



Primary care physician perspectives on providing adult vaccines

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ABSTRACT

Recently, several new vaccines have been recommended for adults. Little is known regarding the immunization purchase and stocking practices of adult primary care physicians. To determine the proportion of family practice and internal medicine physicians who routinely stock specific adult vaccines and their rationale for those decisions, we conducted a cross-sectional survey in 2009 of a national random sample of 993 family physicians (FPs) and 997 general internists (IMs) in the US. Of the 1109 respondents, 886 reported that they provide primary care to adults aged 19–64 years and 96% of these physicians stock at least one vaccine recommended for adults. Of those, 2% plan to stop and 12% plan to increase vaccine purchases; the rest plan to maintain status quo. Of the respondents, 27% (31% FPs vs 20% IMs) stocked all adult vaccines. We conclude that many primary care physicians who provide care to adults do not stock all recommended immunizations. Efforts to improve adult immunization rates must address this fundamental issue.

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1. Introduction

Although the provision of immunizations has become a routine part of preventive care for children, the same is not true for adults. For example, only 17% of non-elderly (<65 years) high-risk adults have received the recommended pneumococcal vaccine [1].

Several studies have attempted to examine why adult patients do not receive immunizations in greater numbers. Patients frequently have reported their physician does not actively recommend vaccines and have identified mistaken assumptions regarding their own need for immunization [2]. Providers often identify different issues than those raised by patients, including patient concerns regarding side effects, patient fear of needles and lack of insurance coverage as reasons for low immunization rates in their practices [2]. Others studies have found a variety of factors contributing to low adult immunization rates such as the lack of a regular primary care provider [3], potentially confusing lifestyle or condition-based indications for some vaccines [4], and lack of prioritization from professional societies of physicians who provide care for adults [4].

Routine methods of informing physicians who provide preventive care for adults of the immunization schedule also have been lacking. Although a combined childhood immunization schedule has been published annually in the journal *Pediatrics* for at least the past decade, it was not until late 2007 that the *Annals of Internal Medicine* first promulgated the national adult schedule and will now do so annually in its pages [5]. Such efforts are greatly needed as many physicians do not make recommendations to their patients because they are not aware of current adult immunization recommendations [2].

Over the past several years, there have been several new vaccines recommended for adults. Provision of these vaccines in private practice settings would require physicians to stock these vaccines in their practices. In contrast to many other pharmaceuticals or biologics prescribed by physicians, vaccines must be purchased directly by practices in advance of patient demand. This requires a financial outlay on the part of the practice to purchase vaccines that the practice may, or may, not be able to resell. The greater the number of types of vaccine products and numbers of doses purchased, the greater the up-front expenditure required without a certainty of resale. Additionally, vaccines require sensitive cold-chain storage and this, in turn, requires an investment in special refrigerators and temperature alarms.

Although pediatricians have long been accustomed to stocking many different vaccines, little is known regarding the immunization purchase and stocking practices of physicians who provide primary care to adults. Such practices are an essential part of creating an environment of vaccine availability to adult patients. We

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sought to determine the proportion of internal medicine and family physicians who routinely stock specific adult vaccines and their rationale for those decisions.

2. Methods

2.1. Sample

We drew a national random sample of 1000 family physicians (FPs) and 1000 general internists (IMs) from the American Medical Association (AMA) Physician Masterfile through a contracted vendor. The AMA Physician Masterfile is the most comprehensive database of physicians licensed to practice in the United States, and includes both AMA members and non-members. Our sampling frame included all allopathic (MD) and osteopathic (DO) physicians self-described as a family physician or general internist in office-based, direct patient care. Excluded were physicians with any subspecialty board certification, age ≥ 70 years, currently in residency training, or employed at federally owned medical facilities (e.g., Veterans Affairs). After review of the 2000 records in the AMA Masterfile sample, we excluded 7 FPs and 3 IMs that were found to not meet our inclusion criteria.

2.2. Survey design

The 4-page, 15-item survey instrument addressed whether the respondent's practice currently stocks any vaccines for adults aged 19–64 years and, if not, reasons for not stocking any vaccines for this group. Then for each of 10 vaccines relevant for adults aged 19–64 years, the survey asked whether the practice currently stocks that vaccine for adults aged 19–64 years and, if not, reasons for not stocking that vaccine for this group. The 10 vaccines were: hepatitis A; hepatitis B; human papillomavirus vaccine (HPV); combined measles, mumps, and rubella (MMR); meningococcal conjugate vaccine (MCV4); pneumococcal polysaccharide (PPSV23); tetanus diphtheria (Td); combined tetanus, diphtheria, and pertussis (Tdap); varicella; and zoster.

Other questions addressed respondent attitudes regarding reimbursement for the cost and administration of vaccines for adults aged 19–64 years; the practice's plans in the next year for stocking vaccines for adults aged 19–64 years (stop, increase/decrease/same number of different vaccines); whether the practice participates with a purchasing cooperative or buying group for adult vaccine; and practice characteristics.

An additional question targeted respondent decision-making involvement in the practice with respect to vaccine purchase, asking "To what extent are you involved in decisions about vaccine purchase for your practice?" Respondents who reported that they are "directly involved in vaccine purchase decisions" were defined as *decision-makers* (DMs). Those who said they were "indirectly involved" or "not involved at all" were classified as *non-decision-makers* (nDMs).

The Institutional Review Board of the University of Michigan Medical School approved this study.

2.3. Survey administration

The initial survey mailing was sent at the end of April 2009 to 1990 physicians (993 FPs, 997 IMs) and included a personalized cover letter, the survey instrument, and a \$5 cash incentive. Two additional mailings to non-respondents occurred at approximately 4-week intervals.

2.4. Data analysis

We generated univariate frequencies for each variable and then performed chi-square analyses to examine associations between variables, with a two-tailed α -level of 0.05 as the threshold for statistical significance. All analyses were conducted using SAS[®] version 8.2 (SAS Institute, Cary, NC).

Bivariate analyses focused on variation in survey responses by physician specialty (FPs vs IMs) and by respondent decision-making involvement with respect to vaccine purchase (DMs vs nDMs).

2.5. Funding source

This work was funded by the Centers for Disease Control and Prevention (CDC). CDC study team members assisted with the design of the study, revisions to the manuscript, and the decision to submit the manuscript for publication.

3. Results

3.1. Response rate

Of the 1990 physicians (993 FPs and 997 IMs) in the sample, 124 were excluded because the mailing materials were returned as undeliverable (53 FPs and 71 IMs). Survey materials were returned by 1109 (594 FPs and 515 IMs) of the remaining 1866 physicians for an overall response rate of 59%.

In response to the initial screener question, 886 respondents (520 FPs and 366 IMs) indicated they do provide primary care to adults aged 19–64 years. Of these, 849 (96%; 96% FPs, 95% IMs) indicated that their practice regularly stocks at least one vaccine for adults aged 19–64 years. Of the 37 respondents who reported their practice does not stock any vaccines for adults, the most common reasons were that vaccines were available elsewhere in their community (69%), the expense of maintaining inventory (61%), inadequate reimbursement (56%) and inconsistent insurance coverage across plans (53%).

3.2. Respondent and practice characteristics

Overall, 34% of respondents were in large (>5 physician) practices (30% FP vs 39% IM; $p = .0031$). The majority of respondents (60%) were in independent private practice. Most (67%) reported that vaccine purchase decisions are made at the practice level rather than through a parent organization or practice network. However, only 30% of practices participated in a vaccine purchasing cooperative (Table 1).

The 849 respondents who stock any vaccines for adults 19–64 years are the focus of the remainder of the analyses reported.

3.3. General vaccine issues

Of all respondents, 49% reported they were directly involved in their practice's decisions with regard to vaccine purchase (i.e., decision-makers, DMs). There were no differences in this proportion between FP and IM respondents. However, DMs often had different perception of both financial and operational issues than nDMs.

Overall, only 2% of respondents reported their practice was planning to stop stocking all vaccines in the next year while 12% planned to *increase* the number of different vaccines they stock for adults and 79% expected no change. However, DMs were more likely than nDMs to report their practice was likely to *decrease* the number of different vaccines stocked for adults (11% vs 3%; $p = .0001$).

Table 1
Respondent characteristics.

	Overall % (N = 886)	FP % (N = 520)	IM % (N = 366)	P-value
Practice size				
Small (1–2 physicians)	38	39	37	
Medium (3–5 physicians)	28	32	24	.0031
Large (>5 physicians)	34	29	39	
Specialties within practice				
Family medicine	70	99	27	
Internal medicine	53	21	100	.0001
Other primary care	11	11	11	
Subspecialists	7	5	10	
Practice ownership				
Private, independent	60	58	62	
Hospital/medical center	19	18	19	
University health system	4	5	5	NS
Practice network/HMO	7	7	8	
Other	10	12	6	
Organizational level where vaccine purchase decisions made (among those stocking any vaccines for adults 19–64 years; could answer ≥1 choice)				
Within practice	67	67	68	NS
Parent organization/practice network	32	35	29	
Other	6	5	6	
Practice participates in vaccine purchasing cooperative (among those stocking any vaccines for adults 19–64 years)	30	32	26	NS

FP, Family physician; HMO, Health Maintenance Organization; IM, Internal Medicine physician.

Table 2
Extent to which certain issues present problems for vaccines stocked for adults aged 19–64 years, overall and by decision-making status.

	A major problem (DM vs nDM)	A minor problem (DM vs nDM)	Not a problem (DM vs nDM)	P-value*
Reimbursement for vaccine products	35% (46% vs 24%)	38% (36% vs 40%)	27% (18% vs 36%)	<.0001
Reimbursement for vaccine administration	24% (32% vs 16%)	40% (41% vs 38%)	36% (27% vs 46%)	<.0001
Patients declining vaccines due to out-of-pocket costs	26% (31% vs 22%)	49% (48% vs 49%)	25% (21% vs 29%)	.0028
Using vaccines by their expiration date	17% (24% vs 10%)	42% (42% vs 42%)	41% (34% vs 48%)	<.0001

DM, decision-maker; nDM, non-decision-maker.

* Significant difference between DMs and nDMs in reporting “major problem” vs “not a problem”.

DMs were significantly more likely than nDMs to believe several issues were “major problems” for their practice including patients declining vaccines due to out-of-pocket costs and reimbursement for vaccine products and for vaccine administration (Table 2). Few respondents reported that their practice had major problems associated with following appropriate storage protocols (5%) and knowing which patients need to be vaccinated (2%). Further, only 9% reported major problems with making vaccines a priority in their practice compared to other clinical demands.

3.4. Stocking of specific vaccines

The proportion of practices that did not stock specific vaccines for adults ranged from 8% to 55%. The vaccines that had the fewest FP and IM practices reporting they did not stock were Td (8%) and PPSV23 (11%). The vaccine with the greatest proportion of respondents reporting it was not stocked in their practices was zoster (55%). There were marked differences between FPs and IMs in reporting whether their practices stocked several vaccines (Table 3). Of the 789 respondents with no missing data for the specific vaccine stocking questions, 212 (27%) stocked all ten vaccines, 148 (31%) of the FPs and 64 (20%) of the IMs.

Although there was some variation in the proportion selecting reasons for not stocking specific vaccines, responses were in a relatively narrow range. Of the choices provided as reasons for not stocking specific vaccines, only one was selected by more than 50% of respondents; the high inventory cost of zoster vaccine. This same vaccine (zoster) had more than 40% of respondents reporting that they did not stock it due to inadequate reimbursement or inconsistent insurance coverage as a reason (Table 4).

Few differences were seen between FPs and IMs in reasons selected for not stocking specific vaccines. Specifically, FPs were more likely than IMs to report a high inventory cost as one of the reasons for not stocking HPV vaccine (55% vs 29%; $p = .0001$), MCV4 (46% vs 31%; $p = .002$) and varicella vaccine (40% vs 25%; $p = .004$). For three vaccines (MMR, MCV4, varicella) FPs were less likely than IMs to report they were not stocked due to having few patients in their practice for whom they were indicated. For two vaccines (HPV and MCV4), FPs were more likely than IMs to report not stocking due to inconsistent insurance coverage (33% vs 17% and 24% vs 13%, respectively; $p < .01$).

Table 3
Percentage of respondents not stocking each vaccine for adults aged 19–64 years, overall and by specialty.

Vaccine	% Not stocked (FP % vs IM %)	P-value
Td	8% (8 vs 7)	NS
PPSV23	11% (12 vs 11)	NS
Tdap	17% (12 vs 24)	<.0001
Hep B	24% (18 vs 33)	<.0001
MMR	35% (27 vs 47)	<.0001
HPV	37% (27 vs 53)	<.0001
HepA	38% (35 vs 43)	.02
MCV4	46% (35 vs 62)	<.0001
Varicella	46% (33 vs 65)	<.0001
Zoster	55% (54 vs 56)	NS

FP, Family Physician; IM, Internal Medicine physician; Td, Tetanus Diphtheria; PPSV23, Pneumococcal Polysaccharide; Tdap, Tetanus-Diphtheria-acellular Pertussis; Hep B, Hepatitis B; MMR, Measles-Mumps-Rubella; HPV, Human Papilloma Virus; Hep A, Hepatitis A; MCV4, Meningococcal Conjugate.

Table 4
Reasons for not stocking among those who do not stock each vaccine.

Vaccine	Inadequate reimbursement %	Inconsistent insurance coverage %	High inventory cost %	Patients receive elsewhere %	Few patients for whom indicated %	Patients do not want %
Td	26	23	17	23	38	9
PPSV23	38	27	38	33	30	4
Tdap	34	31	33	32	23	7
Hep B	34	30	46	35	23	2
MMR	19	16	27	33	48	5
HPV	26	24	40	32	28	7
HepA	25	26	38	26	42	7
MCV4	20	18	38	32	41	5
Varicella	20	19	31	28	44	6
Zoster	41	40	58	24	14	4

Respondents could choose more than one reason for each vaccine. Td, Tetanus Diphtheria; PPSV23, Pneumococcal Polysaccharide; Tdap, Tetanus-Diphtheria-acellular Pertussis; Hep B, Hepatitis B; MMR, Measles-Mumps-Rubella; HPV, Human Pampilloma Virus; Hep A, Hepatitis A; MCV4, Meningococcal Conjugate.

4. Discussion

Among the most important findings from our study was that only between 20% (IMs) and 31% (FPs) stocked all recommended adult vaccines, although only 2% of respondents were planning to stop providing all vaccines to adults aged 19–64 years. However, 79% were *not* planning to increase the number of recommended vaccines stocked for adults 19–64 years. For many of these vaccines, a large proportion of physicians who currently provide primary care for adults simply do not make them available to their patients. Such structural impediments to immunization are contrary to the concept of the medical home now gaining traction in the field of internal medicine [6]. Without even the opportunity to receive immunizations from their primary care physician, many adults will continue to remain unimmunized for recommended vaccines.

Related to this point is the finding that, excluding hepatitis B, Td and PPSV23 vaccines, at least a third of all physicians in our study do not stock the remaining seven recommended adult vaccines studied. The vaccine least likely to be stocked by both FPs and IMs is zoster, despite the recent 2006 recommendation for all adults aged 60 and over to receive it to prevent varicella-zoster reactivation [7]. Further, for internists specifically, the proportion rises to 50% not stocking almost all vaccines. While some of these vaccines are more often used in the adolescent age group, many internists still provide care to these patients and to young adults. Therefore, if these patients seek to receive immunizations, they likely must do so from sites other than their medical home. To fulfill the medical home concept, however, it would seem that primary care physicians should provide the full range of vaccines, including those that might be infrequently indicated. The policymaking agenda for adult vaccines should include addressing barriers to stocking these vaccines.

Our findings suggest that there may be a physician subset that is less likely to stock adult vaccines. Previous studies have demonstrated that racial disparities exist with regard to adult immunizations, and also that racial groups are served by different subsets of providers [8–10]. Future studies should explore whether physicians serving minority communities are more or less likely to offer vaccines for adults.

One probable reason that the vast majority of both FP and IM practices stock the PPSV23 vaccine is that it is one of the two vaccines, the other being seasonal influenza, included as part of the Healthcare Effectiveness Data and Information Set (HEDIS), a tool used by most US health plans to measure performance [11]. One potential course of action to increase the number of vaccines stocked in practices would be to increase the number of vaccines included in HEDIS measurements for adult patients.

Another important point is that there was not a single dominant or group of factors reported by physicians as reasons why they choose not to stock a particular recommended vaccine. Thus, based on our findings, there is not a single financial action or policy change that will likely have a significant positive impact on the majority of physicians who currently choose not to stock specific vaccines. Yet, efforts to address each of these factors may result in some practices choosing to stock more adult vaccines.

Similar to a previous study of provider beliefs regarding childhood immunizations [12], a relatively unique facet of our study was analyzing our data with regard to the self-declared vaccine purchase decision-making role of our respondents. We hypothesized that decision-makers would have a greater sensitivity to the financial aspects of immunization. Indeed, when looking at vaccines stocked in their practices as a whole, decision-makers were more likely than non-decision-makers to believe that major problems for their practices included patients declining vaccines due to out of pocket costs, their own reimbursement for vaccine products and vaccine administration, and using vaccines by their expiration date. However, with the exception of reimbursement for vaccine products (46%), no issue was identified by more than one-third of decision-makers as a major problem. Therefore, similar to reasons for not stocking vaccines, no problems with vaccines that are stocked appear dominant as a factor influencing immunization behavior for stocking adult vaccines.

Concerns regarding the adequacy of reimbursement for specific services must be kept in perspective as they are not unique to immunization provision. Discontent with payment for a variety of services have been reported in both the pediatric and the adult literature [13–17]. However, it is important to note that most recommended vaccines for adults are covered by private insurance plans [18].

As with all studies utilizing mailed surveys, the potential for response bias is the primary limitation of this analysis. Respondents may have a greater interest in immunization than non-respondents. Non-respondents did not differ from respondents for available demographic characteristics (age, gender, MD vs DO). Additionally, recall bias for some items may have occurred. For questions using a Likert scale, the phrasing of statements was varied to be either in a positive or negative frame to avoid further bias.

Another limitation is that our study only focused on primary care physicians. Many adults do not have primary care providers, instead relying exclusively on specialists who may be even less likely to stock routine adult immunizations [4]. Thus, our findings may represent a “best case” scenario with regard to vaccine availability for adults.

This report focused only on non-influenza vaccines recommended for adults aged 19–64 years; seasonal influenza vaccine is the most common adult vaccine.

In conclusion, this study provides baseline data on the stocking practices for adult vaccines. We found that many primary care physicians who provide care to adults do not stock vaccines recommended for adults. Efforts to improve adult immunization rates must address this fundamental issue. The ability of such primary care providers to function as a medical home for their patients is severely compromised if these providers continue to choose not to make available this major component of preventive care.

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