

## Legionellosis



### Case Definition

Clinically compatible illness (fever, cough and pneumonia) plus one of the following:

- isolation or antigen detection of *L. pneumophila* from a site which is normally sterile (e.g., bronchial washings);
- a four-fold or greater rise in antibody titre, to  $\geq 1:128$  against *L. pneumophila*;
- positive urinary antigen for *L. pneumophila* (not very sensitive).

### Reporting Requirements

- All positive laboratory tests for legionellosis are reportable by laboratory.
- All clinical cases of legionellosis are reportable by attending health care professional.

### Clinical Presentation/Natural History

Legionellosis is an acute bacterial disease with two currently recognized, distinct clinical and epidemiological manifestations.

#### Legionnaire Disease

Legionnaire disease is characterized by anorexia, malaise, headache and myalgias. Within a day, there is usually a rapidly rising fever associated with chills. Temperatures commonly reach 39°C-40.5°C. A non-productive cough, abdominal pain and diarrhea are common, as is leukocytosis. The clinical condition may progress to multi-system failure with confusion, depression, disorientation, increasing respiratory distress and disseminated legionellosis. Prolonged convalescence and significant case fatality rates (as high as 39%) can occur, especially in persons with immunosuppression or chronic medical conditions. A chest X-ray is usually consistent with pneumonia.

#### Pontiac Fever

Initial symptoms are as above, but without pneumonia or progression to multi-system

involvement. Rapid recovery without sequelae is the rule. This syndrome may represent reaction to inhaled antigen, rather than bacterial invasion.

### Etiology

*Legionellae* are poorly staining, gram-negative bacilli. There are at least 35 species of *Legionella*, but *Legionella pneumophila* serogroups 1, 4 and 6 are responsible for more than 90% of clinical disease.

### Epidemiology

**Reservoir:** The organism is ubiquitous in nature, particularly in aquatic environments. Since the major outbreak in Pontiac, Michigan in 1976, other outbreaks and sporadic cases have been linked to air conditioning cooling towers, evaporative condensers, humidifiers (including household humidifiers), whirlpool spas, respiratory therapy devices, decorative fountains and potable water systems (in hospitals, for example).

**Transmission:** Transmission is thought to be by aerosolization of water containing *L. pneumophila*. The organism can survive for years in water at 2°C-8°C and is resistant to usual levels of chlorination.

#### Occurrence:

**General:** The earliest documented case of legionellosis occurred in 1947, with the first documented outbreak in Minnesota in 1957. Cases have been reported in Canada, the United States, Europe, Australia, Africa and South America. Cases are more common in summer and autumn. Outbreaks of legionellosis usually occur with low attack rates (0.1-5%) in the population at risk.

**Manitoba:** Ten cases of legionellosis were reported in Manitoba in 1995 and 1999.

#### Incubation Period:

- Legionnaire disease: two to 10 days (most often five to six days).
- Pontiac fever: five to 66 hours (most often 24 to 48 hours).

**Susceptibility and Resistance:** Illness occurs most frequently with increasing age (most cases are at least 50 years of age), especially in persons who smoke and in those with diabetes mellitus, chronic lung disease, renal diseases or malignancy; and in the immunocompromised. The disease is extremely rare in those under 20 years of age. Several outbreaks have occurred among hospitalized patients. Unrecognized infections are common.

**Period of Communicability:** Legionellosis is not transmissible from person-to-person.

## Diagnosis

Diagnosis is by isolation of the organism from respiratory secretions or from a normally sterile site; seroconversion (may require up to eight weeks for antibody levels to peak); a four-fold increase in antibody levels; or positive urinary antigen for *L. pneumophila*. Consider the diagnosis in any cluster of respiratory illness with pneumonia.

## Key Investigations

- History of relevant exposure, particularly to air conditioners, humidifiers, etc.
- Investigate to determine whether the case was community acquired and whether a common source exposure has occurred.

## Control

### Management of Cases:

- Erythromycin is the preferred treatment (2 grams/day in four divided doses). If illness progresses, rifampin can be added. Alternative agents include azithromycin and levofloxacin. Infectious disease consultation is recommended.

### Management of Contacts:

- Contacts are at risk only if exposed to the same source as the patient. The attack rate for legionellosis is quite low, but is high for Pontiac Fever.

## Management of Environment:

- Routine surveillance of environmental sources is not recommended because of the high prevalence of the organism in water, the multiplicity of potential sources, likely recolonization of environmental sources, and the frequency of environmental bacteria in the absence of clinical disease. The following measures are recommended:
  - Cooling towers should undergo regular maintenance and should be drained when not in use. Appropriate biocides should be used to limit the growth of slime-forming organisms.
  - Where clinical cases are linked to a likely environmental source, sampling may be considered, in consultation with the public health inspector and the EnviroTest Laboratory.
  - If it is necessary to attempt to eliminate *L. pneumophila* from a cooling tower or potable water system, the most effective methods are heating to 60°C, and/or superchlorination. As both these procedures have inherent dangers, expert advice is necessary.
  - Tap water should not be used for respiratory therapy devices.

## Management of Outbreaks:

- Search for common exposures among cases and for possible environmental sources of infection. Decontamination of implicated sources by chlorination and/or superheating of water supply have been effective, but at times only temporarily.

## Preventive Measures:

- Avoidance of exposure to aerosolized water.