Unexpectedly Limited Durability of Immunity Following Acellular Pertussis Vaccination in Preadolescents in a North American Outbreak

To the Editor—We read with interest Witt et al’s recent article on the limited durability of protection following acellular pertussis vaccination (DTaP) and we note that disease rates in their study population were highest in 12-year-olds and were dramatically lower in those aged ≥14 years (see Figure 1 [1]). We would like to raise with the authors the possibility that the shift from whole cell pertussis vaccine (DTwP) to DTaP as the primary course vaccine, and particularly the initial vaccine, may have contributed to the age-specific nature of infection in their patient population.

Queensland, Australia, which introduced DTaP for the primary course in March 1999, has been experiencing a sustained pertussis outbreak since 2009, with a similar peak in late childhood notifications of disease. We investigated a cohort of children born in 1998, vaccinated during the transition from DTwP to DTaP, and found that receiving a primary course of DTwP was associated with a significantly reduced risk of pertussis when compared to receipt of a DTaP primary course [2]. Receiving DTwP as the first dose in a mixed primary course also appeared to be associated with a similar reduced risk of notification. This differential protection persisted for more than a decade after receipt of the primary course despite most of the children (84%–89%, depending on type of primary course) receiving at least 2 DTaP booster doses (scheduled at 18 months and 4 years of age).

Witt and colleagues state that details on manufacturers of administered vaccines prior to 2002 could not be retrieved for the children in their study. However, if an acellular pertussis vaccine replaced DTwP for the primary course soon after the recommendation from the Advisory Committee on Immunization Practices (ACIP) in March 1997 [3], then it is likely that children aged 12 years during the period covered by Witt et al’s analysis (March–October 2010) were the first group to be exclusively vaccinated with DTaP. If this is the case, then the increase in notification rates in the late childhood years, peaking in 12-year-olds, would coincide with the first wave of widespread use of DTaP for the primary course.

We would be interested to know whether it is possible for Witt et al to disentangle the influence of receipt of a booster at 10–12 years of age from that of receipt of a primary course of DTwP in their study population, for example, by comparing rates of pertussis in children who were likely to have received both a DTwP primary course (using the ACIP recommendation date as a cutoff) and a booster at age 10–12 years with those who were likely to have received both a DTaP primary course and a booster at age 10–12 years.

Notes

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Potential conflicts of interest. K. G. has served on the GlaxoSmithKline (GSK) advisory boards for pneumonia and pneumonia conjugate vaccine. S. B. L. has been an investigator on clinical studies sponsored by GSK and Sanofi Pasteur, both manufacturers of pertussis-containing vaccines, and has served on GSK and Sanofi Pasteur advisory boards for pneumococcal and influenza vaccines, respectively. All other authors report no potential conflicts.

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References
