State of Alaska Epidemiology **Bulletin**

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Pertussis (Whooping Cough): Two Alaska Cases

Case #1 - In December 1999, a 22-month-old Mat-Su Valley child was examined for coughing episodes seemingly associated with swallowing a foreign object. The child was unimmunized because of her parents' religious beliefs. Blood drawn 3 weeks after cough onset had a *Bordetella pertussis*/*parapertussis* IgM titer of 169.7 EIA units (normal <55.0), an IgG titer of 17 EIA units (normal <10), and a normal IgA titer. Since serologic results were not available until 2 weeks after the infant was presumptively diagnosed and treated, and 5 weeks after the onset of coughing, prophylaxis of household contacts was not indicated.

Case #2 - In January 2000, a 1-month-old Anchorage infant was examined for coughing episodes. His white blood cell (WBC) count was elevated at 31,700 cells/µL (normal 5,000-19,500 cells/µL), with 86% lymphocytes. A direct fluorescent antibody (DFA) stain of a nasopharyngeal swab was negative for *Bordetella pertussis*; however, the culture was positive. All other family members, several of whom had been ill, had both negative DFA tests and negative cultures for pertussis. They were prescribed erythromycin. The child was too young to be vaccinated.

Pertussis is an acute bacterial respiratory infection caused by *Bordetella pertussis*, a gram-negative bacilli. Initial clinical signs include nasal discharge (catarrh) which progresses to a cough that can become paroxysmal. Paroxysms consist of a series of violent coughs following by a characteristic crowing or high-pitched inspiratory whoop, often ending with the expulsion of clear thick mucus or vomiting. Paroxysms can last 1 to 10 weeks until coughing becomes less pronounced and gradually disappears. Patients with pertussis are usually afebrile. Adults or infants under 6 months of age might not exhibit the characteristic whoop or cough paroxysms.

Humans are the only reservoir for *B. pertussis*, and transmission occurs via direct contact with respiratory discharges (e.g., airborne droplets) of infected persons. An asymptomatic or mildly ill older sibling or parent can infect younger unimmunized children. The usual incubation period is 7-10 days, with a range of 6-20 days. The disease is highly communicable before the onset of paroxysms. Persons treated with erythromycin become non-infectious after 5 days of treatment. If untreated, persons can remain communicable for up to 3 weeks after the onset of paroxysms.

Diagnosis and Treatment

Definitive diagnosis is based on culture of nasopharyngeal secretions. Swabs must be Dacron or calcium alginate (**not cotton**), and must be inoculated on special media. False negative cultures may occur if the patient has been ill for more than 3 weeks, was previously immunized, or has been on antibiotics.

Other laboratory data can lend supporting evidence to a diagnosis of pertussis. As the whooping stage develops, high total WBC counts with lymphocytosis can be observed, as demonstrated by Case #2. DFA stains of nasopharyngeal secretions can be used to provide a rapid presumptive diagnosis. However, DFA tests have a low sensitivity and variable specificity. Case #2 had a negative DFA, but pertussis was confirmed by a positive culture. Serology is not well standardized and should not be used alone for diagnosis. Unless epidemiologically linked to a culture-confirmed case, persons with suggestive serology, such as Case #1, should be considered "probable" cases.

The antibiotic of choice is erythromycin. Treatment during the catarrhal stage can reduce symptoms. Erythromycin given during the paroxysmal stage usually will not affect the clinical course, but can shorten the period of communicability. Severe cases often require hospitalization for supportive care and assistance in managing paroxysms and their sequelae.

Public Health Recommendations

1. Possible cases of pertussis must be reported to the Section of Epidemiology. Call 269-8000 or the RTR System at 561-4234 (Anchorage) or 1-800-478-1700 (statewide).
2. **Cultures** of nasopharyngeal secretions are the most accurate method of diagnosis. Results from DFA and serology should be used **only** as supporting evidence.
3. A 14-day course of erythromycin is recommended for all household and close contacts, **regardless of age and vaccination status**. Prophylaxis should be initiated as soon as possible and no later than 3 weeks after exposure to an infectious case.
   Children should be given 40-50 mg/kg/day PO and adults 1-2 g/day PO in 4 divided doses for 14 days. Alternative antibiotics include trimethoprim-sulfamethoxazole.
   Recent CDC work suggested an association between the use of erythromycin in neonates <3 weeks of age and hypertrophic pyloric stenosis. CDC emphasized the importance of carefully defining contacts to prevent overuse of erythromycin.[1]
4. Patients with possible pertussis should be kept in respiratory isolation until after completion of 5 days of antibiotics. Isolation of patients from household members is usually not feasible; however, patients should refrain from direct contact with persons outside the household during this time.
5. Close contacts under 7 years of age should be offered a dose of DTaP (Diphtheria, Tetanus and acellular Pertussis) vaccine if they have either not received 4 doses or not had a dose within the past 3 years.
6. The most effective way to control pertussis is to **prevent** cases by ensuring that children are immunized with DTaP vaccine.

Ages for Recommended Pertussis Immunizations
2 months -- 4 months -- 6 months -- 15-18 months

More information about DTaP and a short video demonstrating a characteristic paroxysm are available on our website: http://www.epi.hss.state.ak.us/pubs/pln_talk/pertussis.htm

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Reference:

1. CDC. Hypertrophic pyloric stenosis in infants following pertussis prophylaxis with erythromycin - Knoxville, TN, 1999. MMWR 1999;48(49):1117-1120. Also available on the Internet at http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/mm4849a1.htm.

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