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TO: Healthcare Providers, Healthcare Facilities, Clinical Laboratories, and Local Health Departments (LHDs)

FROM: New York State Department of Health (NYSDOH)
Bureau of Communicable Disease Control (BCDC)

HEALTH ADVISORY: LEGIONELLOSIS

For All Clinical Staff in Internal Medicine, Pulmonary and Intensive Care Medicine, Geriatrics, Primary Care, Infectious Diseases, Emergency Medicine, Family Medicine, Laboratory Medicine, and Infection Control/Epidemiology

SUMMARY

- **New York State has a high burden of legionellosis. In 2018 New York reported more cases of legionellosis than any other state and twice the national incidence. Medical provider recognition of the possibility of Legionnaires' disease (in persons with pneumonia), Pontiac fever (in persons without pneumonia) or Extrapulmonary Legionellosis (in persons with *Legionella* in sites outside of the lungs) coupled with appropriate diagnostic testing is critical to the identification and investigation of community clusters.**
- **While legionellosis occurs year-round, the incidence of illness usually increases during the summer and early fall. Local health departments (LHDs), with the assistance of the NYSDOH, investigate potential time-space clusters of cases as they are recognized.**
- **Legionnaires' disease (LD) cannot be distinguished from other causes of pneumonia on clinical or radiologic grounds, including the virus that causes COVID-19. LD and COVID-19 both cause fever, fatigue, and respiratory illness (including pneumonia). In hospitalized or at-risk patients with suspected pneumonia, test for *Legionella* infection especially if testing for COVID-19 has been negative.**
    - **Culture of the organism from respiratory secretions or tissues is the gold standard for diagnosis.**

    - **When ordering culture, specify that the intent is to identify *Legionella*, as laboratory procedures for identifying this organism are different from standard respiratory specimen cultures.**
    - **Culture from respiratory secretions or tissues has the added benefit of allowing for a molecular comparison of clinical isolates to environmental isolates which can serve to identify a potential source of exposure in the setting of a potential outbreak.**
- ***Legionella* isolates from any clinical specimen should be submitted to the Department's Wadsworth Center Laboratories for serogrouping and whole genome sequencing.**
- **Report legionellosis cases promptly to the LHD where the patient resides.**
    - **LHD contact information is available at https://www.health.ny.gov/contact/contact_information/.**
    - **If you are unable to reach the LHD where the patient resides, please contact the NYSDOH Bureau of Communicable Disease Control at 518.473.4439 during business hours or 866.881.2809 evenings, weekends, and holidays.**

Epidemiology

Between 2018 and 2019, New York reported 2,479 cases of legionellosis. Cases reported in 2018 were the highest number of any state and accounted for 14% of the cases reported nationally. The statewide incidence rate of 7.2 cases per 100,000 population was more than double the national incidence rate of 3.04 cases per 100,000.

Information for Healthcare Providers, Facilities and Clinical Laboratories

Testing for *Legionella* guides clinical treatment of the patient and assists LHDs and NYSDOH with detecting outbreaks and linking cases to potential environmental sources of *Legionella*. This is especially critical for persons at risk for Legionnaires' disease (LD), including but not limited to persons aged 50 years or older; current or former smokers; persons with chronic lung disease, immunocompromising conditions, systemic malignancy, or comorbid conditions like diabetes or renal/hepatic failure; and persons with a history of travel, care at a healthcare facility, or exposure to hot tubs. The case-fatality rate is estimated to be 9% for community-acquired LD.

Empiric treatment of community-acquired pneumonia in hospitalized patients should include adequate coverage for *Legionella* with either a macrolide (e.g., azithromycin) or a respiratory fluoroquinolone (e.g., levofloxacin). Full detail on treatment regimens is available from the Infectious Diseases Society of America at

https://doi.org/10.1086/425921 and the American Thoracic Society at https://www.atsjournals.org/doi/full/10.1164/rccm.201908-1581ST. Respiratory tract specimens for *Legionella* culture should ideally be obtained before initiation of antibiotics, although antibiotics should not be delayed in order to obtain a specimen.

Pontiac fever is a less severe illness than LD. Pontiac fever symptoms are primarily fever and muscle aches. Symptoms begin between a few hours to 3 days after exposure to *Legionella* and usually last less than a week. Persons with Pontiac fever do not have pneumonia.

Extrapulmonary legionellosis is rare. However, *Legionella* has been identified as the cause of clinical infections as diverse as endocarditis, wound infections, joint infections, and graft infections, among others. A diagnosis of extrapulmonary legionellosis is made when there is clinical evidence of disease at an extrapulmonary site and diagnostic testing indicates evidence of *Legionella* at that site.

Additional information for clinicians on LD is available at the Centers for Disease and Control and Prevention's Legionellosis Resource Site: https://www.cdc.gov/legionella/index.html.

Diagnostic Testing

- **Culture** of the organism from lower respiratory secretions or tissues is the gold standard for diagnosis of Legionnaires' disease. Culture has the added benefit of allowing comparison of clinical isolates and environmental isolates to identify a potential source of infection in the setting of a potential outbreak. Please note the following regarding the diagnosis of legionellosis:
    - The best specimens for culturing *Legionella* are sputum or bronchoalveolar lavage fluid. *Legionella* culture requires specialized media (buffered charcoal yeast extract agar {BCYE}). Please specifically request that the clinical specimen be cultured for *Legionella* (not a general respiratory bacterial culture) and alert your microbiology laboratory that legionellosis is in the differential diagnosis.
- **Polymerase chain reaction (PCR)** can be performed on sputum or pathologic specimens with a high degree of sensitivity and specificity. It can detect *Legionella pneumophila* serogroup 1 as well as other *Legionella* species and subgroups. However, availability may be limited.
- **Urine antigen testing (UAT)** is widely available as a rapid method for detecting *Legionella*. UAT is most sensitive for detecting *L. pneumophila* serogroup 1. Although *L. pneumophila* serogroup 1 accounts for most legionellosis cases, a negative UAT does not rule out infection due to other *Legionella* species and serotypes. Furthermore, UAT does not allow for molecular comparison of organisms to help identify linked clusters of cases and determine the

environmental source. Providers should also obtain respiratory specimens for culture to diagnose legionellosis.

- **Serologic** diagnosis is less useful for diagnosing acute infection and requires paired sera, collected 3–4 weeks apart, to detect a fourfold rise in antibody titer to a level >1:128. A single antibody titer is not diagnostic for legionellosis; convalescent serum must be obtained for comparison. It is important to note that because paired sera are required, results are delayed and thus may not be useful for acute case diagnosis or active outbreak investigations.

Public Health Reporting

Report cases promptly to the local health department where the patient resides. LHD contact information is available at https://www.health.ny.gov/contact/contact_information/. If you are unable to reach the LHD where the patient resides, please contact the NYSDOH Bureau of Communicable Disease Control at 518.473.4439 during business hours or 866.881.2809 evenings, weekends, and holidays.

Questions regarding clinical or epidemiological information should be directed to your LHD or the NYSDOH Bureau of Communicable Disease Control at 518.473.4439 and epiLegionella@health.ny.gov.

Information for Local Health Departments

NYSDOH is reminding LHDs of the following actions that should be taken locally:

- Regularly provide education to providers and healthcare facilities about legionellosis. Local educational efforts should emphasize the messages described above and should be repeated when appropriate (e.g., local increase in cases or during cluster or outbreak investigations).
- Interview cases as soon as possible, but within 3 business days of the reports. If cases are potentially part of a cluster or outbreak, attempts to interview should occur sooner.
- LHD staff should utilize the reviewed supplemental form, which is available at https://commerce.health.state.ny.us/hpn/ctrldocs/cdess/CdessHelp/cdessforms.html.
- Once the interview is completed, promptly update CDESS with the newly obtained information. Contact regional Hospital Epidemiology and Infection Control staff if the case had an overnight stay in an Article 28 health care facility or skilled nursing facility in the incubation period.
- Epidemiology staff should compare the interview information with that obtained

from other reported cases and share appropriate, deidentified information with environmental health staff.

- Environmental health staff should review the epidemiological information collected to identify possible points of exposure to *Legionella* for these cases. Based upon the environmental health risks identified, sample collection should be considered. Staff in the NYSDOH's Bureau of Water Supply Protection and the regional offices are available to assist by providing maps of the impacted areas for coordination of an environmental health response.
- Environmental health staff should assess the cooling tower registry for compliance of cooling towers that are in close proximity to cases and work to either secure compliance or collect samples from noncompliant towers.
- When an unusual increase in cases is identified, either by public health staff or via the Department's automated mapping or geo-temporal analysis, LHDs may use the Department's specially trained interview team to re-interview existing cases and directly interview any new cases during the investigation. Requests for interview assistance should be made by emailing the NYSDOH regional epidemiologist.
- For additional guidance, consult the detailed protocols entitled "Routine Epidemiologic Approach to Legionellosis" and "Community Legionellosis Clusters or Outbreaks" that were distributed to LHDs in November 2018.

LHDs should provide health education to the public about legionellosis, including but not limited to the following messages:

- Certain host factors will place persons at greater risk for acquiring Legionnaires' disease. Persons with severe immunosuppression from organ transplantation or chronic underlying illness, such as hematologic malignancy or end-stage renal disease, are at the greatest risk for acquiring Legionnaires' disease. Persons with severe immunosuppression from organ transplantation or chronic underlying illness, such as hematologic malignancy or end-stage renal disease, are at the greatest risk for acquiring, and dying from, Legionnaires' disease.
- Persons with diabetes mellitus, chronic lung disease, non-hematologic malignancy, HIV, persons over the age of 50, and persons with a current or past history of smoking are at moderately increased risk.
- Advise the public and providers when there is an unusual increase in cases and/or when a cluster or outbreak is being investigated. All efforts should be coordinated with BCDC and the NYSDOH Public Affairs Group, which can be reached at 518.474.7354.

Questions regarding clinical or epidemiological information should be directed to your LHD or the NYSDOH Bureau of Communicable Disease Control at 518.473.4439 and epiLegionella@health.ny.gov.

Questions regarding environmental issues should be directed to your LHD or the NYSDOH Bureau of Water Supply Protection at 518.402.7650 and wsca.legionella@health.ny.gov.

Patient resources; https://www.cdc.gov/legionella/downloads/fs-legionnaires.pdf
CDC resources: https://www.cdc.gov/legionella/resources/guidelines.html
ASHRAE updated guidelines: https://www.ashrae.org/about/news/2020/ashrae-publishes-updated-legionella-guideline