



**2013-07-26-057 Legionellosis - USA (04): (WI) increased incidence
To: (03) Food-borne, water-borne and air-borne diseases; (05) Bacteriology, general; (12)
Scientific Information, research and education;**

LEGIONELLOSIS - USA (04): (WISCONSIN) INCREASED INCIDENCE

A ProMED-mail post

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<<http://www.jsonline.com/news/milwaukee/legionnaires-outbreak-a-mystery-may-be-tied-to-summers-late-start-b9958121z1-216368021.html>>

The legionnaires' disease outbreak [in the Milwaukee area] is a mystery but may be tied to summer's late start. The disease has seriously sickened 31 people in the Milwaukee area since 1 Jun 2013. Public health officials have not determined the environmental source of the [outbreak of] legionnaires' disease in south eastern Wisconsin.

It's possible they never will find the source if the legionella bacteria that caused the disease have already dissipated.

One theory points to cooling towers on top of large buildings prepped and waiting for hot weather that arrived unusually late, in mid-June 2013. Five patients might have been within a few-miles radius at about the same time in June 2013, family members said they were told. Public health officials haven't disclosed the geographic location because it's an active investigation.

One patient, who lives in Waukesha but works in St Francis, is a smoker with newly diagnosed emphysema. He's one of 4 people in Waukesha County diagnosed with legionnaires' since 1 Jun 2013. He had driven himself to Waukesha Memorial Hospital on 5 Jul 2013 because he couldn't breathe. He spent nearly 2 weeks in a medically induced coma and on a ventilator while being treated with antibiotics. His kidneys failed, requiring daily dialysis. Now in a critical but stable condition, he is breathing with the help of a tracheotomy, according to family members.

Towers that use water to cool buildings are suspect because they have a seasonal maintenance schedule that assumes hot weather before mid-June, said Paul Biedrzycki, director of disease control and environmental health for the Milwaukee Health Department. The towers are filled with water in late April or early May so they're ready to cool buildings as soon as it gets hot outside, Biedrzycki said.

Because the water sat in rooftop cooling towers from early spring until sometime in June 2013, it could have stagnated and become dirty, allowing legionella bacteria to colonize, Biedrzycki said. When air conditioning units finally were flipped on, the cooling towers could have spewed the bacteria into the air. The bacteria could travel a few miles beyond the buildings on water droplets.

Chlorine that's automatically fed through cooling towers once air conditioning is turned on for the 1st time may not have reached appropriate levels to kill the legionella bacteria, Biedrzycki said. Someone randomly passing within a few miles of contaminated cooling towers could have inhaled the airborne bacteria. Those with heart or lung conditions would be most vulnerable.

Biedrzycki said there isn't a single source common to all 14 City of Milwaukee cases, or even to a cluster of a half-dozen cases that appear to be related. "In absence of a smoking gun after a week of looking, I wonder whether there was a seasonality factor," he said, referring to the cooling towers and timing of hot weather. Four of the 14 Milwaukee people sickened by the bacteria remain hospitalized but are expected to recover, Biedrzycki said. Some of the 17 cases in surrounding counties may be linked to exposure in Milwaukee, too.



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The last report of legionnaires' in the city was last Monday [15 Jul 2013]. It can take up to 14 days from exposure to the bacteria until symptoms begin, though the Milwaukee cases have had an incubation period of 4-5 days on average, Biedrzycki said.

Three years ago, a legionnaires' outbreak that sickened 8 people was linked to a decorative waterfall inside a Cudahy hospital. The waterfall was contaminated with high levels of the heat-loving legionella bacteria. Those sickened in the current Milwaukee-area outbreak weren't in a common building, Biedrzycki said.

Water samples have been taken from outdoor decorative fountains and pools with water-spraying devices, anything other than building cooling towers that could aerosolize legionella bacteria. Tests of those samples and of swabs taken from surfaces of devices that spray warm water so far have come back negative for legionella, Biedrzycki said.

A total of 37 cases of legionnaires' disease have been confirmed statewide since 1 Jun 2013, including 31 cases in contiguous counties in south eastern Wisconsin: 20 in Milwaukee County, 4 in Waukesha County, 3 in Racine County, 3 in Walworth County and one in Kenosha County, according to epidemiologist Tom Haupt of the state Department of Health Services. "At least 4 or 5 cases had onset of symptoms on the 4th of July [2013], with an incubation period up to 14 days prior," Haupt said. Officials have been investigating whether those individuals shared a common travel history in or around Milwaukee in the same time frame. "We may never know which cases are related," Haupt said. "When you can't pinpoint it to one location, it makes it extremely difficult."

Legionnaires' cases are confirmed every year in Wisconsin. Last year [2012], there were 93 cases statewide. In 2011, there were 69 cases, and in 2010, 63 cases, according to Haupt. So far this year [2013], the state has seen 53 cases, including the 37 since 1 Jun 2013. The recent cases in Milwaukee make up one of the larger clusters detected in the state in a while, Haupt said.

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[CDC recently reported that in the US, only legionellosis (that is, most commonly legionnaires' disease, the acute pneumonic form of legionellosis) showed a marked increase beyond historical data in the ratio of the current 4-week total through 13 Jul 2013, to a mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years) among 9 selected notifiable diseases (legionellosis, giardiasis, acute hepatitis A, B and C, measles, meningococcal disease, mumps, and pertussis <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6228md.htm?s_cid=mm6228md_w#fig1>). For the US as a whole, the cumulative case count for legionellosis for the reporting year 2013 ending 13 Jul 2013 is about 22 per cent higher than that for the year 2012 ending 14 Jul 2012.

This increase in cases of legionellosis was seen mainly in Mid-Atlantic states (New Jersey, New York, and Pennsylvania) (37 per cent increase), East-North Central states (Illinois, Indiana, and Ohio) (43 per cent increase), South Atlantic states (Florida, Maryland, North Carolina, and Virginia) (17 per cent increase), and Pacific states (California and Washington) (33 per cent increase) (Table 2, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6228md.htm?s_cid=mm6228md_w#fig1>).

The reason(s) for this increase in the incidence of legionellosis this year [2013] is unknown. Dr Victor Yu drew our attention last year to the association of heavy rainfall and flooding with the incidence of legionellosis (see ProMED-mail post Legionellosis - USA (06): post-Hurricane Sandy, Alert 20121110.1403819). The incidence of legionnaires' disease is consistently highest during the warm summer months, which may coincide with periods of heavy rainfall in the US.

Heavy rains during the warm season might favor the growth of *Legionella* spp., which is enhanced by warm temperatures. Heavy rainfall did occur in the US midwest this spring, with the state of Iowa reportedly receiving the most spring rainfall since records began 141 years ago (<<http://www.reuters.com/article/2013/05/31/us-usa-corn-weather-idUSBRE94T0H320130531>>);



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and the 1st named storm of the Atlantic hurricane season made this 7 Jun 2013 the wettest on record for many cities and towns along the US East Coast (<<http://local.msn.com/storm-breaks-rainfall-records-across-northeast-us>>).

However, it is unclear exactly how heavy rainfall would lead to an increased incidence of legionellosis. Perhaps, run-off of organic sediment during heavy rainfall might contaminate municipal water systems, and the contaminated water is then aerosolized by a variety of mechanisms.

Legionellosis is usually acquired by inhalation of an infectious dose of aerosolized legionella. Water temperatures of 25-40 C (77-104 F) support the highest concentrations of the organism in water storage tanks of plumbing systems. Aerosolization of the contaminated warm water can occur in showers, spa pools, sprays in groceries, fountains, cooling towers, and car washes.

Legionnaires' disease is rarely confirmed with laboratory testing because cases of pneumonia are frequently treated empirically without identifying the causative pathogen. Therefore, analyzing only reported cases of legionnaires' disease likely underestimates the burden of this disease. Compounding the problem is the fact that legionella urinary antigen test when used to aid in the diagnosis of patients with suspected legionnaires' disease only is able to confirm *L. pneumophila* serogroup 1 infection. If the suspected water source shows *Legionella* species other than *L. pneumophila* or non-serogroup 1 *L. pneumophila* species, culture using selective media of sputum, which is often not readily available, is required to make the diagnosis.

Genotyping of patient and environmental isolates has become a helpful tool to establish transmission pathways. The predominance of one genotype of legionella isolated from patient specimens suggests transmission from a common source. Because legionella may be found in environmental samples without linkage to any cases of legionellosis, the actual causative infectious reservoir can be confirmed by matching the genotype of clinical and environmental isolates (see <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC86783/>> and <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2730281/>>).

However, genotyping is often not an option, because genotyping requires clinical isolates of the pathogen, and frequently the diagnosis of legionnaires' disease is made only on the basis of urinary *L. pneumophila* serogroup 1 antigen testing or serology, rather than isolation of the organism from cultures of respiratory tract specimens.

We await results of the epidemiologic investigation of this increase in cases of legionellosis in Wisconsin, especially in the Milwaukee area in south eastern Wisconsin. Milwaukee, with an estimated population of 1 566 981 as of 2012, is the largest city in the US state of Wisconsin (<<http://en.wikipedia.org/wiki/Milwaukee>>). It is the county seat of Milwaukee County and is located on the southwestern shore of Lake Michigan. Contiguous counties are Waukesha County to the west, Racine County to the south; Walworth County and Kenosha Counties are south of Milwaukee along the border with the state of Illinois.

For a map of Wisconsin counties, see <<http://www.digital-topo-maps.com/county-map/wisconsin.shtml>>. - Mod.ML

A HealthMap/ProMED-mail map can be accessed at: <<http://healthmap.org/r/3adO>>.]

[see also:

Legionellosis - USA (03): (OH) fatal, retirement community
20130720.1835445

Legionellosis - USA (02): (MI) RFI 20130711.1820524 Legionellosis - USA: (PA) nosocomial, CDC
investigation

20130226.1560035
2012

Legionellosis - USA (07): (PA) nosocomial 20121124.1422656 Legionellosis - USA (06): post-
Hurricane Sandy, Alert
20121110.1403819



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Legionellosis - USA (05): (PA) hotel 20120913.1293109 Legionellosis - USA (04): (IL) fatal, more cases, hotel fountain 20120901.1276694

Legionellosis - USA (03): (IL) hotel 20120823.1259486 Legionellosis - USA (02): (Maryland) 20120622.1178048 Legionellosis - USA: (NY) hotel 20120205.1033536 2011

Legionellosis - USA (08): (Virgin Islands) hotels 20111214.3591 Legionellosis - USA (07): (Northeast, Mid-Atlantic) increased incidence 20111202.3506 Legionellosis - USA (06): (FL) fatal 20111104.3287 Legionellosis - USA (05): (MD) fatal, hotel 20111014.3073 Legionellosis - USA (04): (NY) shredder 20110826.2604 Legionellosis - USA (03): (NV) hotel 20110716.2159 Legionellosis, nosocomial - USA (03): (OH) 20110315.0831 Legionellosis, nosocomial - USA (02): (OH) 20110310.0775 Legionellosis - USA (02): (CA) conference, susp. 20110304.0713 Legionellosis, nosocomial - USA: (OH) 20110303.0692 Legionellosis - USA: (CA) conference, susp. 20110214.0494]
