

## Waning Immunity in Adolescents Klein Vaccinated for Pertussis

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Pertussis has been a difficult foe for pediatricians, vaccine manufacturers and public health policy makers. The disease has spawned record levels of outbreaks in many states, partly because some children go unvaccinated and other are incompletely vaccinated. New research published this month in *Pediatrics* suggested that control of the disease will require new vaccinations strategies because the new acellular vaccines produce limited immunity in adolescents.

Researchers from Klien et al. ([10.1542/peds.2015-3326](#)) studied the effectiveness of vaccination among a group of 279,493 persons who contributed 792,418 person years of follow up. A total of 1,207 pertussis cases occurred during the study period, including 2010 and 2014 outbreaks. They modeled pertussis risk in relation to Tdap vaccine status starting at the 10<sup>th</sup> birthday. The adolescents in the study had been vaccinated exclusively with the Tdap vaccine. The researchers estimated the hazard ratio for each year after Tdap receipt compared to unvaccinated adolescents. They used Cox regression modeling and adjusted for calendar time, age, race sex and the health care facility.

The researchers found that vaccine efficacy declined rapidly from 69% in the first year after vaccination to 8.9% four years after vaccination. The decline in vaccine effectiveness equated to the 35% increased risk of pertussis each year after vaccination. The authors suggest that their work means future pertussis epidemics will be larger in cohorts of adolescents who have only received acellular pertussis. They suggest that Tdap may be useful in a vaccination campaign to control epidemics.

The declining vaccine efficacy of the acellular vaccines also suggests the need for the development of new vaccines that offer longer protections and better vaccine efficacy. Herd immunity is important in the control and eradication of any vaccine-preventable disease. This research demonstrates that much more work remains to be done to control pertussis. That is well documented in CDC surveillance case reporting that document increasing numbers of cases in the last decade.

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