The 100-Day Cough: The Time for Prevention Has Arrived

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(Please refer to the article by Lee et al. on pages 1572–80 and the article by Cherry et al. on pages 1715–8)

Pertussis was largely conquered in the United States and many western countries by administration of whole-cell pertussis vaccines in the 1950s. A decade ago, clinical trials found that much safer acellular pertussis vaccines had equivalent efficacy. Nonetheless, pertussis persists. Two populations in particular remain unprotected: infants in the first 6 months of life who have not received the first 3 doses acellular pertussis vaccine, and adolescents and adults whose immunity has waned since report of their last childhood dose of pertussis vaccine.

Although pertussis has been known for decades to occur in adults and adolescents, low diagnostic suspicion and limited use of confirmatory tests in adults and adolescents with coughing illness have left the full incidence and severity of disease uncertain. The application of improved serological assays has documented pertussis in coughing adults and adolescents both in clinical settings [1–3] and in epidemiologic surveillance systems [4–6]. Increased surveillance by means of a single-serum anti-pertussis antibody assay in Massachusetts has demonstrated that the incidence of pertussis is substantial: 75–100 cases per 100,000 adolescents and at least 5 cases per 100,000 adults [6]. Because the diagnostic criterion for this test is very conservative and diagnostic suspicion less than optimal, the true incidence may be even higher. Immunization of adolescents and adults with acellular pertussis vaccine would be a logical next step. However, vaccine licensure and immunization policy recommendations in the United States are yet to be realized. Questions remain: Is pertussis in adolescents and adults severe enough to justify immunization, and are most adults and adolescents susceptible to the disease?

Two articles in this issue of Clinical Infectious Diseases shed further light on these issues. In serum specimens evaluated in a multicenter trial, Cherry et al. [7] demonstrate serological evidence of prior pertussis disease or immunization in many adults and adolescents, yet across geographic sites, a substantial proportion of adults have no detectable antibody. Although precise criteria for susceptibility have not been defined, the reasonable conclusion from the data is that pertussis susceptibility is widespread among adolescents and adults.

The study by Lee et al. [8] provides important data on the clinical course, consequences, and costs of pertussis disease in adolescents and adults. At least one-third of adolescents and one-half of adults have coughing illness lasting 100 days. Observed consequences of pertussis included difficulty sleeping, weight loss, and lost time from school and work. Nonmedical costs were primarily due to lost time from work, whereas medical costs included hospitalizations (for a few patients), physician visits, diagnostic tests, and antibiotics for both the patients and their contacts. These cost data will enable forthcoming calculations of the cost-effectiveness of various vaccine strategies and will help formulate vaccine policy decisions. Cost-effective analyses are typically performed from the vantage point of societal benefits, which is a valid perspective.

If immunization cannot be justified on the basis of cost-effectiveness from a societal viewpoint, there is another perspective. What is it worth, from the individual’s standpoint, to prevent the “100-day cough?” Cost-effectiveness from the societal perspective does not usually place a value, or at least a monetary value, on this adverse life experience, other than that associated with lost work productivity. Even if public health authorities do not choose to recommend universal immunization, individual citizens may wish to protect themselves from the 100-day cough. They should be given this opportunity.

Such a policy—if centered on the importance of individual decision making—would be wrong not on philosophical grounds, but because the policy would miss a larger opportunity. There may be indirect effects from immunization of adolescents and adults—so-called herd immunity. Recently, the use of pneumococcal conjugate vaccine in infants has had an
indirect effect: the reduction of invasive pneumococcal disease in adults [9]. Pertussis immunization may be an opportunity to use the immunization of adolescents and adults to indirectly protect infants. Indeed, many infants contract pertussis from a coughing adult or adolescent, often their own mother [10]. However, indirect protection associated with pertussis vaccine remains to be demonstrated, and a large-scale trial to answer this question before licensure and use of acellular pertussis vaccine for adolescents and adults is not feasible. Vaccine policy will have to be formulated without comprehensive data for all of the important issues. We will have to wait until after licensure and administration of pertussis vaccine to adolescents and adults to see whether there is indirect protection of infants.

There is a time when decisions must be made without all of the data we would like to have. Immunization of infants has provided some protection for adults. It is time for effective adult immunization to protect infants. It is time to take a bold step and perform this “natural” experiment. The time has come for universal immunization to prevent the 100-day cough in adolescents and adults.

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References