

## Policies That Improve Childhood Vaccination Rates

Hughart N, Strobino D, Holt E, Guyer B, Hou W, Huq A, Ross A. *The relation of parent and provider characteristics to vaccination status of children in private practices and managed care organizations in Maryland. Med Care 1999;37:44-55.*

### Study Overview

**Objective.** To identify provider practices and policies as well as family characteristics that relate to vaccination status.

**Design.** Epidemiologic study using data obtained from interviews and medical record audit.

**Setting and participants.** Randomly selected children aged 24 to 30 months ( $n = 709$ ) seen at 18 private practices and staff-model managed care organizations located in 15 Maryland counties. Urban, suburban, and rural counties were represented in the sample.

**Data sources.** Provider policies and practices and physician and nurse practitioner knowledge, attitudes, and beliefs were assessed with questionnaires. Family data were obtained via telephone interviews. Vaccination status was assessed through medical records review.

**Measures.** Five vaccination status variables were calculated: (1) age-appropriate diphtheria vaccine, tetanus toxoid, and pertussis vaccine (DTP1); (2) age-appropriate DTP3; (3) age-appropriate measles, mumps, and rubella vaccine (MMR); (4) up-to-date for DTP4, 1 MMR, 3 polio vaccines (OPV), and 4 *Haemophilus influenzae* type b vaccines (Hib); and (5) up-to-date for hepatitis B vaccine. Variables were based on the immunization schedules recommended by the American Academy of Pediatrics [1,2]. Among the provider characteristics examined were use of reminder or follow-up systems, positive vaccination appointment scheduling policies, receipt of vaccine information from health departments, and concern about liability. Family characteristics assessed included demographic characteristics and parents' knowledge of and attitudes about immunization.

**Main results.** Although 94% of the children received DTP1 at the age-appropriate time, overall rates of age-appropriate or up-to-date vaccination were close to or more than 20 percentage points lower. Only 73% and 68% of children, respectively, received DTP3 and MMR age-appropriately. Similarly, only 71% were up-to-date for DTP4, MMR, OPV, and Hib,

and only 50% were up-to-date for hepatitis B vaccine, which was not offered at all sites. Site reminder or follow-up systems, positive vaccination appointment scheduling policies, and receipt of vaccine information from health departments were positively associated with higher vaccination rates (with odds ratios between 2.0 and 3.0 for appropriate vaccination at sites with these characteristics relative to sites without). On the other hand, concern about liability was associated with lower rates (with odds ratios between 0.44 and 0.67 relative to sites without). Family demographic characteristics were the strongest predictor of undervaccination, and children from poor, large (more than 2 siblings), or minority families were less likely to be vaccinated age-appropriately. However, neither parents' knowledge or attitudes about immunization nor children's insurance coverage were statistically associated with appropriate vaccination levels.

### Conclusion

Policies instituted by providers and health systems can effectively improve vaccination rates, regardless of geographic location or the family characteristics of the population served.

### Commentary

This carefully designed and executed study evaluated which provider and family characteristics are associated with improved vaccination rates. The authors found that the implementation of relatively simple office practices (among modifiable factors such as policies, knowledge, and attitudes) is associated most strongly with higher rates of appropriate vaccination. This finding may be surprising to those who have focused on factors such as improving parent education or increasing health insurance coverage as a way to boost vaccination rates. However, these factors may be less

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important in successfully immunizing pediatric patients than improved practice policies.

### **Applications for Clinical Practice**

The results of this study should encourage and motivate physicians, nurses, and administrators to keep abreast of national vaccination recommendations and guidelines and to implement practices that optimize the availability and convenience of vaccination services and that ensure a vaccination tracking and reminder system is in place. At the same

time, public health departments should feel secure that their provision of vaccine policy information to physicians and other health care providers is an effective motivator.

### **References**

1. American Academy of Pediatrics. 1991 Red book: report of the Committee on Infectious Diseases. Elk Grove Village (IL): The Academy; 1991.
2. American Academy of Pediatrics. 1994 Red book: report of the Committee on Infectious Diseases. Elk Grove Village (IL): The Academy; 1994.

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