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Is Infant Immunization a Risk Factor for Childhood Asthma or Allergy?

Trudi Kemp,¹ Neil Pearce,¹ Penny Fitzharris,¹ Julian Crane,¹ David Fergusson,²
Ian St. George,³ Kristin Wickens,¹ and Richard Beasley¹

The Christchurch Health and Development Study comprises 1,265 children born in 1977. The 23 children who received no diphtheria/pertussis/tetanus (DPT) and polio immunizations had no recorded asthma episodes or consultations for asthma or other allergic illness before age 10 years; in the immunized children, 23.1% had asthma episodes, 22.5% asthma consulta-

tions, and 30.0% consultations for other allergic illness. Similar differences were observed at ages 5 and 16 years. These findings do not appear to be due to differential use of health services (although this possibility cannot be excluded) or confounding by ethnicity, socioeconomic status, parental atopy, or parental smoking. (*Epidemiology* 1997;8:678-680)

Keywords: asthma, allergy, immunizations, children.

The prevalence of asthma and allergic disease has increased in many countries,¹⁻⁴ and there has been a great deal of speculation as to possible causes,⁵⁻¹¹ including the possible role of immunization in promoting allergic sensitization.¹² For example, pertussis vaccination acts as an adjuvant for antigen-specific responses in laboratory animals¹³⁻¹⁵; a specific immunoglobulin E (IgE) response to pertussis toxin itself has been identified in children receiving pertussis immunization¹⁶; and vaccination with some other organisms enhances histamine release in laboratory animals.^{17,18} In addition, two studies have found that pertussis infection increased the risk of atopy,^{19,20} and another study found that aluminum-adsorbed vaccines produce greater IgE responses.²¹ It is therefore theoretically possible that immunization may contribute to the development of allergic disease, whether through reducing clinical infections in infancy,¹² or through the

direct IgE-inducing effects of the vaccines themselves and/or the potentiating adjuvants. We have therefore examined data from a New Zealand cohort study to investigate the relation between infant immunization and subsequent allergic disease.

Methods

The Christchurch Child Development Unit comprises 1,265 children born in 1977.²² Information on immunizations, asthma, and other allergic disease (collected annually until age 16 years) was obtained from (1) a medical diary supplied to all mothers, (2) direct questioning of the mother about medical contacts, and (3) cross-checking with the family doctor when maternal reports or diary records were vague or inconsistent. Infants were scheduled to receive diphtheria/pertussis/tetanus (DPT) and polio immunizations at ages 3 and 5 months and measles immunization at 12-15 months; we did not consider subsequent immunizations, since our hypothesis focused on infant immunizations. Data on asthma, eczema, and other allergies (including rhinitis, food allergy, and urticaria, but excluding drug allergies) were categorized as to whether children had consultations (reported medical contacts) or episodes (consultations plus reported episodes not medically seen) up to ages 5, 10, and 16 years. A child was assigned to a negative category only if there were complete negative data for that child; a positive category was allocated if any episodes or consultations took place, whether or not the data were complete.

We analyzed the data using the Mantel-Haenszel summary risk ratio^{23,24} and Fisher exact methods where appropriate.

From the ¹Wellington Asthma Research Group, Department of Medicine, and ²Department of the Dean, Wellington School of Medicine, Wellington, New Zealand; and ³Christchurch Health and Development Study, Christchurch School of Medicine, Christchurch, New Zealand.

Address correspondence to: Neil Pearce, Wellington Asthma Research Group, Wellington School of Medicine, P.O. Box 7343, Wellington South, New Zealand.

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