



Theme: Immunization

 **Epidemiological and economic effects of priming with the whole-cell pertussis vaccine** (*JAMA Pediatr.* 2016 Mar 28. doi: 10.1001/jamapediatrics.2016.0047)

Current acellular pertussis vaccines may not protect against transmission of *Bordetella pertussis*. This simulation study was conducted (June 2014 to May 2015) to assess whether a priming dose of whole-cell pertussis (wP) vaccine is cost-effective at reducing pertussis infection in infants. The population was divided into 9 age groups corresponding to the current pertussis vaccination schedule, and fit to 2012 pertussis incidence. A priming dose of wP vaccine into the current acellular pertussis vaccination schedule was included. The results of the study reveal that switching to a wP-priming vaccination strategy could reduce whooping cough incidence by up to 95%, including 96% fewer infections in neonates. Although there may be an increase in the number of vaccine adverse effects, nonetheless a 95% reduction in quality-adjusted life-years lost with a switch to the combined strategy and a cost reduction of 94% was estimated, saving more than \$142 million annually. The results suggest that an alternative vaccination schedule including 1 dose of wP vaccine may be highly cost-effective and ethically preferred until next-generation pertussis vaccines become available.


Comment: More and more studies are now highlighting the inferior protection against pertussis accorded by acellular pertussis than whole cell vaccines. However, as far as industrialized countries are concerned, reverting back to wP vaccines is fraught with the danger of disruption of their well-established mass immunization program against pertussis, owing mainly to negative public opinion toward the wP vaccine.

 **Reciprocal interference of maternal and infant immunization in protection against pertussis** (*Vaccine.* 2016;34:1062-9)

Because of the current re-emergence of pertussis, vaccination during the 3rd trimester of pregnancy is recommended in several countries in order to protect neonates by placental transfer of maternal antibodies. In this study, the potential reciprocal interference of mother and infant vaccination in protection against pertussis in mice was examined. Female mice were vaccinated with acellular pertussis (aP) vaccines and protection against *Bordetella pertussis* challenge, as well as functional antibodies were measured in their offspring with or without re-vaccination. Maternal immunization protected the offspring against *B. pertussis* challenge, but protection waned quickly and was lost after vaccination of the infant mice with the same vaccine. Without affecting antibody titers, infant vaccination reduced the protective functions of maternally-derived antibodies, evidenced both *in vitro* and *in vivo*. Protection induced by infant vaccination was also affected by maternal antibodies. However, when mothers and infants were immunized with two different vaccines, no interference of infant vaccination

on the protective effects of maternal antibodies was noted. The researchers concluded that it may be important to determine the functionality of antibodies to evaluate potential interference of maternal and infant vaccination in protection against pertussis.

Comment: This study added yet another dimension to the interaction between maternal antibodies and primary infant pertussis vaccination in which not only maternal antibodies 'blunt' the immune responses of infant's primary vaccination, but antibodies generated by infant vaccination also impair the functionality of maternal antibodies. Indirectly, the study favors the use of wP vaccine as primary infant pertussis vaccination since wP-based vaccines cannot be administered to pregnant mother.

 **Live attenuated influenza vaccine may be less effective against A(H1N1) than inactivated influenza vaccine** (*Pediatrics.* 2016;137:1-10)

Few observational studies have evaluated the relative effectiveness of live attenuated (LAIV) and inactivated (IIV) influenza vaccines against medically-attended laboratory-confirmed influenza. The researchers at CDC, Atlanta, analyzed US Influenza Vaccine Effectiveness Network data from participants aged 2 to 17 years during 4 seasons (2010–2011 through 2013–2014) to compare relative effectiveness of LAIV and IIV against influenza-associated illness. Vaccine receipt was confirmed via provider/electronic medical records or immunization registry. The odds ratio of influenza-positive to influenza-negative was calculated among those age-appropriately vaccinated participants with either LAIV or IIV for the corresponding season. Of 6819 participants, 2703 were age-appropriately vaccinated with LAIV ($n=637$) or IIV ($n=2066$). Odds of influenza were similar for LAIV and IIV recipients during 3 seasons (2010–2011 through 2012–2013). In 2013–2014, odds of influenza were significantly higher among LAIV recipients compared with IIV recipients 2 to 8 years old (OR 5.36; 95% CI, 2.37 to 12.13). Participants vaccinated with LAIV or IIV had similar odds of illness associated with influenza A/H3N2 or B. LAIV recipients had greater odds of illness due to influenza A/H1N1pdm09 in 2010–2011 and 2013–2014. The researchers observed lower effectiveness of LAIV compared with IIV against influenza A/H1N1pdm09 but not A(H3N2) or B among children and adolescents, suggesting poor performance related to the LAIV A/H1N1pdm09 viral construct.

Comment: Till recently, LAIV was considered superior to IIV as far as protective efficacy against influenza among healthy individuals is concerned. The results of this study are quite relevant to us since majority of seasonal influenza in India is caused by A/H1N1pdm09 serotype.

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