

# *epi*TRENDS

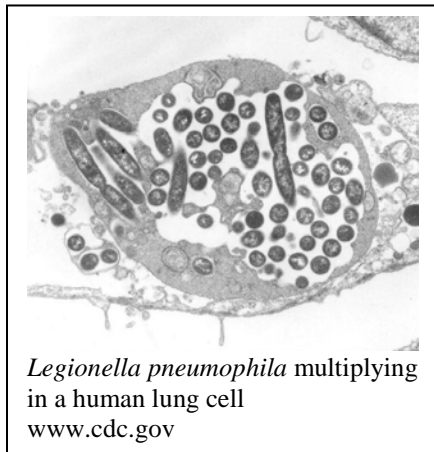
A Monthly Bulletin on Epidemiology and Public Health Practice in Washington

## **Legionnaires' disease**

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.

## **Legionellosis**

Legionellosis 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 numerous different *Legionella* species and serogroups but most recognized infections are due to *L. pneumophila* serogroup 1. The extent to which this is due to testing bias is unclear since only *L. pneumophila* serogroup 1 is identified via commonly used urine antigen tests; other species and serogroups must be identified through PCR or culture, tests which are less commonly ordered.

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. Health conditions that increase the risk of pneumonia include: age fifty years or older, chronic kidney or liver failure, diabetes, systemic malignancy,

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P.O. Box 47812  
Olympia, WA 98504-7812

John Wiesman, DrPH, MPH  
Secretary of Health

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State Health Officer

Scott Lindquist, MD, MPH  
State Epidemiologist,  
Communicable Disease

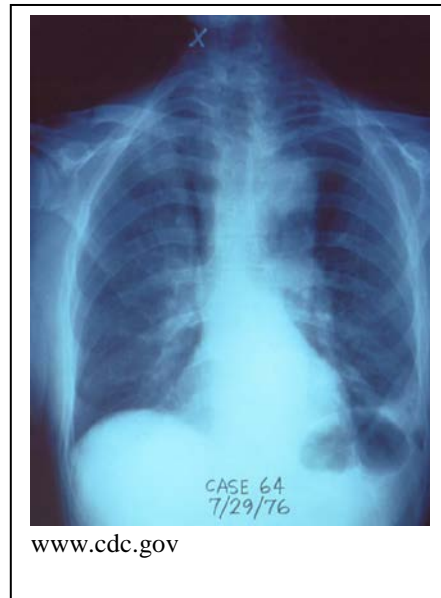
Jerrod Davis, P.E.  
Assistant Secretary  
Disease Control and Health  
Statistics

Sherryl Terletter  
Managing Editor

Marcia J. Goldoft, MD, MPH  
Scientific Editor

chronic lung disease (like COPD or emphysema), current or former smoker, and immune system disorders or immunosuppressive treatment. The incubation period for Pontiac fever is 24-72 hours after exposure, while the incubation period for Legionnaires' disease is 2-10 days after exposure.

Exposure is 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 include higher water temperatures (77°-108° F), stagnation, sediments, biofilms, and the presence of amoebae. Attack rates are low for Legionnaires' disease (the Centers for Disease Control and Prevention [CDC] estimate that less than 5 percent of exposed persons develop Legionnaires' disease in the context of an identified outbreak) but high for Pontiac fever (greater than 90 percent).



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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 an increased emphasis on primary prevention via water management planning and the concomitant release of numerous CDC materials on this topic, and because of multiple outbreaks nationwide.

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). During recent years in Washington, 50 to 70 legionellosis cases have been reported annually, with usually 10 percent of cases being fatal. Increased awareness and testing may result in more cases being diagnosed.

Clinical suspicion and proper diagnostic testing for legionellosis are necessary to identify and treat patients appropriately. Subsequent

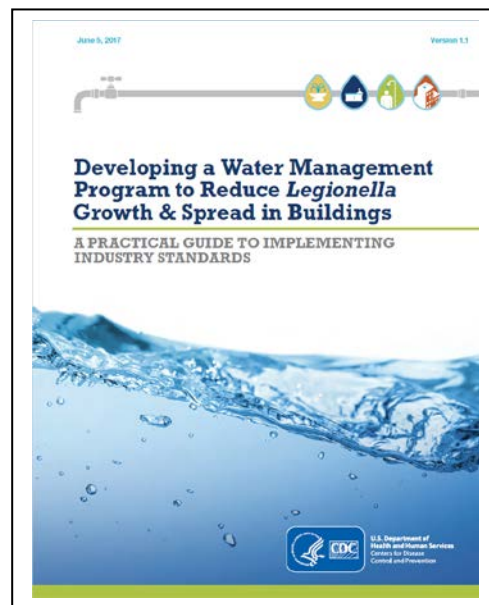
investigation of cases may lead to identification of an environmental source of *Legionella* where other susceptible persons are at risk of exposure. According to the CDC, healthcare providers should suspect legionellosis and order *Legionella*-specific testing on any patient with:

- a consistent illness who has failed antibiotic therapy
- severe pneumonia, in particular a case requiring intensive care
- pneumonia and immunocompromise
- pneumonia in the setting of a legionellosis outbreak
- a travel history in the exposure period
- suspected healthcare-associated pneumonia

For suspected cases, clinicians should collect *both* urine and respiratory specimen (for urine antigen test and for culture, respectively.) Urine antigen tests are rapid but able to identify only *Legionella pneumophila* serogroup 1 infections. Cultures of respiratory specimens are necessary to detect all *Legionella* species and serogroups and to allow comparison between patient and environmental specimens during case and cluster investigations. 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).

CDC recommend that many facilities have water management programs for primary prevention of Legionnaires' disease and other waterborne illnesses. In June 2017, the Centers for Medicare & Medicaid Services released a survey and certification memo stating that healthcare facilities should develop and implement water management programs to reduce the risk for *Legionella* and other pathogens in their water systems (see Resources.)

CDC maintain extensive information regarding environmental testing for *Legionella*. In addition, CDC-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 a cluster or healthcare investigation, several sections within Department of Health, including Office of Communicable Disease Epidemiology, Division of Environmental Public Health, Division of Health Services Quality Assurance and others may work together with the local health jurisdiction to investigate and respond. In the context of a cluster investigation or healthcare associated investigation, environmental isolates and clinical isolates can be sent by the Washington State Public Health Laboratories to CDC for genetic fingerprinting. 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.

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 a 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>

CDC water management information: <https://www.cdc.gov/legionella/maintenance/wmp-toolkit.html>

DOH surveillance and investigation guideline:  
<http://www.doh.wa.gov/Portals/1/Documents/5100/420-058-Guideline-Legionellosis.pdf>