



**Department
of Health**

Nursing Home Guidance for Prevention and Control of Legionnaires' Disease



Outline

- Emergency *Legionella* regulation
- Brief overview of *Legionella* and Legionnaires' disease
- Clinical guidelines
- Infection prevention and control guidelines
- Environmental guidelines
- References and resources

New Regulation

- Approved as an emergency regulation by the Public Health and Health Planning Council on August 17, 2015
- Available on NYSDOH website
 - http://www.health.ny.gov/diseases/communicable/legionellosis/docs/emerg_regs.pdf

New Regulation

- Focus on cooling towers
- However, includes a section for general hospitals and nursing homes
 - *Legionella* sampling plan for potable water systems

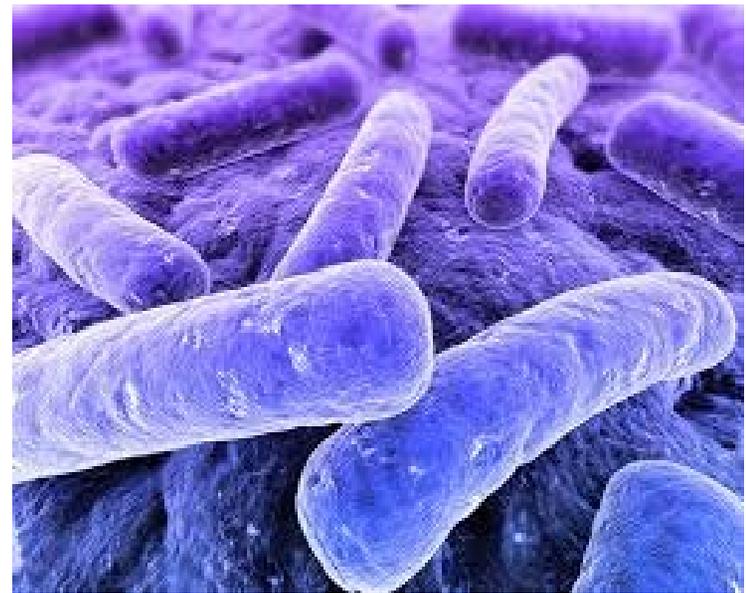


Legionellosis

- A bacterial infection causing:
 - Legionnaires' disease
 - Progressive pneumonia
 - 2-10 day incubation period
 - Pontiac Fever
 - Self-limiting, flu-like illness (no pneumonia)
 - 1-2 day incubation period
 - Rarely, can infect other sites

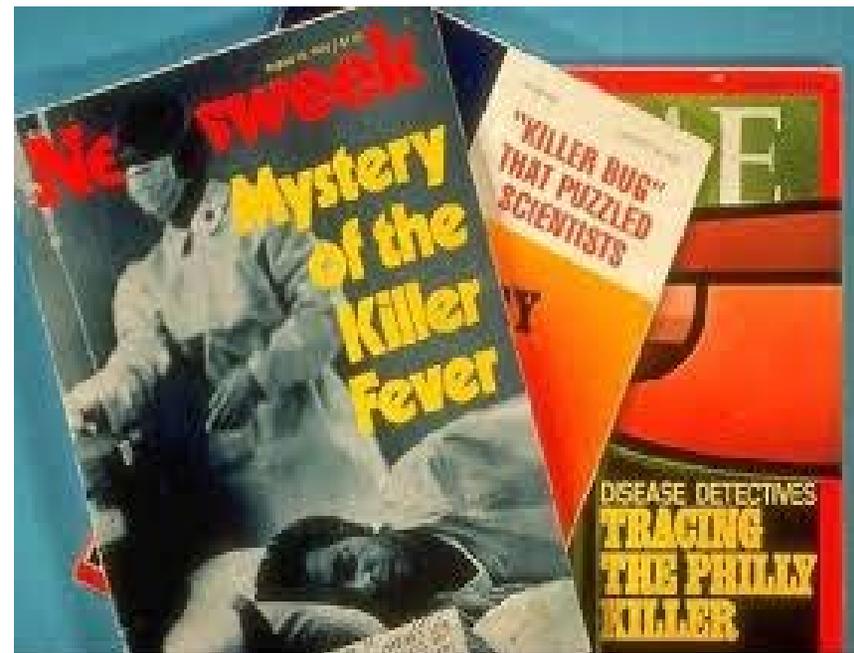
Legionella

- Ubiquitous, aquatic organism
- First isolated in the lab in 1943
- Facultative intracellular parasite



Legionnaires' Disease (LD)

- American Legion convention in Philadelphia, 1976
 - 200+ ill
 - 20+ deaths
 - Illness linked to hotel air conditioning system

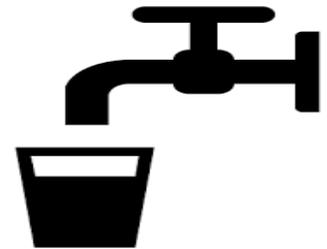


Epidemiology

- *L. pneumophila* causes 90% of infections
 - Serogroup 1 most common cause of disease
 - Serogroups 2-6 also can cause disease
- *L. micdadei*, *L. bozemanii*, *L. dumoffii*, *L. longbeachii*, *L. anisa* also cause human disease

Epidemiology

- *Legionella* prefers aquatic environments
 - Ideal growth at 77-115° F (25 - 46° C)
- LD cases have been linked to:
 - Potable water systems
 - Cooling towers
 - Showers/faucets
 - Hot tubs, whirlpool spas
 - Respiratory therapy equipment
 - Room-air humidifiers



Epidemiology

- Human host factors
 - Greatest risk group: Immunosuppression
 - Organ transplant, hematologic malignancies, end-stage renal disease
 - Moderate risk group: Other factors
 - Diabetes mellitus
 - Chronic lung disease
 - Non-hematologic malignancies
 - HIV
 - Elderly (≥ 50 years)
 - Tobacco smoking
 - Rare among children

Clinical Considerations

- LD is not clinically distinguishable from pneumonia caused by other agents
 - Incubation period 2-10 days
 - Pneumonia developing 48+ hours after admission is considered healthcare facility-associated
 - Maintain heightened awareness in all healthcare facility-associated pneumonia, especially persons at greatest or moderate risk

Clinical Considerations

- Diagnostic work up should include the following:
 - Chest radiograph
 - Respiratory cultures for *Legionella* spp.
 - Requires special laboratory techniques; routine sputum culture will not grow *Legionella* spp.
 - Alert lab that *Legionella* is suspected!
 - *Legionella* urinary antigen test (UAT)
 - Not reliable for serogroups other than *L. pneumophila* 1

Clinical Considerations

- Additional lab testing
 - Direct fluorescent antibody (DFA) staining
 - Polymerase chain reaction (PCR)
 - Identifies both living and dead organisms
 - Presents challenge in diagnosis and comparison of clinical and environmental isolates
 - Serology
 - Requires acute and convalescent phase sera 2-4 weeks apart
 - Not helpful in a timely manner

Clinical guidelines

- When isolates are positive for *Legionella* spp.:
 - Submit to NYSDOH Wadsworth Laboratories
 - Facilities within NYC should submit to NYCDOHMH Public Health Laboratory
 - Notify infection control within the facility

Infection Control

- Close collaboration with multidisciplinary team is essential
 - Infection control
 - Physical facilities management
 - Engineering
 - Clinicians
 - Laboratory
 - Hospital Management

Infection Control

- Residents at greatest or moderate risk should be tested for *Legionella* if they develop a healthcare facility-associated pneumonia
- Report all community- and healthcare facility-associated cases to public health within 24 hours of diagnosis

Infection Control

- Respiratory devices/equipment
 - Use sterile water for rinsing or filling reservoirs
 - If reusable, follow manufacturer instructions for cleaning and disinfection
 - This includes patient equipment brought from home



Infection Control

- Guidelines for “protective environments” are outlined in the NYSDOH document released 8/10/15
 - Does not apply to most nursing homes
 - Pertain to protecting patients with stem cell and solid organ transplants from exposure to potentially contaminated water

New Regulation

- Emergency regulation requires:
 - “All general hospitals and residential health care facilities, as defined in Article 28 of the Public Health Law, shall, as the department may determine appropriate: (1) adopt a Legionella sampling plan for its facilities’ potable water distribution system; (2) report the results of such sampling; and (3) take necessary responsive actions. (b) With respect to such general hospitals and residential health care facilities, the department shall investigate to what extent, if any, requirements more stringent than those set forth in the Part are warranted.”

Infection Control

- If single or multiple cases of LD detected
 - Report to NYSDOH and local health department
 - NYSDOH will provide consultation
 - Investigations in NYC conducted jointly with NYCDOHMH

Surveillance

- Investigations of one or more healthcare facility-associated cases might involve:
 - Retrospective and prospective surveillance for additional cases
 - Review of facility's potable water and cooling systems
 - Molecular analysis of clinical and environmental cultures
 - Reinforcement of published prevention guidelines
 - Tap water restrictions for immunocompromised residents
 - Resident notification

Environmental Assessment

A complete environmental assessment includes:

- Facility characteristics
- Source of water supply and treatment
- Heating and cooling components
- Construction issues

Environmental Assessment Form (EAF)

NYSDOH - V 1.11

Environmental Assessment of Water Systems in Healthcare Settings

1. Type of Assessment (check as appropriate):

On-site assessment? Telephone assessment
 Mailed/emailed prior to telephone conference

2. Information about the person doing the assessment:

Name: _____
 Job title: _____
 Facility name: _____
 Facility address: _____

 Date of assessment: _____

3. Contact information:

Telephone number (work or cell?): _____
 FAX number _____
 Email _____

Instructions and Notes to the User (please read):

This information collection tool may be used where a thorough understanding of the potable water system of a healthcare facility is needed during a public health investigation. It can be used by a hospital

Available on the Health Commerce System

<https://commerce.health.state.ny.us/hcsportal/docs/Source/hin/hinapps/envhlt/water/EAHealthcare.pdf>



Control Measures – Short Term

- Heat and Flush:
 - 160° F (71° C) for > 5 minutes at each tap
- Hyperchlorination
 - Minimum 2.0 ppm free chlorine residual for no less than two hours but no more than 24 hours.

To determine re-growth for the above: Re-sample at least 7 days but no later than 4 weeks after above treatments.

- Low level continuous chlorination:
 - Target concentration level – 0.5 ppm at most distal locations
 - Re-sample in 7 to 10 days.
- Copper-silver ionization (CSI)
 - Usually 30 – 60 days of treatment
 - Re-sample over the next 4 months to confirm continued efficacy
 - Reapply or decide on another long-term treatment

Control Measures – Long Term

- Copper-silver ionization (CSI)
- Chlorine dioxide
- Additional steps in conjunction with the above:
 - Maintaining a minimum return temperature of 124° F (51° C) with anti-scalding valve installation
 - Continuous chlorination – maintain free chlorine residual of 0.2 ppm at outlets
 - Periodic superheating/flushing
 - Automated temperature control (balancing hot water delivery)
 - Other (chloramination, UV disinfection)

Environmental surveillance for *Legionella*

- Culture is the gold standard for environmental surveillance
 - Use a CDC certified ELITE lab
- Culturing in the absence of disease
 - Be prepared to respond to positive sample results.



Environmental surveillance for *Legionella*

- Considerations for culturing in the presence of disease
 - Sampling locations based on
 - History of disease in facility
 - Physical plant structure (EAF)
 - Cases definitely or possibly associated with the facility
- Distinguish between *L. pneumophila* and other *Legionella* spp.



Culture Interpretation

If the number of positive sampling sites is:

>30% - acute (short-term) treatment is often recommended; the system needs to be reassessed to determine the efficacy of the treatment

=30% - treatment may need to be considered, dependent upon *Legionella* species. This is a borderline condition if the number of colony forming units is quite high (generally double-digit colony count values per 100 ml sample), even if the number of positive sites is 30%, an acute treatment may be advisable.

<30% - continue to monitor the facility.

Guideline for *Legionella* spp. Levels of Concern

- Primary concern: *Legionella pneumophila* serotype 1
- Secondary concern: *Legionella pneumophila* serotypes 2-6
- Less concerning: sporadic isolates of *L. pneumophila* serotypes 7-16 and non-*pneumophila* spp.
- Exceptions from above rules:
 - A facility is extensively colonized with any *L. pneumophila* 7-14 and/or non-*pneumophila*;
 - Extensive occurrence of *L. anisa*, *L. micdadei*, *L. bozemanii*
 - Disease in the facility has been caused by *L. pneumophila* 7-16 and any non-*pneumophila* spp.

Questions



Contact Us

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Resources

NYSDOH Legionella Website:

<https://www.health.ny.gov/diseases/communicable/legionellosis/>

CDC Legionella Website: <http://www.cdc.gov/legionella/index.html>

American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE): www.ashrae.org