

Waning Protection after Fifth Dose of Acellular Pertussis Vaccine in Children

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Abstract

BACKGROUND

In the United States, children receive five doses of diphtheria, tetanus, and acellular pertussis (DTaP) vaccine before 7 years of age. The duration of protection after five doses of DTaP is unknown.

METHODS

We assessed the risk of pertussis in children in California relative to the time since the fifth dose of DTaP from 2006 to 2011. This period included a large outbreak in 2010. We conducted a case-control study involving members of Kaiser Permanente Northern California who were vaccinated with DTaP at 47 to 84 months of age. We compared children with pertussis confirmed by a positive polymerase-chain-reaction (PCR) assay with two sets of controls: those who were PCR-negative for pertussis and closely matched controls from the general population of health-plan members. We used logistic regression to examine the risk of pertussis in relation to the duration of time since the fifth DTaP dose. Children who received whole-cell pertussis vaccine during infancy or who received any pertussis-containing vaccine after their fifth dose of DTaP were excluded.

RESULTS

We compared 277 children, 4 to 12 years of age, who were PCR-positive for pertussis with 3318 PCR-negative controls and 6086 matched controls. PCR-positive children were more likely to have received the fifth DTaP dose earlier than PCR-negative controls ($P < 0.001$) or matched controls ($P = 0.005$). Comparison with PCR-negative controls yielded an odds ratio of 1.42 (95% confidence interval, 1.21 to 1.66), indicating that after the fifth dose of DTaP, the odds of acquiring pertussis increased by an average of 42% per year.

CONCLUSIONS

Protection against pertussis waned during the 5 years after the fifth dose of DTaP. (Funded by Kaiser Permanente).

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