


Showers

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

Investigation 2015 - Hotel

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

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

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*

When do we stop thinking about *Legionella* ?

- ▣ Building plumbing and water supply
 - Tracking of complaints and maintenance issues -> dead legs?
- ▣ Building disinfection systems
 - Properly maintained and monitored
 - Cost?
 - Training?
- ▣ Cooling towers
 - Maintenance plan
 - Process control
 - pH, temperature, biocide (Cl), conductivity, HPC, *Legionella* testing
 - Mechanical integrity
 - Multiple parties – build, biocide treatment, maintenance