

## Pertussis Cases Show Threat To Infants, Health Care Staff

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Three recent hospital pertussis outbreaks and one infant death from the disease strongly point to the need for improved recognition and protection against transmission, the Centers for Disease Control and Prevention said.

The cases, from four states, also illustrate the potential benefit of vaccination against *Bordetella pertussis* in adolescents and adults, because immunity from infant immunization wanes after a decade.

No vaccine is currently licensed for persons aged 7 years and above, but two manufacturers have filed for licensure with the Food and Drug Administration for vaccines that combine acellular pertussis, tetanus toxoid, and tetanus toxoid antigens. One would be indicated for persons aged 10-18 years, the other for ages 11-64 years.

All three hospital outbreaks, which occurred in August and September of 2003, involved hospitalized infants with cough illness. In Pennsylvania, a 3-week-old infant was hospitalized with cough, post-tussive vomiting, and fever. Pertussis was considered unlikely, the infant wasn't tested for it, and hospital staff did not observe droplet precautions.

The infant was transferred to a referral hospital after 1 day, nasopharyngeal secretions were obtained, and *B. pertussis* was isolated 16 days later (MMWR 2005;54:67-71).

Meanwhile, the pediatrician who had cared for the infant at the first hospital developed a cough 9 days after exposure. Despite remaining symptomatic, he continued to treat patients—and to have contact with coworkers, family, and friends—without wearing a mask. His nasopharyngeal secretions tested positive 22 days after the initial exposure, while a total of 16 other health care workers and two pediatric patients at the initial hospital developed cough illness and/or tested positive for pertussis.

Hospital infection control personnel subsequently screened exposed employees, treated all who were symptomatic with a 5-day course of azithromycin, and excluded them from work for 5 days. Another 307 close contacts of the symptomatic health care workers were given azithromycin prophylactically, the CDC reported.

The other two outbreaks, in Kentucky and Oregon, also involved acutely ill infants with cough illness, exposed health care workers, and potential transmission to a large number of contacts who subsequently received azithromycin as either treatment or prophylaxis.

All three cases illustrated the difficulties in the diagnosis of pertussis, particularly in older individuals in whom the symptoms during the catarrhal stage are usually nonspecific while the disease is already highly communicable.

In infants, diagnosis may be delayed when the presentation is respiratory dis-

### Treating Pertussis In Health Workers

#### Clinical Findings

- ▶ Incubation period: 7-10 days (range: 4-21 days).
- ▶ Catarrhal stage: 1-2 weeks; coryza, low-grade fever, and mild cough.
- ▶ Paroxysmal stage: 1-6 weeks; paroxysmal cough, posttussive vomiting, and inspiratory "whoop."
- ▶ Convalescent stage: at least 3 weeks; cough gradually lessens and disappears.

#### Treatment/Prophylaxis

- ▶ Macrolides (erythromycin, azithromycin, or clarithromycin) are preferred.
- ▶ Trimethoprim-sulfamethoxazole is an alternative antibiotic that is used in persons with allergy or intolerance to macrolides.

Source: Centers for Disease Control and Prevention

tress with apnea but without the typical cough.

Also problematic is the lack of adequate diagnostic tests for pertussis. Culture is not sensitive beyond 3 weeks of illness or after antibiotic therapy, polymerase chain reaction for pertussis is not standardized, and no serologic test is available, although the CDC and the FDA are developing one.

A second MMWR report illustrates the fact that incompletely immunized children aged less than 6 months continue to be the most vulnerable to pertussis when the disease is circulating around them (MMWR 2005;54:71-2).

A 29-day-old West Virginia infant was brought to the emergency department with difficulty breathing. The infant's mother had had prolonged paroxysmal cough illness for 3 weeks before the infant's delivery; the father had onset of paroxysmal cough illness 2 weeks before the infant's illness.

The infant had been coughing for 5 days with increasing severity, resulting in posttussive vomiting and choking. At presentation, she was lethargic, tachycardic, and had a mild fever.

Laboratory results indicated leukocytosis. Chest x-ray revealed pneumonia, and she developed respiratory failure.

She died approximately 30 hours after admission to the pediatric intensive care unit, despite azithromycin treatment for presumed *B. pertussis*, high-frequency ventilation, nitric oxide administration, and a double-volume exchange transfusion.

The diagnosis of pertussis was based on history, clinical findings, and a positive polymerase chain reaction test. Around the time of the infant's death, two cousins, her paternal grandmother, and a great-grandmother all had cough illness as well. ■

## Pertussis Outbreak Reflects Growing Problem in Teens

ATLANTA — Pertussis in adolescents is an increasingly reported problem across the United States, Margaret M. Cortese, M.D., said at a meeting of the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.

Preliminary data for 2004 include 8,000 cases reported in adolescents, with large numbers in Wisconsin, upstate New York, Colorado, and Massachusetts. More than 100 cases were reported in adolescents in each of 16 states, while 14 states reported more than 500 cases each in persons of all ages. Moreover, although reporting rates have increased, "these numbers are likely only a portion of the true burden," said Dr. Cortese, a medical officer with the CDC's National Immunization Program.

Her presentation was among the discussion points during a 4-hour session at the Advisory Committee for Immunization Practices (ACIP) meeting devoted to issues surrounding the pertussis disease burden and to the anticipated licensure of two new reduced-antigen tetanus-diphtheria-acellular pertussis (Tdap) vaccines formulated for use in adolescents.

Both candidate vaccines—Sanofi-Pasteur's Adacel and GlaxoSmithKline's Boostrix—will be reviewed this month by the Food and Drug Administration's Vaccines and Related Biological Products Advisory Committee, and ACIP is expected to issue recommendations later this year for their use as adolescent boosters.

In Massachusetts—which is the only state that conducts active surveillance for pertussis using a standardized serologic test for diagnosis—there were

1,088 cases of pertussis among adolescents in 2003, compared with 374 in 2002, 331 in 2001, and 869 in 2000. Of those cases, between 45% and 50% were involved in school outbreaks, Dr. Cortese reported.

Because Massachusetts has such an aggressive surveillance and reporting system for pertussis, its rates are typically about 20 times higher than the reported rates of any other state and "probably give a true indication of the rest of the country," she noted.

Previously published data have documented significant morbidity and high costs associated with pertussis in adolescents. Among 314 children aged 10-17 years identified in Massachusetts, paroxysmal cough was reported in 74%, difficulty sleeping in 77%, difficulty breathing in 72%, post-tussive vomiting in 56%, and weight loss in 33%. A total of 38% were still coughing at the last interview, done a mean 3.4 months following the initial diagnosis (Clin. Infect. Dis. 2004;39:1572-80).

Those 314 were a subset of a larger group of 1,679 adolescents in whom various cost parameters were assessed. The teenagers made a median of two office visits, and 83% reported missing a mean 5.5 school days, while 43% of their parents/caretakers missed a mean 2.4 days of work.

Average medical cost (including office visits, chest x-rays, and antibiotics) per case was \$256, and average non-medical cost (mostly in missed work) was \$160.

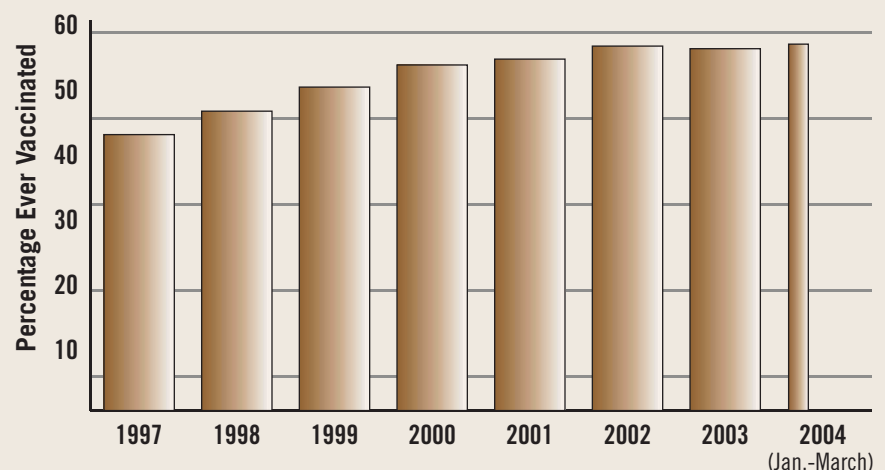
These estimates don't include the costs of prophylactic antibiotics for contacts or the public health response, Dr. Cortese noted.

—Miriam E. Tucker

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### DATA WATCH

#### Pneumococcal Vaccination Rate Reaches 56% In Adults Aged 65 Years and Older



Source: Centers for Disease Control and Prevention