

# Tdap in Every Pregnancy: Circling the Wagons Around the Newborn

Mark H. Sawyer, MD<sup>a</sup>, Sarah S. Long, MD<sup>b</sup>

The resurgence of pertussis in the United States and many other countries in the world has become a major problem, with no immediate solution in sight. In 2014, the >10 000 reported cases of pertussis in California surpassed a recent previous record set in 2010 and all other records in the postvaccine era. The national experience mimics that of California, with rising numbers of cases widespread over the last 4 years. Sadly, the rising disease rate is accompanied by an increase in deaths from pertussis, almost exclusively in young infants. Why is this happening? We have learned that the immunity induced by acellular pertussis vaccines, the only type of vaccine used in the United States since the late 1990s, is not durable and wanes rapidly over just a few years. No sooner is 1 cohort of children protected from pertussis through immunization than another, older, cohort becomes susceptible again. We merely are treading water in our efforts to control pertussis with currently available vaccines.

As well outlined in the Global Pertussis Initiative review and position statement by Forsyth et al<sup>1</sup> in this issue of *Pediatrics*, we must circle the wagons around young infants. Very young infants suffer the greatest morbidity and almost exclusively the mortality related to pertussis, before they can be immunized. Couple this with an inability to prevent pertussis in members of the population that expose infants, and it is clear that we must focus on bridging the protection of infants from birth until they themselves can be effectively immunized. The most effective and

implementable strategy to reach infants is by immunizing their mothers against pertussis during pregnancy. Women generally access health care during pregnancy and by immunizing them we can passively protect their infants. With consistent recommendations from the Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics, the American Academy of Family Physicians, and the American College of Obstetricians and Gynecologists to provide influenza vaccine to pregnant women over many years, reluctance to immunize during pregnancy finally is overcome. This opened the door for the recommendation for tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis, adsorbed (Tdap) vaccine during pregnancy in 2011 in an effort to protect both pregnant women and their infants.<sup>2</sup> We now have data that this approach is safe and effective. This is good news, especially for infants. In California, the 9120 reported cases of pertussis in 2010 led to 10 infant deaths, whereas the >10 000 cases in 2014 led to only 3 infant deaths. It is reasonable to assume that pertussis immunization during pregnancy, which has been steadily increasing since its emphasis in California beginning in 2010, has contributed to the reduction in infant deaths.

Because the adequacy of short-term protection of young infants depends solely on the level of transplacentally delivered antibody, and because antibody titers wane rapidly after immunization, mothers must be reimmunized during each pregnancy.<sup>3</sup> Reimmunization is a small price to pay

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Opinions expressed in these commentaries are those of the author and not necessarily those of the American Academy of Pediatrics or its Committees.

[www.pediatrics.org/cgi/doi/10.1542/peds.2015-0770](http://www.pediatrics.org/cgi/doi/10.1542/peds.2015-0770)

DOI: 10.1542/peds.2015-0770

Accepted for publication Mar 16, 2015

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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**FINANCIAL DISCLOSURE:** The authors have indicated they have no financial relationships relevant to this article to disclose.

**FUNDING:** No external funding.

**POTENTIAL CONFLICT OF INTEREST:** Dr Sawyer is a member of the American Academy of Pediatrics Committee on Infectious Diseases and is a member of the Vaccines and Related Biological Products Advisory Committee to the US Food and Drug Administration. Dr Long is an associate editor of *Red Book: 2015 Report on the Committee on Infectious Diseases* and an ex-officio member of the Committee on Infectious Diseases, American Academy of Pediatrics; a liaison to the Pertussis Workgroup of the Advisory Committee on Immunization Practices, the Centers for Disease Control and Prevention; and a member of the Vaccines and Related Biological Products Advisory Committee to the US Food and Drug Administration. The authors are the sole writers of this commentary and have not received any financial support for writing the manuscript.

**COMPANION PAPER:** A companion to this article can be found on page e1475, online at [www.pediatrics.org/cgi/doi/10.1542/peds.2014-3925](http://www.pediatrics.org/cgi/doi/10.1542/peds.2014-3925).

to prevent infant deaths, but we can render benefit only for each woman immunized. We are falling woefully short. Currently, pertussis immunization rates during pregnancy are <20% despite strong recommendations by the CDC, the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, and the American Academy of Family Physicians.<sup>4,5</sup> All of us can do better. A concentrated effort to immunize pregnant women with Tdap in the Northern California Kaiser system attained an 83.9% coverage rate in 2014.<sup>6</sup> Obstetricians and family physicians must immediately increase their efforts to immunize during pregnancy because it is the standard of care and will continue to be for the foreseeable future, ie, unless and until new pertussis vaccines are developed, implemented, and proven more effective.

A second strategy discussed in the Global Pertussis Initiative article is to protect infants through immunizing those around them, known as “cocooning.” Although this strategy makes sense, it cannot prevent all cases that occur in the first few weeks after birth, and as a primary public health strategy it is very difficult to implement. In several studies, the success of implementation has been highly variable, with 19% to 85% of family members other than the mother immunized.<sup>7–9</sup> National pertussis immunization coverage for adults 19 to 64 years of age who reported living with an infant <1 year of age was 25.9% in 2012.<sup>10</sup> Barriers to the cocooning strategy include insurance coverage, the reluctance of providers caring for the mother to immunize the whole family, poor adherence of family members to

refer back to their own providers for immunization, and difficulties finding immunization records to determine who should be immunized. Pregnancy is the sole indication for repeated Tdap doses. The CDC currently recommends that every person 11 years of age and older should have received 1 dose of Tdap, but by 2012 a pitiful 14.2% of people aged ≥19 years had received Tdap.<sup>10</sup> The anticipated birth of a child is a good opportunity to ensure that everyone who will have contact with the infant has received recommended pertussis vaccines. The strategies together can complete a circle of protection around newborns.

We desperately need a new pertussis vaccine. Every indication is that large-scale pertussis outbreaks will continue until a new approach is developed. In the meantime, the best primary strategy to prevent infant deaths is to immunize every pregnant woman during every pregnancy and to present the immunization schedule as the standard of care rather than as an option.

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*Pediatrics* 2015;135:e1483

DOI: 10.1542/peds.2015-0770 originally published online May 11, 2015;

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The online version of this article, along with updated information and services, is located on the World Wide Web at:

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