

Update on *Pertussis*

The incidence rate of *pertussis* declined steadily between 1940 and 1980. However, since 1980 the incidence rate has been increasing, primarily in the adolescent and adult populations¹. Between 1977 and 1979, the proportion of cases of *pertussis* involving adolescents and adults was 15.1%. By 1993, it had risen to 26.9%². Hypothesized reasons for *pertussis* persistence have included³:

- A greater number of unvaccinated or inadequately vaccinated individuals
- Waning immunity
- Occurrence of unrecognized cases in vaccinated adults with waning immunity
- Susceptibility of infants prior to completion of vaccination series
- Vaccine failure.

A recent study concluded that children exempted from *pertussis* vaccination were 5.9 times more likely to acquire *pertussis* than vaccinated children⁴. Suspicions of waning immunity after *pertussis* vaccination were validated during a 1962 outbreak in Michigan, when a much higher rate of infection occurred among individuals who were vaccinated more than 12 years prior to the outbreak than those vaccinated within 3 years of the outbreak⁵. An outbreak in Vermont in 1996 echoed this experience when researchers found that 46% of laboratory confirmed cases were 10 to 19 years of age, and 23% were 20 years or over⁶.

In the year 2000, the incidence of *pertussis* in the United States (reported by CDC) varied widely by state, from a low of 0.04/100,000 in Mississippi to a high of 37.76/100,000 in Vermont⁷. Although law mandates reporting, clinical diagnoses of *pertussis* are rarely reported. These statistics are therefore misleading when used for assessing true incidence rate of *pertussis*.

Pertussis should be included in the differential diagnosis of chronic cough in patients of all ages. Adults can present with the classic *pertussis* symptomatology of a catarrhal phase, followed by two to four weeks of paroxysmal coughing (rarely with inspiratory whoop) and a convalescent phase with prolonged cough. Often however, disease is mild and characterized by a nonspecific cough lasting several weeks to months. Some infectious adults may be totally asymptomatic. *Parapertussis* (*Bordetella parapertussis*) causes similar symptoms in adults, and differentiation can only be determined by isolation in laboratory culture. Table 1⁸ shows the frequency of clinical symptoms in adult patients with *pertussis*.

Table 1. Frequency of Clinical Symptoms in Adult Patients Diagnosed with *Pertussis*

Symptom	% of Patients
Paroxysmal cough	70 to 94
Whoops	8 to 38
Post-tussive emesis	17 to 42
Awakened by cough	52 to 88
Sputum production	66 to 79
History of fever	26 to 38
Preceding upper respiratory symptoms	44 to 58
Pharyngitis	31
Sweating attacks	14

Children less than one year of age are at greatest risk of serious complications from *pertussis* infections, including pneumonia, seizures, encephalopathy, hospitalization and death⁹. Mortality in adolescents and adults with *pertussis* is low, but undiagnosed (and untreated) individuals serve as a disease reservoir for infection of unvaccinated infants¹⁰. Recognition and diagnosis of *pertussis* in older children and adults followed by appropriate antibiotic treatment of the infected individual, prophylactic treatment of contacts, and accelerated vaccination of exposed, susceptible infants and children are effective tools for

prevention and management of *pertussis* outbreaks as well as decreasing morbidity and mortality in infants and toddlers.

Appendix I covers the Centers for Disease Control and Prevention (CDC) protocol for *pertussis* treatment and chemo-prophylaxis. The CDC publication, *Guidelines for the Control of Pertussis Outbreaks* can be viewed in its entirety at this website address:

<http://www.cdc.gov/nip/publications/pertussis/guide.htm>

Laboratory tests for *Bordetella pertussis* by culture and polymerase chain reaction (PCR) are available from the Nevada State Health Laboratory. PCR can detect as few as 2-5 organisms in a single specimen. Appendix II lists the criteria for submitting samples.

Nevada State law requires that suspect as well as confirmed cases of *B. pertussis* cases be reported to the Clark County Health District, Office of Epidemiology. To report, please call (702) 383-1378 or fax information to (702) 383-4936.

Written by: Patricia Rowley

Edited by: Rose Lee Bell, PhD, MPH

References:

¹ Vrchoticky TL, Chandramouli JC, *Bordetella Pertussis: What's all the Whoop?*, PT News: February 1998, <http://www.vh.org/Providers/Publications/PTNews/1998/02PTN.html>

² Centers for Disease Control and Prevention, *Resurgence of Pertussis – United States, 1993*, Morbidity and Mortality Weekly Report 1993; 42:952-953, 959-960.

³ Edwards KM, Karzon DT, *Pertussis Vaccines*. *Pediatr Clin North Am*. 1990 Jun;37(3):549-66, **In:** PT News: February 1998, <http://www.vh.org/Providers/Publications/PTNews/1998/02PTN.html>.

⁴ Feikin DR, Lezotte DC, Hamman RF, Salmon DA, Chen RT, Hoffman RE, *Individual and Community Risks of Measles and Pertussis Associated with Personal Exemptions to Immunization*. 2000, *JAMA*, 284 (24): 3145-3150. <http://jama.ama-assn.org/issues/v284n24/abs/joc01122.html>

⁵ Wright SW, *Pertussis Infection in Adults*, *South Med J* 91 (8) 701-708, 1998.

⁶ Centers for Disease Control and Prevention, *Pertussis Outbreak – Vermont, 1996*, Morbidity and Mortality Weekly Report 1997; 46(35); 822-826.

⁷ Centers for Disease Control and Prevention, *Pertussis Surveillance Report – Weeks 1-48, 2000*. Child Vaccine Preventable Disease Branch/ National Immunization Program.

⁸ Wright SW, op.cit. (See reference 5)

⁹ Vrchoticky TL, Chandramouli JC, op. cit. (See reference 1)

¹⁰ Estrada B, *Pertussis: Immunization Beyond Childhood*, 2000, *Infect Med* 17(6):391, 393.