Legionellosis

Legionellosis is a bacterial respiratory infection which can result in severe pneumonia and death. Most cases are sporadic but legionellosis is an important public health issue because outbreaks can occur in hotels, communities, healthcare facilities, and other settings.

Legionnaires’ disease was first recognized in 1976 when an outbreak affected more than 200 people and caused more than 30 deaths, mainly among attendees of a Legionnaires’ convention being held at a Philadelphia hotel.

Legionellosis is caused by the bacteria Legionella, with the species L. pneumophila accounting for the majority of cases. The disease involves two clinically distinct syndromes: Pontiac fever, a self-limited flu-like illness without pneumonia; and Legionnaires’ disease, a potentially fatal pneumonia with initial symptoms of fever, cough, myalgias, malaise, and sometimes diarrhea progressing to symptoms of pneumonia which can be severe. The case fatality rate for Legionnaires’ disease is 5-30%.

The incubation period for Pontiac fever is 24-72 hours after exposure, while the incubation period for Legionnaires’ disease is 2-14 days after exposure.

Only about one out of 20 people who get infected with Legionella bacteria will develop Legionnaires’ disease. Health conditions that increase the risk of pneumonia include: age fifty years or older, chronic kidney or liver failure, diabetes, systemic malignancy, chronic lung disease (like COPD or emphysema), current or former smoker, and immune system disorders or immunosuppressive treatment.
Exposure is almost always through inhalation of aerosolized water contaminated with *Legionella* bacteria. Although the bacteria are commonly found in natural or artificial freshwater environments, there are rarely sufficient quantities of *Legionella* to cause an infection. Factors that allow the bacteria to amplify to higher concentrations that can cause disease include higher water temperatures (77-108°F), stagnation, sediments, biofilms, and the presence of amoebae.

Epidemiologic risk factors for exposure to *Legionella* include recent travel with an overnight stay outside of the home, exposure to whirlpool spas, and maintenance work or repairs on domestic plumbing. Nationally, legionellosis outbreaks have been associated with potable water systems, whirlpool spas, and cooling towers. Such sources promote both amplification and aerosolization of contaminated water. Hotels, hospitals, long-term care facilities, and cruise ships have also been sites of outbreaks. Recently, legionellosis has been in the news due to a large outbreak associated with cooling towers in New York City.

A local health jurisdiction receiving a legionellosis case notification performs a detailed patient interview, with the information collated at the state and federal levels, and commonalities in exposures investigated as indicated. The Washington State Department of Health legionellosis guideline has more information about case investigations (see Resources). In Washington there have been several dozen legionellosis cases and several associated deaths reported each year over the past decade. Increased awareness and testing may result in more cases being diagnosed.

**Patient Management**

Clinical suspicion and proper diagnostic testing for legionellosis are necessary to identify and treat patients appropriately. Subsequent investigation of cases may lead to identification of an environmental source of *Legionella* where other susceptible persons are at risk of exposure. According to the Centers for Disease Control and Prevention (CDC), healthcare providers should suspect legionellosis and order *Legionella*-specific testing on any:
• Patient with a consistent illness who has failed antibiotic therapy
• Patient with severe pneumonia, in particular those requiring intensive care
• Immunocompromised patient with pneumonia
• Patient with pneumonia in the setting of a legionellosis outbreak
• Patient with a travel history (within two weeks of onset)
• Patient suspected of having healthcare-associated pneumonia

Both urine antigen and culture of respiratory secretions on special media are the preferred diagnostic tests for Legionnaires’ disease. Urine antigen tests are rapid immunoassays with good sensitivity for detecting *L. pneumophila* serogroup 1 antigen but very poor sensitivity for detecting other *L. pneumophila* serogroups and other *Legionella* species. Lower respiratory tract secretions are the preferred specimen for culture. Although less rapid than urine antigen tests, cultures detect all *Legionella* species and allow comparison between patient and environmental specimens during outbreak investigations. Paired serology or direct fluorescent antibody stain alone are not recommended for diagnosis of legionellosis due to poor timeliness and poor sensitivity, respectively.

The Infectious Disease Society of America and the American Thoracic Society published guidelines on the management of community-acquired and hospital-acquired pneumonias in adults including those due to *Legionella*. Information for clinicians about legionellosis is also available from CDC (see Resources).

**Environmental Testing**

CDC maintains extensive information regarding environmental testing for *Legionella*. CDC has certified select sites as Environmental *Legionella* Isolation Techniques Evaluation (ELITE) laboratories which are able to perform environmental testing for *Legionella*. This work is often done in consultation with industrial hygienists.

In the context of an outbreak, the Washington State Public Health Laboratories can perform pulse field gel electrophoresis (PFGE) on patient isolates and on any environmental isolates that may be obtained. This ability to match patient and environmental isolates underscores the importance of obtaining respiratory specimen for cultures and not just urine (for urine antigen testing) for patients with suspected legionellosis. In an outbreak investigation, several sections within Department of Health, including Office of
Communicable Disease Epidemiology, Office of Transient Accommodations, Office of Drinking Water, Water Recreation Program and others may work together with the local health jurisdiction to investigate and respond.

Legionellosis is nationally notifiable. In Washington, healthcare providers, healthcare facilities, and laboratories must report patients with legionellosis within 24 hours of diagnosis to the local health jurisdiction where the patient resides. In addition, laboratories must submit *Legionella* isolates to the Washington State Public Health Laboratories within two business days. By rapidly identifying cluster of cases, public health agencies can recognize, investigate and stop outbreaks of legionellosis.

**Resources**

CDC clinician resources: [http://www.cdc.gov/legionella/clinicians.html](http://www.cdc.gov/legionella/clinicians.html)


Guidelines on management of community-acquired pneumonia in adults: [http://cid.oxfordjournals.org/content/44/Supplement_2/S27.full](http://cid.oxfordjournals.org/content/44/Supplement_2/S27.full)