Influenza vaccination of parents and guardians by US pediatricians

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In the 2008–2009 and 2009–2010 influenza seasons, 84 pediatric offices participating in a prospective observational study were surveyed about whether the office offered influenza vaccine to parents and guardians of pediatric patients. Each season, approximately half of all offices cited offering seasonal influenza vaccine to parents. In 2008–2009, reported barriers to parental vaccination included reimbursement, medicolegal concerns and logistics. In 2009–2010, 51% of offices (n = 43) administered one parental seasonal vaccination for every 29 pediatric seasonal vaccinations and one parental H1N1 vaccination for every 23 pediatric H1N1 vaccinations. Currently, the number of parental vaccinations per office is small but parental vaccination by pediatricians may increase in the future given the new recommendations that all adults 18 to 49 years of age should be vaccinated annually. Efforts should be taken to address barriers to parental vaccination so that pediatricians are better able to vaccinate parents/guardians of their patients against influenza.

Introduction

Influenza is the most common vaccine-preventable disease, resulting in significant annual morbidity and mortality.¹ Most deaths related to influenza are found among the elderly and school-aged children have the highest burden of disease;¹ nonetheless, the impact of influenza is also felt within the young adult population. Infection rates with seasonal influenza in adults over the age of 18 can reach up to 20%.² Influenza illness can be debilitating to adults, may require bedrest, may cause the adult to miss up to 6 days of work per infection and may require up to 2 weeks for full recovery.³

In 2010, the Advisory Committee on Immunization Practices (ACIP) recommended that all individuals 6 months of age and older be vaccinated against influenza annually, adding healthy adults 18 to 49 years of age to the groups recommended for vaccination.⁴ Before 2010, the ACIP and the American Academy of Pediatrics (AAP) recommended influenza vaccine for those healthy adults 18–49 who were household contacts of children younger than 5 years or other high-risk individuals.^{1,5} The rate of influenza vaccination among younger, and particularly healthy, adults has historically been low. The Centers for Disease Control and Prevention (CDC) estimated that 17% of healthy adults 18–49 years of age were vaccinated against influenza in 2007–2008 and 22% of all adults (healthy and high-risk) were vaccinated in 2008–2009.^{1,6} In 2009–2010, the vaccination rate among healthy adults 18–49 years of age increased to an estimated 28%, likely driven by concerns surrounding the emergence of the novel H1N1 strain.⁷

Compared with children, adults have more potential venues at which they can receive an influenza vaccine, including workplace clinics, healthcare provider offices, public health clinics, emergency rooms or hospitals and pharmacies and other retail settings.⁸ For adults 18 to 49 years of age, approximately two-thirds of all influenza vaccinations may be delivered outside the physician's office.⁸ Convenience and enhanced access to the vaccine have been consistently associated with an increased likelihood of vaccination,^{8–12} and convenience may be particularly important for younger adults 18–49 years of age.⁸ Accompanying a child to a pediatric provider visit presents another opportunity for adults to be vaccinated against influenza. The AAP describes the topic of pediatricians' vaccinating the parents/guardians of their patients in the pediatric office as an area of "future need" in their annual influenza recommendations.⁵ To the best of our knowledge, no previous study has detailed and prospectively quantified influenza vaccination of parents and guardians among US primary care pediatricians. The current analysis utilizes data collected during a multiyear observational study of influenza vaccination in US pediatricians' offices¹³ to describe the practice of parental influenza vaccination among a small sample of US pediatric offices.

Results

In the 2008–2009 and 2009–2010 seasons, 84 offices completed the study. Thirty-two offices that participated in 2008–2009 continued in the study during 2009–2010; the remaining 52 offices enrolled in 2009–2010 were offices that had not previously participated in the study. Office characteristics are presented in

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Table 1. Office characteristics

	2008–2009	2009–2010
Number of pediatric offices	84	84
Mean physicians/office, n (range)	3.1 (1–9)	3.0 (1–12)
Mean nurses/office, n (range)	3.4 (0–17)	4.1 (0–19)
Mean nurse practitioner or physician assistant/office, n (range)	0.6 (0–5)	0.7 (0–4)
Mean other staff/office, n (range)	5.1 (0–32)	5.9 (0–27)
Mean patients per physician, n (range)	3,323 (393–13,160)	2,300 (274–7018)
Location within the US, n (%)^a		
Northeast	20 (24)	15 (18)
South	29 (35)	34 (40)
West	18 (21)	18 (21)
Midwest	17 (20)	17 (20)
Office demographics, n (%)		
Rural	13 (16)	13 (16)
Suburban	55 (65)	55 (65)
Urban	16 (19)	16 (19)
Distribution of practices by percentage of children in the VFC program, n (%)		
0	11 (13)	11 (13)
1–25	28 (33)	29 (35)
26–50	27 (32)	26 (31)
51–75	11 (3)	6 (7)
76–100	7 (8)	12 (14)

^aAccording to the American Medical Association, 23%, 22%, 35% and 19% of the US pediatrician population was estimated to reside in the Northeast, West, South and Midwest, respectively.²⁰

Table 1. No differences were noted between sites that did and did not offer vaccine to parents.

During the 2008–2009 study season, 43 of 84 (51%) of offices reported offering seasonal influenza vaccination to parents or guardians of their patients. Sixty-two of 84 sites responded to the detailed supplementary survey regarding parental vaccination, of which 30 (48%) offices stated that they offered influenza vaccine to parents and guardians. The main drivers for pediatricians to vaccinate parents were to protect their patients and to provide a service to the parents (Table 2). The main barriers to vaccination were concerns over health insurance and malpractice issues and concerns regarding vaccine side effects; as expected, concerns regarding these barriers were more frequent among offices that did not offer vaccine to parents (Table 3). Other barriers to vaccination described by offices that did not offer vaccine to parents related to interfering with the adult office medical home and issues related to vaccination logistics. Fifty-six percent of offices that offered vaccine to parents and guardians agreed or strongly agreed that they would increase this practice in the future. Regarding vaccine type used, 62% of offices offered parents the trivalent inactivated influenza vaccine (TIV) and live attenuated influenza vaccine (LAIV), 31% offered TIV only and 7% offered LAIV only. Offices cited vaccine efficacy, parent preference and

speed of administration as reasons for offering LAIV (Table 4). For reimbursement, 53% of offices reported receiving payment directly from the parent while 47% submitted a claim to the parent's insurance company; no information was collected regarding whether parents were encouraged or dissuaded from submitting a claim themselves. Of those offices who received payment directly from families, offices charged a mean of \$30 (range \$18–\$80) for TIV and \$36 (range \$20–\$55) for LAIV. Lastly, 50% of offices created a chart to document the vaccine administration and of those that did, 86% kept it for 2 or more years.

In 2009–2010, 40 of 84 (48%) offices surveyed before the start of the study stated that they offered influenza vaccine. During the study, 43 of the 84 offices (51%) administered 2033 seasonal influenza vaccinations to parents/guardians; 69% and 31% of doses were TIV and LAIV, respectively. Of offices administering vaccine to parents, a median of 17 doses (range: 1–1,075) were given per office. Most offices administered fewer than 25 doses; all but 1 office administered fewer than 100 doses (Fig. 1). Of offices administering vaccine to parents, 1 parent/guardian dose was administered for every 29 pediatric doses administered; at the office-level, the ratio ranged from 1:6 to 1:2,752. No relationship was seen between the number of parental vaccinations and the number of pediatric vaccinations. Similar to responses to the 2008–2009 survey, 60%, 30% and 10% of offices administered LAIV and TIV, TIV only, and LAIV only, respectively. Also during 2009–2010, 50 of the 84 offices (60%) administered 2,080 doses of pandemic H1N1 vaccine to parents/guardians, providing a median of 17 doses (range: 1–264) per office. Of offices administering vaccine to parents, 1 parent/guardian H1N1 dose was administered for every 23 pediatric H1N1 doses administered, with some offices providing only parental H1N1 vaccination and others providing as few as 1 parental vaccination for every 2,489 pediatric H1N1 vaccinations. Inactivated vaccine accounted for 66% of doses administered while live attenuated vaccine accounted for 34% of doses. There was no apparent correlation between practice size (total number of children ≤18 years of age) and an offices' total number of parental vaccinations (seasonal or H1N1). Measured as a function of time during the season, parental vaccinations occurred at similar time periods as pediatric vaccinations.

Discussion

Although this study involves a small number of US pediatrician offices, this is the first study of attitudes regarding and involving a quantification of parental influenza vaccination from a diverse sample of US pediatricians. The topic of parental influenza vaccination is currently a subject of debate among pediatricians.¹⁴ During the 2 years of this observational study, we found that approximately one-half of US pediatric offices offered seasonal influenza vaccine to the parents and guardians of their patients. As might have been expected, the greatest driver for pediatricians to vaccinate parents and guardians was to protect their patients, while the main barriers were concerns over health insurance and malpractice issues. Although many offices in the study offered the influenza vaccine to parents and guardians, generally few doses

were administered. However, parental vaccination by pediatricians may increase in the future given the new recommendations that all adults 18 to 49 years of age should be vaccinated annually.

The extent to which adults are immunized against influenza in the pediatric office has not been extensively studied. However, the AAP conducted a survey in 2006 in a random sample of 629 pediatricians and asked a single question about whether the physicians offered influenza vaccine to parents of high-risk children.¹⁵ In response, 30% and 21% of pediatricians reported usually and occasionally offering influenza vaccine to parents. This figure matches what we found in 2008–2009 and 2009–2010 through both of our surveys and in 2009–2010 through monitoring actual vaccine administrations.

Previous studies have demonstrated that vaccinating parents in pediatric settings can be highly successful. One study in a neonatal intensive care unit achieved parental vaccination rates as high as 95% when the vaccine was offered at no charge.¹⁶ A randomized controlled trial in an emergency department found that offering influenza vaccination (which would be charged to the patient or their insurance company) to families of high risk patients increased vaccination rates in accompanying family members from 34% to 75%.¹⁷ Only one previous study has investigated the acceptance of influenza vaccine by parents in primary care pediatric office.¹⁸ This study in an urban pediatric practice found that 250 of 292 (85%) caregivers of high risk children (children younger than 5 years or with a high-risk underlying medical condition) were willing to be vaccinated in the pediatric office when the vaccine was offered at no charge. Of those vaccinated, the mean age was 28 years, 66% were a child's mother, 19% were a child's father, 15% were other adult caregivers and 77% had no underlying high-risk medical conditions.

Although multiple estimates now substantiate that one-half of pediatricians administer influenza vaccinations to parents, the total number of parental influenza vaccine doses delivered in the pediatric office has not been previously quantified. Our study of seasonal influenza vaccine estimated that 1 parental vaccination was administered for every 29 pediatric vaccinations. In response to a query, SDI Health, LLC, a company with significant access to US insurance claims data, reported that more than 370,000 adult seasonal influenza vaccinations were administered by US pediatricians and reimbursed by private insurance companies in 2009–2010.¹⁹ Because our survey found that only one-half of pediatricians would submit a claim to the parent's insurance company after parental vaccination, this figure likely underestimates the total number of adult vaccinations delivered by pediatricians.

Table 2. Pediatric office attitudes and beliefs about parental vaccination against influenza, 2008–2009 season

	Somewhat or strongly agree, %
Among all offices surveyed (n = 62)	
We believe it is important that parents of children are vaccinated against influenza themselves (either in our office or elsewhere)	90.3
In the future, we will proactively stress the importance of the parents/guardians being vaccinated to parents of my patients (even if we do not vaccinate them in the office)	83.9
Parents often express interest in flu vaccination for themselves	69.4
The practice of vaccinating parents/guardians will increase in my office.	33.9
Among offices vaccinating parents, reasons for doing so (n = 30)	
To protect our patients	89.7
To provide a service to the parents of our patients	89.7
To ensure we utilize all of the influenza vaccine we purchase	41.4
It generates profit for the office	27.6

The strengths of this study include the prospective collection of parental influenza vaccinations in a geographically representative sample of multiple US pediatric offices. Study weaknesses include the small number of offices that participated in each study year and that the detailed survey on parental vaccination and the quantitative assessment of vaccine delivery occurred in different study years. Assessment of the number of vaccines administered to parents occurred during the response to the H1N1 pandemic which may compromise the ability to generalize the results of this study to those of nonpandemic years. Although pediatric offices were randomly invited to participate in the study, the potential for a selection bias exists. Voluntary response bias and inclusion criterion that required the calculations of exact patient numbers may have selected for offices with providers who were more aggressive in vaccinating patients and with enhanced infrastructures. However, given the wide range of doses provided per office to both children and parents, a substantial bias seems unlikely.

In conclusion, adult influenza vaccination programs in alternative settings, such as the pediatric office, can enhance the capacity of the healthcare system to effectively deliver vaccine to the adult

Table 3. Pediatrician concerns regarding parental vaccination against influenza reported by offices, 2008–2009 season

	Somewhat or strongly agree, %			
	All offices (n = 62)	Offices offering vaccine to parents (n = 30)	Offices not offering vaccine to parents (n = 32)	p ^a
Health insurance issues	56.5	36.7	75.0	0.004
Malpractice issues	50.0	33.3	65.6	0.02
Vaccine reactions/side effects	48.4	43.3	50.0	0.62

^aOffices offering vaccines to parents versus offices not offering vaccines to parents, Fisher exact test.

Table 4. Beliefs concerning influenza vaccine options for parents/guardians among offices that vaccinate parents, 2008–2009 season (n = 30)

	Somewhat or strongly agree, ^a %		
	LAIV	TIV	p ^b
We believe that it is a more effective vaccine in eligible parents/guardians	75.0	6.9	<0.001
We believe that parents/guardians would prefer this vaccine	67.9	3.4	<0.001
We believe that this vaccine can be administered faster	48.1	13.8	0.008
We believe that this vaccine is a safer option	25.0	13.8	0.3
We believe that this vaccine carries less of a malpractice risk	14.3	10.3	0.7

LAIV, live attenuated influenza vaccine; TIV, trivalent inactivated influenza vaccine. ^aThe same questions were asked separately for each vaccine (LAIV and TIV). Respondents were asked to rank their level of agreement on a 5-point Likert scale (1, Strongly Disagree; 3, Neither Agree or Disagree; 5, Strongly Agree). The values presented here represent the percentage of respondents answering with a 4 or 5. ^bComparing responses for LAIV versus TIV, Fisher exact test.

Figure 1. (A) Office-level parental and pediatric seasonal influenza vaccinations 2009–2010 season (n = 42). An outlier site that administered 1,075 parental and 6,097 pediatric vaccinations was excluded from this figure. (B) Office-level parental and pediatric H1N1 vaccinations 2009–2010 Season (n = 50). Both panels are presented with the same scale for the axes to facilitate comparison.

population. Parents are a particularly important target population, given that many are household contacts of high-risk children and studies have shown that parents may be particularly receptive to vaccination in pediatric settings. Approximately one-half of US pediatricians may currently vaccinate parents/guardians of their

patients against influenza, but the number of parental vaccinations administered per office is small. Given the new recommendations that all adults 18 to 49 years of age should be vaccinated annually, parental vaccination by pediatricians will likely increase in the future. Efforts should be taken to eliminate the financial and medicolegal barriers that may hamper pediatricians' ability to offer influenza vaccine to parents and guardians of their patients. Larger, national surveys of pediatrician attitudes and behaviors regarding parental influenza vaccination appear warranted.

Methods

A prospective, observational, noninterventional study was conducted in US pediatricians' offices during the 2007–2008, 2008–2009 and 2009–2010 influenza seasons; results from the first 2 seasons of the study (2007–2009) have been previously described in reference 13. Briefly, each year a sample of US outpatient pediatric offices from the American Medical Association (AMA) Physicians Masterfile list was recruited through a random selection process to achieve a geographically-balanced sample. Offices were accepted into the study in order of response to the invitation using geographic quotas. Following the 2008–2009 season, approximately one-half of offices that completed the study were invited to participate in the 2009–2010 season; new offices were recruited to reach an approximate sample size of 100 offices. To participate, offices had to provide influenza vaccine at their location and were required to be able to generate an accurate count of their patient population by age, preferably through an electronic method. To focus on outpatient physician practices, hospital-based offices were excluded. Participating offices completed surveys at the beginning and end of the study. Surveys were completed by a designated primary contact in the office (physician, nurse or office manager). In 2008–2009, all offices were asked whether they offered influenza vaccine to parents or guardians of their patients (yes/no) and were requested to complete a more detailed survey regarding their attitudes and behaviors regarding parental vaccination. In the detailed survey, respondents answered yes/no and multiple choice questions and rated their agreement with prespecified statements on a 5-point Likert scale (1 = Strongly Disagree, 3 = Neither Agree or Disagree, 5 = Strongly Agree). A few questions allowed free text, including: “Why do you refer the parents/guardians of your

pediatric patients?” and “How do you screen the parent/guardian for influenza vaccine eligibility?”

During the 2009–2010 season, all offices were again asked whether they offered influenza vaccine to parents or guardians of their patients, but the detailed survey was not repeated. Instead, parental vaccination was quantitatively monitored in study offices. From August 1, 2009, through March 31, 2010, offices prospectively recorded each seasonal and H1N1 influenza vaccination that was given to a parent/guardian of their patients as it was administered in the office. Administered vaccines were recorded by hand on a paper tally sheet by the individual who removed the vaccine from the office refrigerator. Each half-month during the season, the total vaccinations were calculated and reported. A new tally sheet was then used for the subsequent half-month. To simplify data collection, no information was collected regarding the age of the parent/guardian or whether the vaccinated parent/guardian had a high-risk underlying medical condition.

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Conflict of Interest

Drs. Bhatt and Hackell have received compensation and an honorarium from MedImmune for their office’s participation in this study and the presentation of its results. Dr. Carr and Ryan have received compensation from MedImmune for their office’s participation in this study. Drs. Ambrose and Toback are employees of MedImmune.

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