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Advancing Public Health Department Legionnaires' Disease Prevention Efforts Through the Epidemiology and Laboratory Capacity for Infectious Diseases Cooperative Agreement

Editor's Note: NEHA strives to provide up-to-date and relevant information on environmental health and to build partnerships in the profession. In pursuit of these goals, we feature this column on environmental health services from the Centers for Disease Control and Prevention (CDC) in every issue of the *Journal*.

In these columns, authors from CDC's Water, Food, and Environmental Health Services Branch, as well as guest authors, will share insights and information about environmental health programs, trends, issues, and resources. The conclusions in these columns are those of the author(s) and do not necessarily represent the official position of CDC.

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Legionnaires' disease (LD) is a severe respiratory illness caused by breathing in aerosolized water containing *Legionella* bacteria. *Legionella*-related outbreaks account for almost 60% of reported potable water outbreaks and for all of the deaths related to potable water outbreaks in the U.S. during 2013–2014 (Benedict et al., 2017). The number of reported LD cases has increased 350% since 2000 (Figure 1), and cases occur throughout the U.S. (Figure 2). The reason for this increase is unknown but is likely multifactorial and due to increased susceptible popu-

lations, opportunities for *Legionella* growth in the environment, or awareness with improved testing and reporting.

Based on the association of *Legionella* with water in built environments, implementation of effective water management programs (WMPs) has been cited as an important LD prevention measure, particularly in buildings at increased risk with complex plumbing systems such as healthcare facilities (Garrison et al., 2016; Lucas, Cooley, Kunz, & Garrison, 2016; Soda et al., 2017). Health departments might not have the environmental expertise

or resources, however, to provide WMP guidance. A memo from the Centers for Medicaid and Medicare Services that requires certain healthcare facilities to have WMPs has further underscored the need for public health jurisdictions to have the capacity to advise stakeholders regarding LD prevention (Centers for Medicaid and Medicare Services, 2017).

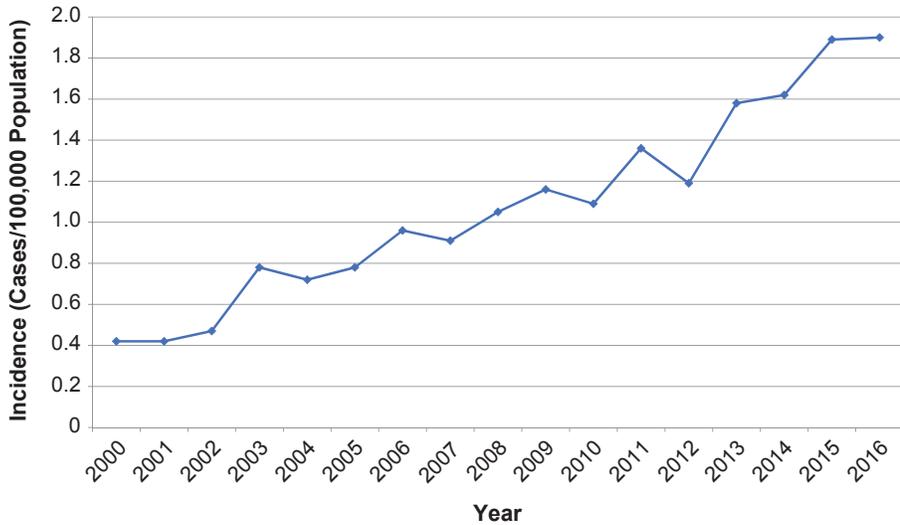
Anticipating the need for WMP expertise, the Centers for Disease Control and Prevention's (CDC) National Center for Environmental Health and National Center for Immunization and Respiratory Diseases LD team has funded state and local health agencies in 2016 through the Epidemiology and Laboratory Capacity for Infectious Diseases (ELC) Cooperative Agreement to build capacity for LD response and prevention. Developed in 1995, ELC is a national funding program focused on improving the public health workforce, laboratories, surveillance, and overall infrastructure for rapid response and prevention of cases and outbreaks of disease. Since 2016, CDC has provided ELC funding to improve the multidisciplinary expertise of 12 state and 2 local health departments (Figure 2) working on LD.

The goals of this program are to build capacity for LD response and prevention through

- increased utilization of environmental assessments and WMPs compliant with industry standards such as ANSI/ASHRAE Standard 188-2015 (ASHRAE, 2015);
- improved outbreak response; and
- enhanced case surveillance and reporting.

FIGURE 1

Reported Cases of Legionnaires' Disease per 100,000 Population by Year, United States, 2000–2016

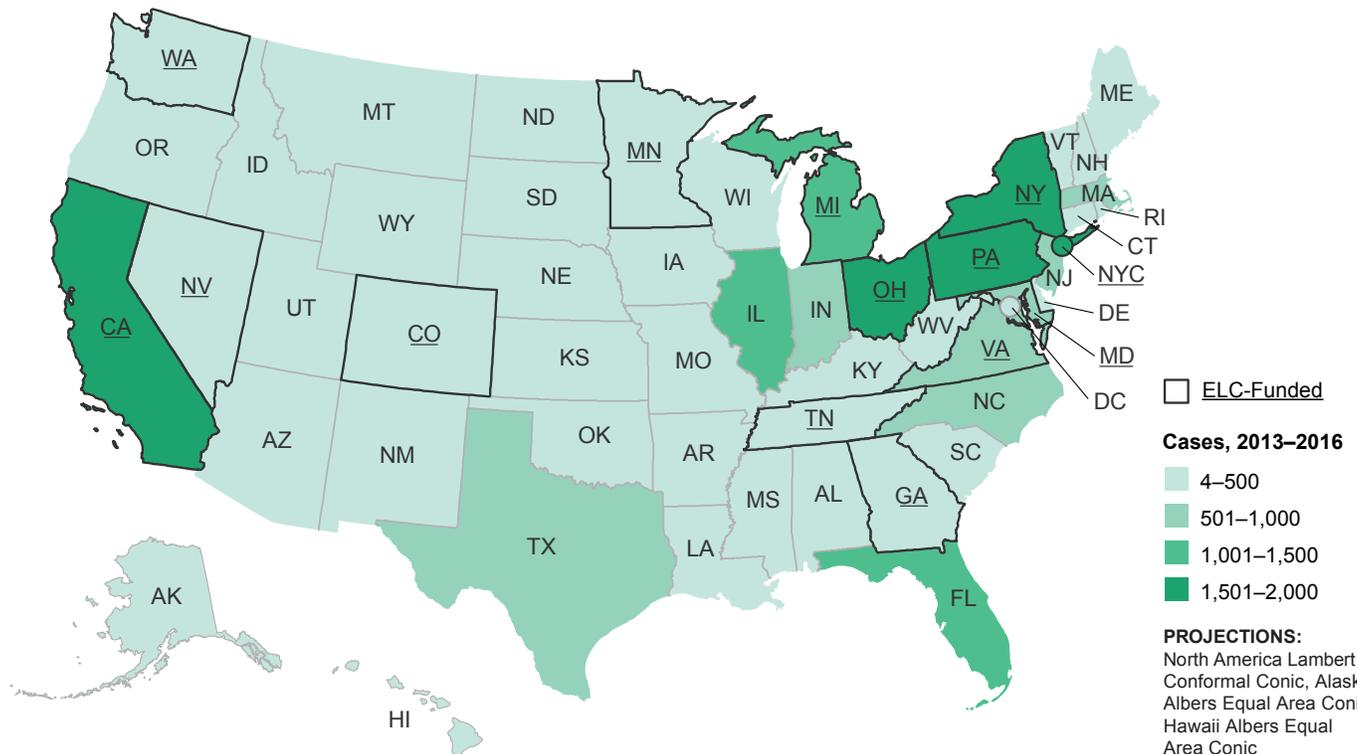


Based on core strategies (Table 1), the long-term purpose of this program is to reduce the incidence of LD cases and outbreaks by decreasing the amplification, aerosolization, and transmission of *Legionella* in building water systems. CDC organizes workgroups and bimonthly calls to advance cross-partner information sharing. The CDC LD team also created and disseminated evaluation plan guidance and provided technical assistance to ELC partners on coordination between epidemiological, environmental health, and laboratory activities.

During the first 2 years of funding, ELC partners have demonstrated marked progress on addressing *Legionella* response and prevention. Of the ELC partners, 71% hired additional staff (e.g., epidemiologists, environmental health specialists, laboratorians) to assemble multidisciplinary *Legionella* teams to enhance collaboration, outbreak response, protocol development, and training. The ELC *Legionella* teams have engaged various organi-

FIGURE 2

Number of Legionnaires' Disease Cases Reported During 2013–2016 and Location of Epidemiology and Laboratory Capacity for Infectious Diseases (ELC)-Funded Partners



Data available from www.cdc.gov/nndss/infectious-tables.html.

zations to conduct tabletop exercises, conferences, and presentations to educate audiences about effective water management.

To accomplish these activities, some teams developed partnerships with nontraditional stakeholders such as state and local environmental health programs, building and management organizations, and healthcare licensing agencies. ELC partners have also surveyed hospitals and other facilities to identify factors associated with WMP uptake. Two jurisdictions are evaluating the effectiveness of WMPs. ELC partners have written manuscripts to share their experiences and lessons learned. Some teams are expanding *Legionella* case surveillance and reporting, resulting in a better understanding of sources of exposure. They also are expanding laboratory testing capacity to include advanced molecular techniques to better support outbreak investigations and understand trends in regional strain prevalence. This work has future implications for LD regulations in the U.S. (Whitney, Blake, & Berkelman, 2017) and international settings (Ricketts, Joseph, Lee, Wewalka, & European Working Group for *Legionella* Infections, 2008), as well as for trend analysis and cluster detection (Fitzhenry et al., 2017).

Conclusion

CDC technical assistance has improved state and local capacity for *Legionella* outbreak response and prevention activities, laying the foundation for 1) improved identification of clusters, 2) more thorough sampling to determine possible exposure sources, 3) improved capacity to provide long-term prevention recommendations, and 4) reduced risk of *Legionella* growth and transmission. ELC partners underscore the importance of state and local multidisciplinary work among epidemiology, environmental health, laboratory, clinical, and communication specialties for LD prevention. Shared stories of challenges and opportunities across funded ELC jurisdictions result in less duplication of efforts, increased collaboration, and leveraging of innovations. ELC partners will continue to serve a key role in generating the evidence base to reduce LD nationwide. Learn more about CDC's environmental health-related work on LD at www.cdc.gov/nceh/ehs/activities/legionella.html. 🐞

TABLE 1

Core Strategies and Outcomes of Legionnaires' Disease Epidemiology and Laboratory Capacity for Infectious Diseases Cooperative Agreement

Core Strategies	Long-Term Outcomes
Improve knowledge within state and local health departments regarding maintenance strategies for the primary prevention of Legionnaires' disease (LD) in building water systems and cooling towers	<ul style="list-style-type: none"> • Improved primary prevention informed by enhancing stakeholder understanding of environmental risk factors for LD • Strong public health guidance and enforcement regarding prevention strategies
Identify and implement strategies to encourage the implementation of preventive maintenance programs among building owners and operators	<ul style="list-style-type: none"> • Increased percentage of buildings with water management programs (WMPs) • Reduced incidence of LD and number and size of outbreaks
Evaluate effectiveness of policies and public health approaches to the implementation of industry standards for primary prevention of LD (two jurisdictions)	<ul style="list-style-type: none"> • Improved primary prevention informed by enhancing stakeholder understanding of environmental risk factors for LD • Reduced incidence of LD and number and size of outbreaks
Identify and implement strategies for leveraging the incorporation of LD preventive maintenance programs into building and public health codes	<ul style="list-style-type: none"> • Increased percentage of buildings with WMPs • Reduced incidence of LD and number and size of outbreaks
Maximize completeness and timeliness of case reporting, including reporting of supplemental exposure information; consider participation in pilot of new consolidated electronic surveillance platform	Improved ability to follow trends in incidence and possible exposure sources
Identify and implement strategies to encourage collaboration among epidemiologists, laboratorians, and environmental health specialists for the purpose of primary prevention of LD and outbreak response	Reduced incidence of LD and number and size of outbreaks
Improve laboratory capacity to identify <i>Legionella</i> in outbreak and/or prevention settings	Quicker outbreak response and matching of environmental and clinical samples

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Did You Know?

A lot of questions have been raised regarding the U.S. Environmental Protection Agency's proposal to restrict science in rule making under the Strengthening Transparency in Regulatory Science proposed rule (www.epa.gov/osa/strengthening-transparency-regulatory-science-0). NEHA's government affairs program has been actively engaged to prevent these changes. The comment period for the proposed rule has been extended to August 16. Furthermore, a public hearing will be held on July 17 where NEHA Executive Director Dr. David Dyjack is scheduled to testify on behalf of the environmental health profession.

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