INFLUENZA VACCINATION: PEDIATRIC PRACTICE APPROACHES*

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ABSTRACT

A variety of interventions have been employed to improve influenza vaccination rates for children. Overall, the efforts have met with little success, as influenza immunization rates for children remain low compared to those for older individuals. An age-based recommendation for universal influenza immunization might improve vaccination rates in children, but a variety of logistical, practical, and financial barriers make this problematic. Physician recommendation for influenza vaccination remains one of the strongest influences on parental decisions to immunize their children.


Influenza vaccination rates for children remain low despite clear evidence that immunization reduces the risk of infection. Even children who have high-risk conditions associated with specific recommendations for influenza immunization (eg, asthma) are not routinely immunized against influenza. Though clearly worthwhile from a health perspective, influenza vaccination of children does not appear to be a priority for physicians or parents. Can the situation change? Several strategies have been evaluated for their ability to improve routine childhood immunization rates, but it is not fully understood if these are applicable to pediatric influenza immunization. The first step in any systematic venture to improve quality must be an assessment of status quo. An examination of influenza immunization rates in a well-vaccinated community follows.

RESULTS OF A STUDY ON IMMUNIZATION PERFORMANCE

Pediatricians and other primary care providers believe they are doing a good job of caring for their patients, and few health care experts would dispute that immunizing high-risk children against influenza is part of good overall preventive care. To evaluate the immunization performance of physicians in the Rochester, New York area, a review of an insurer database was conducted. The review encompassed the period of September 1 through January 31 for 3 different years. Patients included in the review were 6 to 35 months of age and resided in the 6-county area surrounding Rochester.

To be eligible for the study, the patients had to be continuously enrolled in the insurance database during at least 1 of the 3 influenza vaccination seasons. Compared to many populations eligible for immunization, the patients included in the review could be considered advantaged, a factor favoring higher immunization rates. More than 40% of the study population lived in suburban areas, and 86% were covered by commercial insurance plans. The remaining 14% were

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enrolled in Medicaid managed care plans. In 77% of cases, pediatricians were the primary physicians for the patients.

In what might be considered a setting that would encourage vaccination, the study revealed an overall influenza immunization rate of 20% to 25%. Among children with asthma and other recognized high-risk conditions, immunization rates hovered around 25%. Despite the expectation of high rates of immunization, the review showed that even in good circumstances for providing health care, relatively few eligible children are being immunized against influenza.

**Improving Immunization Rates: What Works?**

Given the surprising and disappointing results from the Rochester study, the next step is to ask about strategies to improve immunization rates. The Centers for Disease Control and Prevention (CDC) convened the Task Force on Community Preventive Services to review these issues and make recommendations related to preventive services, beginning with immunization. The Task Force performed an exhaustive search of the medical literature to identify English language articles related to strategies for increasing immunization rates. They reviewed the articles and grouped the strategies discussed into 3 categories: 1) interventions that increased the demand for vaccination; 2) interventions that increased access to vaccination; and 3) provider-based interventions.

The Task Force then scrutinized the interventions for effectiveness. The strategies judged most effective at improving influenza vaccination received the designation of “strongly recommended.” Interventions that were somewhat less effective, but still potentially useful, fell into the category of “recommended.” The category of “insufficient evidence” was reserved for interventions that lacked sufficient evidence to demonstrate their utility.

**Increasing Community Demand**

Heading the list of the interventions judged most effective were client reminder and recall systems. These include telephone and mail reminders to notify patients or parents of the need to receive medical services. Many of the systems are computerized and updated on an ongoing basis (Table 1).

A second type of strongly recommended strategy was described as “multicomponent interventions with education.” An example would be providing parents with literature about the importance of vaccination in addition to establishing a system to mail immunization reminders to families.

The strongly recommended interventions are not necessarily practical for many primary care medical practices. The University of Rochester conducted a national survey of pediatricians and family physicians regarding the use of reminder systems. The survey showed that only about a third of the respondents had computer systems that would allow them both to sort patients by characteristics such as the presence of a high-risk medical condition and to generate reminders at specified times. Of the practices that had the necessary computer hardware and software, 56% had active reminder systems to notify families by mail, telephone, or e-mail. In short, the survey showed that automated reminder systems were not used by most pediatricians and family physicians because of the lack of the computerization required to generate such notifications. Also, many practices that had the computer hardware and software did not use the equipment to develop reminder systems.

The CDC Task Force identified only one intervention for the “recommended” category: school/day care entry requirements. The intervention refers to school systems and day care programs that make immunization a prerequisite for enrollment.

Several interventions were found to lack evidence supporting their effectiveness. Surprisingly, these interventions include some of the most widely used

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**Table 1. Increasing Community Demand**

- Strongly recommended
  - Client reminder and recall systems
  - Multicomponent interventions with education
- Recommended
  - School/day care entry requirements
- Insufficient evidence
  - Community-wide education only
  - Clinic-based education only
  - Client or family incentives
  - Client-held medical records
strategies to encourage immunization and other health care practices and actions, such as community-wide education, clinic-based education, patient or family incentives, and client-held medical records. While specific examples of effectiveness might exist for each of the interventions, the CDC Task Force found an overall lack of evidence to show the interventions work in broad applications.

**Increasing Access**

Reducing out-of-pocket vaccination costs heads the list of strongly recommended interventions to increase access. The intervention is highly intuitive; as the cost of a service increases, the likelihood that a family will seek the service decreases. Conversely, lowering the cost makes a service, such as vaccination, more attractive to and feasible for families, particularly families with limited financial resources (Table 2).

Expanding access to clinical settings is the only other strongly recommended intervention. Setting aside a particular time for quick service immunization-only visits or remaining open late on a particular night are examples of expanding access. The Task Force noted that expanded access to clinical settings is effective only when included as part of a multicomponent intervention; while staying open late 1 night a week will not be effective in and of itself, it will be effective when combined with education, reminders, or other interventions that help bring patients to the setting where the service is delivered.

Recommended strategies for increasing access include establishing vaccination programs at sites of the Women, Infants, and Children program. By linking immunization to other services that parents and patients seek, the opportunity for vaccination is expanded to people who might not otherwise seek it out. Home visits are also recommended, but are generally too expensive to be practical.

Insufficient evidence exists to demonstrate the efficacy of school- or daycare-based vaccination programs.

**Provider-Based Interventions**

These interventions stimulate healthcare providers to take appropriate action to encourage parents to have their children immunized. The Task Force identified 3 types of interventions that have evidence to warrant a strong recommendation: provider reminder and recall systems, assessment and feedback; and standing orders (Table 3).

Provider reminder and recall systems are similar to patient reminder systems, except directed toward physicians or other providers of health care services. An example might be something as simple as a note attached to a patient’s record that reminds the health care professional that a patient is due for vaccination. Another example is a computer-generated list of patients who are due for vaccination, which the provider can review on a regular basis.

Assessment and feedback refers to interventions that show providers how well they are doing in meeting certain objectives in their patient population. Some years ago, a program in Rochester provided physicians with feedback about immunization rates of

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**Table 2. Increasing Access to Vaccination Services**

- Strongly recommended
  - Reducing out-of-pocket costs
  - Expanding access in clinical settings (as part of a multicomponent intervention)
- Recommended
  - Vaccination in WIC settings
  - Home visits
- Insufficient evidence
  - Vaccination programs in schools (5-18 yrs old) and childcare centers (< 5 yrs old)

WIC = Women, Infants, and Children Program.

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**Table 3. Provider-Based Interventions**

- Strongly recommended
  - Provider reminder and recall systems
  - Assessment and feedback
  - Standing orders (adults)
- Insufficient evidence
  - Provider education only
their own patient populations as well as the rates for other physicians' patients. The feedback spurred some competitiveness among physicians eager to keep pace with or surpass their colleagues' performance.

Finally, the CDC Task Force found evidence to recommend use of standing orders. However, the evidence pertains only to adults in specific clinical situations, such as residents of nursing homes or other long-term care facilities. Standing orders obviously eliminate the need for the provider to remember to take an action.

Interventions targeted solely at education of providers could not be recommended on the basis of information reviewed by the CDC Task Force. Attending a medical conference, eg, is not sufficient to increase immunization rates.

**Universal Influenza Immunization**

The current risk-based recommendations for influenza immunization have not led to full vaccination of children with high-risk medical conditions. In contrast, age-based influenza immunization recommendations for seniors have led to substantially higher immunization rates. Given these observations, some experts are beginning to question whether age-based universal immunization might improve vaccination rates among high-risk children. Additionally, if influenza vaccination were recommended for all eligible infants and toddlers, fewer influenza-related hospitalizations would be seen in this age group and spread of influenza to adults may be decreased.

Several major barriers to universal pediatric influenza vaccination remain. Such a recommendation would greatly increase the number of children requiring immunization in clinical practices, which are already short of time and space for patient visits. Finances pose another obvious barrier; who would pay for all the extra vaccinations and associated office visits? Identification and notification of eligible patients might become more expensive and more time consuming.

To assess some of the logistical and practical issues associated with universal immunization, investigators at the University of Rochester conducted a time-and-motion study for influenza vaccination during December 2000 and January of 2001. Seven primary care practices in the Rochester area provided the setting for the study. Three practices were in the suburbs, and 4 were inner-city clinics. Collectively, the 7 practices provided care for a quarter of all the 2 year olds in the county. The study was limited to pediatric visits for the sole purpose of influenza vaccination. Personnel in each participating practice self-timed their activities related to immunization (Table 4).

The median total time required for immunization of a child was 16 minutes. Six minutes of the total time involved checking in and waiting in the waiting room; 10 minutes were spent in the examination room, with 8 of these spent waiting. Physician and nurse examinations required less than 1 minute each. The actual vaccination took about 2 minutes.

Using the 10-minute median examination-room time as the benchmark, the researchers calculated that 6 patients could be immunized each hour, with 48 patients per day per examination room. The range was from 29 to 104 patients daily per examination room during an 8-hour day. To administer influenza vaccine to 100 children would require 16 hours of examination-room time as well as 12 hours of additional staff nurse time and 10 minutes of clinician time.

The numbers provide ample reason to consider that—using our current model—universal influenza immunization of infants and toddlers might not be feasible.

**One Pediatrician’s Approach**

A pediatrician, Anders Nelson, MD, in Clark Summit, Pennsylvania, decided that immunization

<table>
<thead>
<tr>
<th>Room</th>
<th>Component</th>
<th>Median</th>
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</thead>
<tbody>
<tr>
<td>Waiting</td>
<td>Check-in and wait</td>
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</tr>
<tr>
<td>Exam</td>
<td>Nurse exam (20%)</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>MD exam (9%)</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>Vaccination</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Other-includes wait</td>
<td>8.0</td>
</tr>
<tr>
<td>All</td>
<td>Total visit time</td>
<td>16.2</td>
</tr>
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Total visit time was 2 times as long in urban as in suburban practices.
against influenza would have a big impact on his practice, which is relatively small. His clinic has 3 examination rooms, 2 nurses, and 1 receptionist. The practice comprises about 4600 patients who make about 12,000 visits per year.

This particular pediatrician decided to take a new approach to influenza immunization. In addition to vaccinating children and their siblings during well-child care, he set aside specific office times just for influenza vaccination. When parents arrive at an influenza vaccination-only session, a bulletin board provides an explanation of the process. First, parents fill out their invoice, then pick up a vaccine information statement, which they are encouraged to read before signing the consent form. Parents then take their invoice and signed consent form to the receptionist, who checks their completeness before directing parents and their children to the waiting line. The wait to be seen averages about 5 minutes. Some families bring 2 or more children for vaccination at the same time.

Each nurse has a separate examination room, and the family proceeds from the waiting line to the first available room. The nurses have large quantities of pre drawn influenza vaccine ready to administer. The nurse answers any questions the family has, then administers the vaccine. When the family leaves, the next family in line comes in; the nurse does not leave the room.

Between them, the 2 nurses average 140 vaccinations per session. In the 2000 full vaccination season, about 900 children were vaccinated in this practice, including all of the high-risk patients. In September 2001, an outside observer attended 1 of the sessions and documented vaccination of 163 children in 255 minutes, an average of 1 vaccination every 1.6 minutes.

In prior years, this physician attended the sessions but did not vaccinate any of the children. His goal starting in 2001 is to offer well-child care during the immunization-only sessions. The office receives $8 per immunization over and above the cost of the vaccine. Without considering any income from other visits, the income generated from these immunization sessions is reasonable. The immunization-only days have minimized use of staff and examination-room time, which previously were major barriers to immunization in his practice.

Without a computerized notification system, this physician relies on the old-fashioned but tested technique of word of mouth to remind parents about the vaccination sessions. He mentions the sessions during office visits with parents throughout the year. That brief notification is all the advertising he does to promote the vaccination program, emphasizing the influence of physician recommendation and support on parents' decision making about their children's health care.

Other Immunization Models

The approach discussed in the previous section is not the only strategy that can increase influenza vaccination rates. Ontario, Canada, has adopted a policy of universal influenza immunization for all children. In 2000, 11 million people (children and adults) were immunized in that Canadian province, a huge number considering the overall population.

The primary care model, which is the current model followed by most physicians in the United States, could be revised to combine age recommendations with immunization-only appointments. Many more high-risk patients would probably be immunized because of the age recommendation, not their high-risk health status.

Children who receive care from specialists, such as pulmonologists, are more likely to receive influenza vaccine. As such, a specialty and subspecialty model might be useful in this country. Immunization would be encouraged through specialists such as pulmonologists, cardiologists, and pediatric emergency physicians. Those specialties already see many high-risk children, so coverage of that group would likely increase.

Conclusion

A variety of strategies and interventions have been used to improve influenza vaccination rates for children. Despite ongoing efforts to encourage immunization, rates remain low, even in high-risk children, such as those with asthma. Physician encouragement and support remain strong influences on parents' decision to have their children vaccinated.

References