

LEGIONELLOSIS

1. **Agent:** *Legionella* species are weakly staining gram-negative bacilli, which do not grow on standard bacteriologic media. More than 30 species have been identified, but *Legionella pneumophila* is responsible for 80%- 90% of clinical infections. Six serogroups of *L. pneumophila* are known to cause disease in humans, but serogroup 1 is most commonly associated with disease.

2. **Identification:** Two clinically and epidemiologically distinct syndromes: pneumonia (Legionnaires' disease) and Pontiac fever.

a. **Symptoms:**

Legionnaires' disease: Clinical manifestations and severity may vary between individuals. Typical presentation is subacute onset of malaise, fever, headache, muscle aches, and non-productive cough, followed in 24-48 hours by rapidly rising temperature, relative bradycardia, chills, progressive pneumonia, and evidence of multi-system involvement including diarrhea, changes in mental status, hyponatremia, and abnormal kidney and liver function tests. Initial chest X-rays commonly show patchy bilateral infiltrates, with rapid progression to consolidation.

Pontiac fever: An acute, self-limiting flu-like illness, with headache, sore throat, fever, and myalgia, without pneumonia.

b. **Differential Diagnosis:** Other known causes of pneumonia and febrile respiratory diseases.

c. **Diagnosis:** High index of suspicion; failure to respond to therapy with penicillins, cephalosporins, or aminoglycosides; isolation of organism on special media; 4-fold rise in indirect fluorescent antibody (IFA) titer to >1:128 taken within first 7 days of illness and 3-6 weeks later; direct fluorescent antibody (DFA) stain of lung tissue or sputum; urinary antigen testing by enzyme immunoassay (EIA) or immunochromatography; DNA probe testing of clinical specimens. A single elevated antibody titer does not confirm a case of Legionnaires' disease because IFA titers \geq 1:256 are found in 1-20% of healthy adults.

3. **Incubation:**

Legionnaires' disease: 2-10 days, usually 5-6 days.

Pontiac fever: 5-66 hours, usually 24-48 hours.

4. **Reservoir:** *Legionella* organisms are common inhabitants of aquatic environments. Excavated soil, humidifiers, and air conditioning evaporative condensers and cooling towers have been implicated epidemiologically. The organism has also been isolated from hot and cold water taps and showers, and from creek and pond water and surrounding soil.

6. **Transmission:** Inhalation of aerosols of water contaminated with *Legionella* sp. are the primary mechanisms by which these organisms enter a patient's respiratory tract; aspiration of contaminated potable water or pharyngeal colonization.

7. **Communicability:** Person to person transmission has not been documented.

8. **Specific Treatment:** Quinalones are now the treatment of choice, levoquin 500 mg intravenously daily or ciprofloxacin 400 mg intravenously every 12 hours. Other treatment options include intravenous azithromycin 500 mg daily or erythromycin 2 g to 4 g intravenous daily with the addition of rifampin 600 mg daily for the first 3-5 days for more severe cases. The standard length of therapy is from 14 to 21 days depending of disease severity.

Note: rifampin stains contact lenses and turns urine orange-red. It is not recommended for use during pregnancy. It also may decrease the effectiveness of oral contraceptives.

9. **Immunity:** Apparently lifelong to specific strains.

REPORTING PROCEDURES

1. Reportable. (Title 17, Section 2500, *California Code of Regulations*).

2. **Report Form: LEGIONELLOSIS CASE REPORT (CDC 52.56, 1/02 fillable).** ACDC will complete it.

3. **Epidemiologic Data:**

a. Occupation.

b. History of travel, convention attendance, or hospital stays or visits during the 2 weeks before onset of illness.

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- c. Recent renovation, remodeling, construction at home or office. Presence of air conditioning cooling towers.
 - d. Any history of chronic disease, alcohol use, smoking, organ transplant, dialysis, or who is or has been immunocompromised for whatever reason.
- 4. Serologic diagnosis by immunofluorescent antibody test (IFA) requires both acute and convalescent sera to make the diagnosis of legionellosis. Submit refrigerated spun sera to specialized commercial laboratory or the Public Health Laboratory for testing. The first specimen should be taken within the first 7 days of illness and the second specimen 3 to 4 weeks after onset of symptoms.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigations of outbreaks will be coordinated by ACDC.

CASE: Precautions: None.

CONTACTS: No restrictions.

CARRIERS: Carrier state not demonstrated to date.

PREVENTION-EDUCATION

Appropriate maintenance and disinfection of cooling tower waters and adequate treatment of water supplies where these sources have been implicated. Medical facilities should maintain potable heated water at $\geq 50^{\circ}$ C or $< 20^{\circ}$ C at the tap or chlorinate heated water to achieve 1-2 mg/L of free residual chlorine at the tap, especially in areas where immunosuppressed and other high-risk patients are located. Tap water should not be used for consumption, irrigation of nasogastric tubes or any activity related to respiratory therapy, such as the washing of nebulizers, tubing and humidifiers.

DIAGNOSTIC PROCEDURES

1. Culture of respiratory secretions and/or tissue is the preferred method of diagnosis. Culturing permits identification of the specific *Legionella* species and sero-group. It is essential where outbreaks are suspected so that environmental sources can be linked to patient isolates. Culturing requires specialized media; consult the Public Health Laboratory.
2. Urine antigen detection is a very sensitive test for *L. pneumophila* serogroup-1 and is readily available through commercial laboratories and the Public Health Laboratory.
3. Direct fluorescent antigen (DFA) detection on respiratory secretions or tissue specimens can be performed at the Public Health Laboratory.