

Legionellosis Guidance for Clinicians

Each year, reported cases of legionellosis increase as the weather gets warmer and generally peak in the summer or early fall months. *Legionella* bacteria can be found in natural, freshwater environments, but they are generally present in insufficient numbers to cause disease. Water systems such as potable (drinking) water systems, whirlpool spas, and cooling towers provide the conditions needed for *Legionella* growth and transmission-heat, stasis, and aerosolization; therefore, these are common sources of cases and potential outbreaks. The Michigan Department of Health and Human Services (MDHHS) is asking that the clinical community assist in case finding through accurate identification, testing and reporting of all suspected cases of legionellosis.

Epidemiologic Risk Factors for Legionellosis

- Recent travel with an overnight stay outside of the home (up to 14 days prior to symptom onset)
- Recent inpatient or outpatient healthcare exposure (up to 14 days prior to symptom onset)
- Exposure to whirlpool spas
- Recent repairs or maintenance work on domestic plumbing
- Renal or hepatic failure
- Diabetes
- Systemic malignancy
- Smoking
- Immune system disorders
- Age > 50 years

Diagnosing Legionellosis

	Legionnaires' disease	Pontiac fever
Clinical features	Pneumonia, cough, fever	Flu-like illness (fever, chills, malaise) without pneumonia
Radiographic pneumonia	Yes	No
Incubation period	2-14 days after exposure	24-72 hours after exposure
Etiologic agent	<i>Legionella</i> species	<i>Legionella</i> species
Attack rate	< 5%	> 90%
Isolation of organism	Possible	Never
Outcome	Hospitalization common Case-fatality rate: 5- 30%	Hospitalization uncommon Case-fatality rate: 0%

Source: <http://www.cdc.gov/legionella/clinicians.html>

Who to Test for Legionnaires' Disease

- Patients with pneumonia in the setting of a Legionellosis outbreak
- Patients with pneumonia who have failed outpatient antibiotic therapy
- Patients with severe pneumonia, in particular those requiring intensive care
- Patients with pneumonia who are immunocompromised
- Patients with pneumonia who have traveled away from their home within two weeks before the onset of illness
- Patients with pneumonia who have inpatient or outpatient healthcare exposure within the two weeks before the onset of illness

Testing for Legionnaires' Disease

- Urinary antigen (UA) assay and culture of respiratory secretions on selective media are the requested diagnostic tests for Legionnaires' disease
- A lower respiratory specimen for culture for *Legionella* should be collected before the initiation of antibiotics, or as soon as possible thereafter
 - Collect a tracheal aspirate (TA) or bronchoalveolar lavage (BAL) in patients who are intubated or undergoing bronchoscopy
 - Collect a sputum sample in patients who are not intubated or not undergoing bronchoscopy
 - Oropharyngeal or nasopharyngeal swabs are **not** acceptable
- Culture for *Legionella* should specifically be requested so that specimens are placed on the correct growth media. Any clinical specimen remaining from the respiratory culture should be immediately frozen and stored by the hospital laboratory.

Advantages and Disadvantages of Diagnostic Tests

Test	Advantages	Disadvantages
Culture	<ul style="list-style-type: none"> • Clinical & environmental isolates can be compared • Detects all species & serogroups • 100% specific 	<ul style="list-style-type: none"> • Technically difficult • Slow (>5 days to grow) • Sensitivity highly dependent on technical skill • May be affected by antibiotic treatment
Urinary Antigen	<ul style="list-style-type: none"> • 100% specific... • Rapid (same day) 	<ul style="list-style-type: none"> • ...but only for <i>L. pneumophila</i> serogroup 1 (Lp1) [which may account for up to 80% of cases] • Does not allow for molecular comparison to environmental isolates
Serology	<ul style="list-style-type: none"> • Less affected by antibiotic treatment but delays diagnosis • 80-90% sensitive; specificity varies 	<ul style="list-style-type: none"> • Must have paired sera • 5-10% of population has titer 1:≥256. Single acute phase antibody titers of 1: ≥256 do not discriminate between cases of Legionnaires' disease and other causes of community-acquired pneumonia.
DFA	<ul style="list-style-type: none"> • Can be performed on pathologic specimens • >95% specific 	<ul style="list-style-type: none"> • 25-75% sensitive
PCR	<ul style="list-style-type: none"> • Rapid 	<ul style="list-style-type: none"> • Assays vary by laboratory and are not FDA-approved
Sensitivity varies depending on the quality and timing of specimen collection as well as technical skill of the laboratory performing the test		

Clinical Isolates and Shipping

Isolation of *Legionella* from respiratory secretions, lung tissue, pleural fluid, or a normally sterile site is still an important method for diagnosis, despite the convenience and specificity of urinary antigen testing. Investigations of outbreaks of Legionnaires' disease rely on both clinical and environmental isolates. Clinical and environmental isolates can be compared using monoclonal antibody and molecular techniques. Because *Legionella* are commonly found in the environment, clinical isolates are necessary to interpret the findings of an environmental investigation.

The Michigan Department of Health and Human Services state laboratory will test clinical isolates of legionella shipped to the facility free of charge. Please avoid freezing and thawing of isolates. For labs shipping a clinical isolate, a slant is preferred. Slants are preferred and should shipped to the MDHHS BOL overnight (or via courier) on cold packs. The sending of BCYE plates to BOL is discouraged. If plates are the only option, please contact BOL prior to packaging and sending so that assistance may be provided for meeting necessary safety requirements or to discuss being provided with blank slants.

Treatment

Recommended treatment for *Legionella* pneumonia in most patients includes either a fluoroquinolone (e.g., levofloxacin 750 mg once daily) or a macrolide (e.g., azithromycin 1 gram on day one, followed by 500 mg once daily) for a total treatment duration of 10–14 days. Antibiotic regimen and treatment duration may vary depending on specific patient risk factors or comorbidities.

Reporting

Legionellosis is a reportable disease in Michigan. We are asking health care professionals to report both Legionnaires' disease and Pontiac fever cases via the Michigan Disease Surveillance System (MDSS) or directly to the Local Health Department. Physicians are requested to collect and record illness onset dates as part of the patient record. An accurate illness onset date is extremely important to determine the patient's potential environmental exposures and is vital to the case investigation. In patients with chronic respiratory conditions, the first appearance of fever may be a useful indicator of legionellosis onset date.

For additional information, please contact:

Your local county (or district) health department, or the MDHHS Communicable Disease Division at 517-335-8165.