

MMWRTM

MORBIDITY AND MORTALITY WEEKLY REPORT

- 357 Outbreak of Legionnaires' Disease Among Automotive Plant Workers — Ohio, 2001
- 359 Update: Outbreak of Acute Febrile Respiratory Illness Among College Students — Acapulco, Mexico, March 2001
- 361 Pregnancy-Related Deaths Among Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native Women — United States, 1991–1997
- 365 Notices to Readers

Outbreak of Legionnaires' Disease Among Automotive Plant Workers — Ohio, 2001

During March 12–15, 2001, four cases of Legionnaires' disease (LD) among workers at an automotive engine manufacturing plant (plant X) were reported to the Cuyahoga County Board of Health, Cleveland, Ohio; all four diagnoses were confirmed by *Legionella* urine antigen. Illness onset among the four workers occurred during March 2–4; two workers died. Beginning March 14, CDC assisted state and local health departments with an investigation to identify new cases and potential sources of *Legionella* transmission in the plant. This report summarizes the investigation; findings indicate an epidemiologic association with exposure to one of the plant finishing lines but did not identify a specific source.

Plant X manufactures cast iron engine components, is operated by approximately 2500 employees, and covers approximately 1.6 million square feet of floor space. The plant is divided into four areas: core making, mold production, iron melting, and finishing. A confirmed case of LD was defined as radiograph-confirmed pneumonia and laboratory evidence of *Legionella* infection, defined as a positive *Legionella* urine antigen or isolation of *Legionella* from respiratory secretions or lung tissue. Specimens from the four initial case-patients were sent to CDC for isolation of *Legionella*; available specimens included one sputum specimen, one broncho-alveolar lavage specimen, and lung tissue from the two decedents. Active LD surveillance was established in all hospitals in the greater Cleveland area. Hospital records and plant X employee absentee records were reviewed to identify additional cases. An environmental investigation was conducted to identify aerosol-producing water sources for *Legionella* transmission, including cooling towers, water hoses, and water heaters.

No additional confirmed LD cases were identified among the workers. Nine workers from plant X were hospitalized during February 14–March 28; four had pneumonia, and all nine had negative *Legionella* urine antigen tests. *Legionella pneumophila*, serogroup 1, was isolated from a worker's sputum sample, which was stored at 40 F (4 C) for >1 week before culture. Results are pending from lung tissue samples. *Legionella* was isolated from 18 (9%) of 197 environmental samples, and at least five species were identified. Three samples grew *L. pneumophila*, serogroup 1; none matched the clinical isolate by monoclonal antibody staining.

A case-control study was conducted to determine risk factors for exposure to *Legionella* among plant workers. A case-patient was defined as a worker at plant X during February 14–March 28 who had either a confirmed case of LD or a possible case of legionellosis. A possible case-patient of legionellosis was defined as a worker with a

Legionnaires' Disease — Continued

titer of anti-*Legionella* IgG antibody $\geq 1:1024$ and any two of the following symptoms: cough, shortness of breath, fever, headache, myalgia, or fatigue. Controls were randomly selected workers with fewer than two symptoms and IgG antibody $\leq 1:64$. Serologic specimens were collected 4–5 weeks after the presumed exposure. Each study participant was asked detailed questions about time spent inside and outside of the plant and information about underlying medical conditions associated with LD.

Among 855 workers who were contacted, 484 (57%) agreed to participate in the case-control study; 11 met case criteria (four confirmed and seven possible cases), and 105 met criteria for controls. Visiting one of the finishing lines in the plant (odds ratio [OR]=15.1; 95% confidence interval [CI]=3.0–76.2) and working in the finishing region of the plant (OR=3.8; CI=1.0–13.8) were associated with disease.

Plant X was closed during March 14–19 to facilitate environmental sampling and decontamination. All water systems were decontaminated, and ongoing environmental surveillance for *Legionella* was implemented throughout the plant, including the finishing area. Sources of aerosolized water from the finishing area that had been sampled before decontamination did not yield cultures positive for *Legionella*. On the basis of the case-control study results, additional environmental samples were collected in the finishing area on April 14; all samples were negative for *Legionella*. County health officials are obtaining maintenance records from the implicated area of plant X to determine how transmission might have occurred.

Reported by: T Allan, T Horgan, H Scaife, Cuyahoga County Board of Health, Cleveland; E Koch, S Nowicki, MK Parrish, E Salehi, Ohio Dept of Health. Respiratory Diseases Br, Div of Bacterial and Mycotic Diseases, National Center for Infectious Diseases; Hazard Evaluations and Technical Assistance Br, Div of Surveillance, Hazard Evaluations and Field Studies, National Institute for Occupational Safety and Health; and EIS officers, CDC.

Editorial Note: Industrial plants can be a source for the propagation and transmission of *Legionella*. The identification of *L. pneumophila* in the environmental samples demonstrated that legionellae can survive in this work environment. The tightly clustered onset of illness, lack of other epidemiologic associations among the four confirmed patients besides working in plant X, and the results of the case-control study implicated a particular finishing line within the plant as the likely source of *Legionella*. The narrow period of illness onset and the failure to identify new cases among plant workers suggest that exposure to the infecting *Legionella* strain was short-lived and transient, which may explain the failure to find an environmental sample that matched the clinical isolate.

LD outbreaks have been reported in industrial settings, including an automotive plant where workers were exposed to contaminated metal-working fluids (1), factories that used water to cool molded plastics (2), and waste-water treatment facilities (3). In each setting, an aerosol-producing device was implicated. Guidelines to minimize the risk for *Legionella* transmission in these sites are available (4). In addition to LD, clinicians should consider hypersensitivity pneumonitis, metal fume fever, and humidifier fever as possible diagnoses of an acute febrile respiratory illness with systemic symptoms in persons who work in an industrial setting (5).

Legionella species are estimated to account for 2%–15% of all community-acquired pneumonia; however, only 1200–1500 cases are reported annually (6,7). Appropriate diagnostic testing for LD includes *Legionella* urine antigen and culture of respiratory secretions. *Legionella* urine antigen tests provide rapid and accurate diagnosis of disease caused by *L. pneumophila*, serogroup 1; however, these tests do not identify less common species or serogroups and do not provide an isolate necessary to compare

Legionnaires' Disease — Continued

clinical with environmental isolates during outbreak investigations. LD also can be diagnosed by a four-fold rise in anti-legionella antibody titer or by direct fluorescent antibody on sputum samples, although the latter method lacks specificity and sensitivity. In addition to testing for Legionella urine antigen, the diagnosis and investigation of LD cases would be improved if clinicians obtained respiratory specimens for culture by a laboratory proficient in *Legionella* isolation. To facilitate appropriate investigation and improve understanding of disease associated with *Legionella* species, health-care providers should report legionellosis cases to county or state health departments, and state health departments should report legionellosis cases to CDC.

References

1. Herwaldt LA, Gorman GW, McGrath T, et al. A new *Legionella* species, *Legionella feeleei* species nova, causes Pontiac fever in an automobile plant. *Ann Intern Med* 1984;100:333–8.
2. Muraca PW, Stout JE, Yu VL, Yee YC. Legionnaires' disease in the work environment: implications for environmental health. *Am Ind Hyg Assoc J* 1988;49:584–90.
3. Gregersen P, Grunnet K, Uldum SA, Andersen BH, Madsen H. Pontiac fever at a sewage treatment plant in the food industry. *Scand J Work Environ Health* 1999;25:291–5.
4. American Society of Heating, Refrigerating and Air-Conditioning Engineers. ASHRAE standard: minimizing the risk of legionellosis associated with building water systems. ASHRAE guideline 12-2000. Atlanta, Georgia: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 2000.
5. Rose CS, Blanc PD. Inhalation fever. In: Rom WN, ed. *Environmental & occupational medicine*. 3rd ed. Philadelphia, Pennsylvania: Lippincott-Raven Publishers, 1998:467–80.
6. Marston BJ, Plouffe JF, File TM, et al. Incidence of community-acquired pneumonia requiring hospitalization: results of a population-based active surveillance study in Ohio. *Arch Intern Med* 1997;157:1709–18.
7. CDC. Summary of notifiable diseases, United States, 1999. *MMWR* 2001;48(no. 53):7.

*Public Health Dispatch***Update: Outbreak of Acute Febrile Respiratory Illness
Among College Students — Acapulco, Mexico, March 2001**

On March 30, CDC was notified by the Pennsylvania Department of Health of an acute febrile respiratory illness characterized by fever, chills, dry cough, chest pain, and headache among college students who traveled to Acapulco during March 2001. Initial laboratory testing indicated that most students had histoplasmosis, an infection caused by the soil-inhabiting fungus, *Histoplasma capsulatum*. While in Acapulco, most ill students had stayed at the Calinda Beach Hotel. This report updates the investigation of the outbreak and presents possible evidence of ongoing transmission (1).

As of May 1, 44 colleges in 22 states* and the District of Columbia have reported 229 students with acute febrile respiratory illness defined by fever for at least 3 days and one or more of the following symptoms: cough, shortness of breath, chest pain, or

*Arizona, Connecticut, Delaware, Florida, Illinois, Iowa, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Texas, and Wisconsin.