



Pertussis Outbreak Among Adults at an Illinois Oil Refinery, August-October 2002

By Gregory Huhn, M.D., M.P.H. and T.M.

On September 16, 2002, the Crawford County Health Department (CCHD) reported to Illinois Department of Public Health four cases of cough illness among workers at an oil refinery (total worker population was: 750) in that county. On August 14, a 39 year-old refinery worker reported to the plant's health unit with a cough that had lasted 14 days. On the same day, the worker's 50 year-old supervisor visited the health unit for a paroxysmal cough of three 3 days in duration and an incident of cough syncope. Both patients had serologic test results suggestive of recent *Bordetella pertussis* infection, and CCHD was contacted.

On September 18, IDPH staff initiated active surveillance and case investigations. Between August 1 and October 9, pertussis was diagnosed in 15 (10 percent) of 150 oil refinery workers from two separate operations ($n=95$) and maintenance ($n=55$) complexes, who were linked by contact with the ill supervisor. Through enhanced case finding, 24 cases of pertussis, 21 (88 percent) of which occurred in adults >20 years of age, were identified in this outbreak, underscoring the need to recognize this highly infectious disease in adults and to improve national diagnostic and preventive strategies.

Cases were identified in accordance with CDC case definitions (Figure 1.) A total of 17 pertussis cases were associated with the oil refinery: four confirmed cases (including one culture-positive case and one polymerase chain reaction [PCR]-positive case) and 13 probable cases; 10 patients were males. A pulsed-field gel electrophoresis (PFGE) DNA fingerprint for the culture-confirmed case (illness onset date 9/10/02) was PFGE profile 13. The median age was 40 years (range 16-53 years). Six patients worked in the same work unit. Eight of 14 patients had serologic testing results

(anti-B. pertussis IgA, IgM or IgG EIA) suggestive of recent *B. pertussis* infection. In addition to the 17 patients identified from the oil refinery, seven patients in the community who were unrelated epidemiologically to the oil refinery also were identified as having probable cases of pertussis; four were males with a median age of 24 years (range 5-33 years). All 24 patients (Figure 2) received treatment with macrolide antibiotics and were encouraged to be tested for pertussis by PCR and nasopharyngeal culture. On September 19, with the cooperation of oil refinery management, 150 close work contacts of the 17 patients at the plant were prescribed azithromycin prophylaxis.

No cases of pertussis at the oil refinery have been reported since October 9, 2002. School officials and healthcare providers within the community were given guidelines on pertussis case recognition, reporting, and prophylaxis measures.

Among recommended childhood immunizations, pertussis is the only vaccine-preventable disease that has increased in incidence in the U.S. during the past 20 years, from 1,730 cases in 1980 to 8,296 cases provisionally reported in 2002 (1). The outbreak described in this report reflects the changing demographics of pertussis in the U.S., with reported incidence rates in adults increasing 400 percent from 1990 to 2001 ([2]; CDC, unpublished data, 2002). Adults and adolescents might be a reservoir for *B. pertussis* in the community because immunity from childhood vaccination declines beginning five to 15 years after the last pertussis vaccine dose (3). Despite its increasing recognition as a disease affecting older children and adults, pertussis often is overlooked in the differential diagnosis of cough illness in this population (4). Pertussis can be highly infectious during the three weeks after illness onset, and infection can spread to exposed infants, who have the highest rates for complications and death (5).

In Illinois, 74 of 193 cases (38 percent) of provisionally reported pertussis in 2002 occurred in adults >20 years of age, a greater proportion of cases in this age category was seen nationally (1). Persons ages

10-19 years comprised 19 percent of all cases in 2002 in Illinois. Waning vaccine-induced immunity probably accounts for susceptibility to *B. pertussis* infection in both adults and adolescents (3,6). Since the 1980s, the reported incidence rates in adolescents and adults in the United States have increased as a result of changes in reporting, a true increase in incidence or both (1,2). In 1995, the case definition for pertussis was expanded to include PCR-positive tests and epidemiologic linking of pertussis cases as confirmation criteria. In addition, it is possible that increased awareness of pertussis in older age groups within the medical community might have contributed to increased diagnosis rates in this population during the 1990s (7).

Even with increased awareness, some physicians may fail to consider pertussis as a cause of illness, perhaps partly due to the fact that adults may present with mild symptoms (8). Although the fastidious *B. pertussis* bacterium often cannot be isolated, to confirm diagnosis in symptomatic adults health-care providers should obtain a nasopharyngeal aspirate or swab for *B. pertussis* culture within two weeks of cough onset. In this outbreak, serologic testing for diagnosis of recent *B. pertussis* infection was performed in the majority of cases. No serologic assay for a single convalescent sera is currently approved or recommended for diagnosis of pertussis. Because adults might report to healthcare providers late in the disease course, a standardized and valid serologic test is needed to diagnose recent *B. pertussis* infection in adults (9).

As one of several state health departments with enhanced pertussis surveillance systems, IDPH uses PFGE to analyze *B. pertussis* isolates from cases. The single isolate in this outbreak indicated PFGE profile 13, the most frequently identified pattern among *B. pertussis* isolates in the U.S. Identification of pertussis DNA fingerprints by PFGE might allow health officials to track disease transmission and associated outbreaks.

A 14-day course of erythromycin is the recommended antimicrobial for treatment of patients with pertussis and for prophylaxis of close contacts. Treatment and prophylaxis is most effective when erythromycin is administered to patients within 3 weeks of illness onset and to close contacts within three weeks of cough onset in the primary case (9). During an outbreak, repeated exposure to pertussis

might warrant repeated courses of erythromycin. If erythromycin is poorly tolerated because of gastrointestinal side effects, trimethoprim sulfamethoxazole can be prescribed; azithromycin and clarithromycin might be effective alternatives in the eradication of *B. pertussis* in symptomatic patients (9,10). However, effectiveness of azithromycin or clarithromycin as prophylaxis for asymptomatic close contacts in an outbreak setting is not well documented.

Acellular pertussis vaccines are licensed in the U.S. for infants and children < 7 years of age. These vaccines might have a future role in the prevention of disease and control of outbreaks in older age groups (4,5,7).

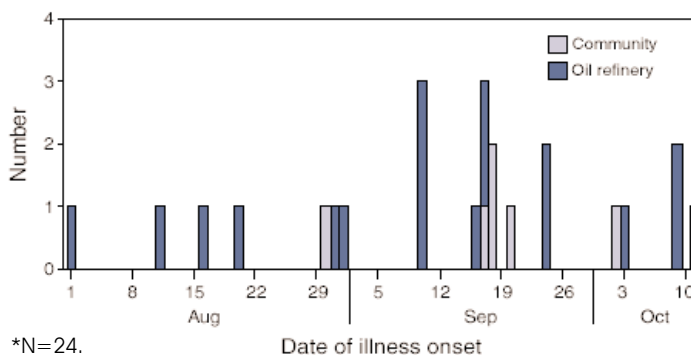
Figure 1. CDC Case Definitions for Bordetella Pertussis

Clinical Case. Acute cough illness lasting > 2 weeks in a person with 1) at least one of the following: Paroxysms of coughing, inspiratory "whoop," or post-tussive vomiting, without other apparent cause or 2) > 14 days of cough in a person in an outbreak setting.

Confirmed Case. Cough illness of any duration in a person with isolation by culture of *B. pertussis* or a case that meets the clinical case definition and confirmed by polymerase chain reaction (PCR) for *B. pertussis* DNA or by epidemiologic linkage to a laboratory-confirmed case.

Probable Case. Cough illness that meets the clinical case definition, is not laboratory-confirmed, and is not linked by direct contact with a laboratory-confirmed case.

Figure 2. Number of confirmed and probable Bordetella pertussis cases,* by date of illness onset and location of onset Crawford County, Illinois, August 1-October 11, 2002



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Syphilis Increase in Illinois and Its Impact on HIV Transmission

By IDPH STD Section

After a decade of steady decline in Illinois and the nation among both men and women, reported primary and secondary syphilis in Illinois increased 10 percent in 2002 compared to 2001. The increase was exclusively among males, who accounted for 82 percent of reported cases in 2002. The number of cases reported among males increased 16 percent (318 to 368) and female cases decreased by 12 percent (91 to 80). Several Illinois counties are currently investigating syphilis outbreaks: Champaign, Cook, DuPage, Lake, Vermilion and Winnebago.

Syphilis is spread through sexual contact with an infected partner. If untreated, it can lead to severe complications including death. Syphilis also can be passed from an infected pregnant woman to her unborn child, resulting in a stillbirth or serious life-threatening or disabling conditions. Many infected persons do not have or do not recognize early signs or symptoms of infection, and the disease, which is curable, includes periods of latency with no outward signs/symptoms. A blood test can be used to diagnose the infection during any stage.

The male-to-female ratio of reported primary and secondary syphilis cases has increased dramatically in recent years, from 1.3:1.0 in 2000 to 4.7:1.0 in

2002. The increase in cases among men, paralleling a nationwide trend, was associated with an outbreak among men who have sex with men (MSM). Since 2000, the percentage of Illinois primary and secondary syphilis cases among MSM has increased from 22 percent of male cases in 2000 to 62 percent in 2002. In Chicago, 72 percent of male cases in 2002 were MSM. Other Illinois locations reporting syphilis cases among MSM in 2002 include the following counties: Champaign, Cook (suburban), DuPage, Kane, Lake, McLean, Will and Winnebago.

This trend in the pattern of syphilis infection is alarming for several reasons. Syphilis infection increases the risk of HIV transmission and acquisition by up to five-fold because syphilis lesions provide an entry point for HIV to infect the blood of sexual partners. In Illinois, 52 percent of MSM infected with primary or secondary syphilis in 2002 were co-infected with HIV. The increase in syphilis among MSM is also disturbing because it is an indicator that many MSM are putting themselves and others at risk for HIV and other infections through unprotected sex.

To effectively address Illinois' outbreak of syphilis, medical providers, public health agencies, affected communities and local community-based organizations will need to work together. Communities must understand local patterns of syphilis transmission and develop targeted intervention strategies that include education, risk reduction, screening programs and rapid treatment of persons who are infected with or exposed to this disease. The Chicago and suburban Cook County health departments have formed syphilis task forces to help focus efforts and to enlist community organizations as partners in syphilis reduction programs; similar efforts are being undertaken in other Illinois communities.

Links to Information about Smallpox

By Craig Conover, M.D., M.P.H.

1. Illinois Department of Public Health
<http://www.idph.state.il.us/Bioterrorism/default.htm>

2. Centers for Diseases Control and Prevention
<http://www.bt.cdc.gov/agent/smallpox/index.asp>
CDC has set up a registry to provide clinicians with real-time information to help prepare for (and possibly respond to) terrorism events. Participants receive regular

e-mail updates on terrorism issues and training opportunities relevant to clinicians. To sign up for the registry, go to <<http://www.bt.cdc.gov/clinregistry/index.asp>>.

3. Center for Infectious Disease Research and Policy, University of Minnesota • <http://www.cidrap.umn.edu>

4. Infectious Disease Society of America Smallpox Resource List • http://www.idsociety.org/bt/biotemplate.cfm?template=sm_resources.htm

5. American College of Physicians Smallpox resource list, including PDA smallpox decision support tool • <http://www.acponline.org/bioterro>

6. Johns Hopkins Center for Civilian Bio-defense Strategies • www.hopkins-biodefense.org
This site includes articles on smallpox vaccination and patients with congenital or acquired immunodeficiency, organ transplants and HIV/AIDS.

7. Center for the Study of Bioterrorism, St. Louis University School of Public Health
<http://www.seiu.org/health/smallpox.cfm>

8. Word Health Organization
<http://www.who.int/csr/disease/smallpox/resources>

TOPOFF Comments

By Mark S. Dworkin, M.D., M.P.H. and T.M.

During the week of May 12-16, the Division of Infectious Diseases of IDPH participated with others at IDPH and local and federal government officials and personnel in a multi-million dollar federally funded bioterrorism exercise called TOPOFF 2. During this exercise, the Division was involved in intensive efforts related to surveillance and epidemiology related to a simulated outbreak of pneumonic plague in the metropolitan Chicago area with cases being identified throughout Illinois, other states, and other countries. The exercise was a success in many ways because it required a great deal of preparation involving IDPH and other agencies who must work together during a real bioterrorism outbreak. It also allowed for testing of a number of preparedness plans that will assist with evaluation of these plans.

Surveillance Is Information for Action!

Q: What public health action is triggered when a syphilis case is reported to the local health department?

A: In Illinois, syphilis is reportable when a serologic test is "weakly reactive, reactive, or positive." In order to attempt to interrupt further transmission of syphilis, the local health authority, designated agency or the Illinois Department of Public Health, where applicable, initiates a contact interview and investigation process. The contact interview and investigation process is provided by counselors who have completed training in sexually transmitted diseases (STD) and the many related issues such as etiology, epidemiology, prevention, treatment, counseling and contact investigation.

Specifically, all persons with suspected and confirmed "early syphilis" (primary, secondary or early latent syphilis of less than one year's duration) are to be interviewed. All cases interviewed are asked to provide the names and any available identifying information regarding their sex contacts. Persons refusing to name their sex contacts are strongly encouraged to self-refer such contacts for testing and treatment, if necessary. Those contacts determined by the counselor to be at significant risk of infection, based on high or increased risk behavior and activities and/or exposure history, are investigated. Interviewing and counseling of STD cases and contacts are conducted in person, in a private manner, and are documented on epidemiologic records furnished by IDPH. Counselors follow the guidelines and standards described in Section 697.300 of the AIDS Confidentiality and Testing Code (for additional information, consult the Control of Sexually Transmissible Disease Code, 77 Ill. Adm. Code 693 and 697).

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