Why there seems to be a re-emergence of whooping cough in the U.S. population?

Author: Patricia Bolivar PhD Epidemiology Candidate at Walden University
Class: Infectious Diseases Epidemiology
May 17, 2013

Whooping cough is a highly contagious respiratory disease caused by *Bordetella pertussis* a bacterial organism. Whooping cough is characterized by uncontrolable and violent coughing making it difficult to breathe resulting in a “whooping” sound (CDC, 2013). Despite almost hundred percent whooping cough (pertussis) vaccination rates in the United States, unvaccinated children in the U.S. is only 0.06% (CDC, 2013), there seems to be a re-emergence of whooping cough in the U.S. population. Pertussis reemergence can be attributed to the following factors: awareness of the disease have increased, diagnostic technology available such as PCR is capable to diagnose pertussis in a matter of hours instead of weeks, decrease number of parents providing their children with vaccine coverage, decrease of vaccine quality to suboptimal levels, waning of induced immunity produced by the vaccine, the pathogen organism adaptation to the vaccine (Mercola, 2010), and antigenic drift due to vaccine pressure affecting the circulating strains (Libster & Edwards, 2012). Reiteration on the importance of getting vaccinated in addition to new vaccine approaches and strategies may provide a measure of pertussis re-emergence control (Libster & Edwards, 2012).

A series of three doses of pertussis vaccine begins at two months after birth and is completed at six months of age at which time the infant is protected (SBC, 2010). Pertussis vaccine confers passive immunity which is not long-life immunity. Whole-cell pertussis vaccine begins to wane after 5-7 years, thus reducing herd immunity (Crowcroft & Britto, 2002). The levels of herd immunity and individual susceptibility to infections are major epidemiological factors that influence the periodicity and secular trends observed with pertussis (Nelson & Williams, 2007). Newborns and babies less than one year who get pertussis must be hospitalized, and of those
cases approximately 1 in 20 infants get pneumonia, 1 in 100 suffer convulsions, and a few babies in some cases die (SBC-DPH, 2010). Since pertussis affects babies most severely, development of new vaccines safe for the newborn may be a solution. Currently vaccine schedules do not give the first pertussis dose earlier than six weeks leaving a window of no protection for the babies. New strategies such as cocooning in which household persons in contact with the neonate are vaccinated have shown to protect the unimmunized baby (Libster & Edwards, 2012). Vaccine booster doses administered to children 7 years of age, adolescents, pregnant women, adults in contact with pregnant women, and adults more than 64 years old is currently recommended (CDPH, 2010).

Despite the widespread vaccine coverage of susceptible age groups in the population, improvements of the vaccine to an acellular pertussis vaccine (DTaP) licensed in the U.S. in 1996, and vaccination rates for children under age three above 84 percent; in 2010 California reported 9,156 with a rate of 23.4 cases per 100,000 persons (Libster & Edwards, 2012), compared to 258 cases and no deaths during the same time period in 2009 (CDPH, 2010). According to Libster & Edwards (2012) surveillance reports show an increased incidence of pertussis since acellular vaccination (DTaP) comprehensive programs in children started. Production of a monovalent acellular vaccine without diphtheria or tetanus toxoid could be administered more often without local and systemic reactions which could alleviate many parents concerns and vaccinate more often. Lastly, I should mention the fact that Bordetella parapertussis for which there is no vaccine also causes wooping cough which can look exactly like B. pertussis usually with milder symptoms. Education of health care personnel and physicians for recognition and testing for Bordetella parapertussis would definitively answer the obvious question: Is Bordetella parapertussis then responsible for the re-emergence of wooping cough? (Mercola, 2010).
References:


