

Emerging Health Threats Forum

Identifying and assessing emerging threats to human health from pathogens, chemicals, the environment, radiation, and society



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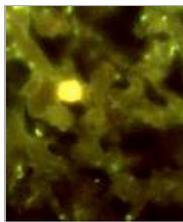
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USA on alert for legionellosis

Legionella bacteria claim large share of outbreaks linked to tainted water over 36 years



Micrograph depicting details of lung tissue specimen from a patient with fatal pneumonia due to Legionnaires' disease.

Photo credit: CDC/Dr. William Cherry

Exposure to *Legionella* bacteria is one of the leading causes of water-borne illness outbreaks that occurred in the USA from 1971 to 2006, Gunther Craun and colleagues report this month. They say health officials should be aware of the risk posed by the bacteria, especially in hospitals.

"*Legionella*... is the third most common etiologic agent among all of the outbreaks associated with drinking water, water not intended for drinking, and water of unknown intent reported during the entire 36-period," write the authors in *Clinical Microbiology Reviews*.

With a statistical analysis they looked for trends in the number of disease outbreaks linked to several pathogens and chemicals in different sources of water. They used US-wide surveillance data collected by the Waterborne Disease and Outbreak Surveillance System (**WBDOSS**). This system was set up in 1971 by the US Centers for Disease Control and Prevention (CDC), together with the US Environmental Protection Agency and the Council of State and Territorial Epidemiologists.

Outbreaks of legionellosis were not included in the database before 2001. But the data available over the six-year period until 2006 were enough to place *Legionella* bacteria among the leading causes of waterborne illness — surpassed only by *Giardia* and *Shigella* bacteria, which were reported for much longer periods.

Legionellosis (or Legionnaires' disease) accounted for a total of 38 outbreaks. Craun and colleagues say that the CDC is also reviewing outbreaks of the disease that occurred before 2001, and these will be added to the database. "The expanded legionellosis outbreak review will likely increase the number of identified outbreaks and further emphasize the importance of *Legionella* as a waterborne pathogen," they write.

The bacteria live in natural waters but thrive and **survive for long periods** in indoor, purpose-built water structures — such as air conditioning systems or cooling towers — where water is kept at high temperatures. People can get exposed to *Legionella* by inhaling water droplets that contain the bacteria, and infection can lead to severe pneumonia or an influenza-like illness called Pontiac fever. Legionellosis was identified in 1976.

The authors note that the "profile" of outbreaks that occur in the country changed when *Legionella* bacteria were added to the list of notifiable water-borne pathogens. Before 2001, there were no reported outbreaks of respiratory illness, and diarrhoeal illnesses were prominent. "However, from 2001 to 2006, while acute gastrointestinal illness remained the dominant illness type, 24 acute respiratory illness outbreaks were reported, all associated with *Legionella*, comprising 29% of all reported drinking water outbreaks during that 6-year period."

All outbreaks of legionellosis recorded by the database were caused by bacteria found in plumbing, pipes, and storage facilities not overseen by public water companies, according to Craun and colleagues.

"Two-thirds of the legionellosis outbreaks associated with drinking water occurred in health care settings, demonstrating the ability of *Legionella* to colonize the biofilms [layers of micro-organisms] frequently found inside the large, complex plumbing systems of hospitals," they write. "These data underscore the importance of maintaining a high index of suspicion for legionellosis associated with health care settings."

Legionnaires' disease can affect anyone, but often turns severe and potentially fatal in the very young and old, or people with weak immunity. Between 2001 and 2006, *Legionella* caused 12 of the 15 deaths linked to all water-borne illnesses recorded in the country.

Previous studies have suggested that that incidence of legionellosis has **risen in the USA since 2003**, with cases reported more often in younger people. Outbreaks of the disease continue to occur, the authors note, and have been linked to contaminated water in healthcare institutions as well as drinking water from natural sources during wilderness travel.

Overall, in the review Craun and colleagues identified 833 outbreaks linked with 577,000 illnesses and more than 100 deaths. The number of outbreaks decreased during the study period, as did the proportion of incidents associated with public water systems. But over time, problems with plumbing inside buildings became a more significant risk factor for reported outbreaks.

Reference and link

1. Craun GF, Brunkard JM, Yoder JS, Roberts VA, Carpenter J, Wade T, *et al.* Causes of outbreaks associated with drinking water in the United States from 1971 to 2006. *Clin Microbiol Rev* 2010, **23**:507–528. doi: [10.1128/CMR.00077-09](https://doi.org/10.1128/CMR.00077-09)

US CDC information on legionellosis

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