

Barriers to Adult Immunization

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ABSTRACT

Our aim was to provide a better understanding of why many adults fail to receive recommended immunizations. Consumers (N = 2,002) and healthcare providers (N = 200) completed structured telephone interviews concerning their attitudes and knowledge about adult vaccines and factors affecting their vaccination decisions. Self-reported immunization rates for tetanus, influenza, and pneumococcal vaccines (which were emphasized in the surveys) were lower than goal rates set by national guidelines. Among the most common reasons consumers gave for not receiving immunizations were lack of physician recommendations and mistaken assumptions (e.g., healthy people do not need immunizations). Healthcare providers tended to cite concerns such as side effects, fear of needles, and lack of insurance coverage as reasons consumers forego vaccination. Providers also cited practice issues, such as lack of an effective reminder system, as barriers to increasing adult immunization rates. We conclude that a better understanding of why adults do not get vaccinated is important for efforts to increase immunization rates in this broad age group.

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KEYWORDS: adult immunization; barriers; consumer; provider surveys

At the beginning of the new millennium, the Centers for Disease Control and Prevention (CDC) listed immunization as 1 of the top 10 public health achievements of the 20th century.¹ The Advisory Committee on Immunization Practices (ACIP) of the CDC, along with other professional organizations, recommends immunization schedules for children and adolescents² and for adults³ and updates them regularly. The recommendations are available to both healthcare professionals and the general public.

Although the US childhood immunization program has been very successful, the same level of success has not been achieved in adults. For example, annual influenza vaccination has long been recommended for everyone aged ≥ 65 years and for any adult with certain chronic conditions. Yet in a recent year in which vaccine availability was not an issue, only 65% of noninstitutionalized adults aged ≥ 65

years and 30% of younger high-risk adults reported receiving influenza vaccine.⁴ Pneumococcal vaccination also is recommended in these populations, but in the same year just 57% of noninstitutionalized men and women aged ≥ 65 years and 17% of younger high-risk adults received the pneumococcal vaccine.⁴ In 1999, the last year that the CDC reported rates for tetanus vaccination in adults, rates ranged from 36% in females aged ≥ 65 years to 71% in males aged 18 to 49 years.⁵

To learn why adults do not receive recommended immunizations, we conducted surveys of >2,000 adult consumers and 200 healthcare professionals in the United States. The surveys focused on general vaccination attitudes and knowledge of 3 specific vaccines recommended for routine use in adults: tetanus, influenza, and pneumococcal vaccines.

METHODS

The surveys were designed and conducted by Adelphi Research by Design, a healthcare marketing research firm. There were 2 distinct populations and survey instruments, 1 for healthcare professionals and 1 for other people (hereafter called “consumers”). Structured telephone interviews

Adelphi Research by Design was supported by a grant from sanofi pasteur Inc. to conduct this research.

Statement of author disclosure: Please see the Author Disclosures section at the end of this article.

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using these survey instruments took place between September 15, 2006 and October 15, 2006.

Consumers were contacted by random digit dialing. The caller asked to speak to the person aged ≥ 19 years with the most recent birthday. The respondent was given the option of conducting the interview in Spanish. The response rate, calculated as the percentage of those contacted who agreed to participate, was 3.1%, resulting in a population of 2,002 for the consumer study. The survey, which lasted approximately 25 minutes, solicited information about the respondent's personal immunization history, barriers or reasons why the respondent did not receive vaccines, the respondent's relationship with healthcare providers, and personal demographics. Questions about personal immunization emphasized 3 vaccines recommended for all adults or for those in particular age groups: tetanus vaccine, which should be administered routinely every 10 years; influenza vaccine, which is recommended annually for those ≥ 50 years or in certain high-risk groups; and pneumococcal vaccine, for people ≥ 65 years or in certain high-risk groups.³

In addition, 200 healthcare providers were randomly recruited from a national database of >16,000 primary care practices. They were contacted by e-mail or fax, and the response rate was 3.5%. This population consisted of 100 primary care physicians (50 internists, 50 family physicians/general practitioners), 34 registered nurses, 33 physician assistants, and 33 nurse practitioners. They completed a structured telephone interview lasting about 45 minutes that solicited information about their practice, their recommendations for adult patients regarding vaccines (again emphasizing tetanus, influenza, and pneumococcal vaccines), and barriers to vaccination.

To ensure that the consumer survey results reflected a nationally representative sample, iterative proportional fitting was used to weight the consumer data to match US Census Bureau data for 2000 on age, ethnicity, sex, income, education, and region of the continental United States. Because differences between weighted and unweighted data were minimal, unweighted consumer survey data are reported in this article. Data from healthcare providers were not weighted.

Statistical significance was determined by the independent *t*-test for means (assuming equal variances) and the independent *Z*-test for proportions. At the 95% confidence level, calculated using a standard formula, the margin of error for the consumer survey was $\pm 2.2\%$. The smaller healthcare provider sample had a margin of error of $\pm 9.8\%$. Significant differences are indicated at the 95% confidence level (2-tailed $P < 0.05$).

RESULTS

Consumer Survey

Population Characteristics. The consumer survey population was almost equally divided between men (48%) and women (52%). Age distribution was 17% aged 19 to 34, 16% aged 35 to 44, 20% aged 45 to 54, 20% aged 55 to 64,

15% aged 65 to 74, and 13% aged ≥ 75 . Of the 2,002 persons in the consumer survey, 74% were non-Hispanic white, 7% were non-Hispanic black, 9% were Hispanic and 10% were other or gave no report.

Most respondents (82%) rated their health as good-to-excellent, but 20% reported having a serious or chronic medical condition. The most common conditions mentioned were obesity (12%), diabetes mellitus (12%), heart disease (10%), and chronic lung disease (9%). In the 12 months before the survey, 20% of respondents had not seen a physician for a well-care visit and 29% had had a single routine care visit; 46% had not had a sick visit.

About half (48%) of respondents worked full-time or part-time, and 19% felt that their job put them at above-average risk of injury (e.g., construction, law enforcement). Approximately 1 of 4 consumers (24%) said their job increased their risk of acquiring a vaccine-preventable illness or brought them into contact with people who were extremely susceptible to illness.

Household income was $< \$35,000$ for 30% of respondents and $\geq \$75,000$ for 21%. Most consumers (84%) had some type of health insurance; 25% received their coverage through Medicare, 4% through Medicaid, and 4% through the military or the Veterans Administration.

Vaccine Awareness and Personal Vaccination History.

Most consumers were aware of the influenza (96%) and tetanus (90%) vaccines. Only 65% were aware of the pneumococcal vaccine, although awareness was higher in the groups for whom this vaccine is recommended. For example, 85% (95% confidence interval [CI], 82% to 88%) of respondents aged ≥ 65 years versus 50% (95% CI, 46% to 53%) of those < 50 years knew about the pneumococcal vaccine ($P < 0.001$). Awareness of this vaccine was 79% (95% CI, 75% to 83%) among people with chronic health conditions compared with 62% (95% CI, 59% to 64%) among those without chronic conditions ($P < 0.001$), and 67% (95% CI, 61% to 73%) among those with increased occupational risk compared with 53% (95% CI, 49% to 58%) among those without occupational risks ($P < 0.001$).

Although most consumers were aware of the tetanus vaccine, only 36% knew that adults should receive a booster every 10 years. Just 27% knew when they were next due for a tetanus immunization. Among the 533 consumers who had received a pneumococcal vaccination, 147 were aged ≤ 65 years and had a chronic condition, and 46% of these individuals were not aware they needed a booster.

Most consumers (82%) believed that it is important to keep up-to-date with immunizations, yet 34% said they were skeptical about receiving any type of vaccine. The skepticism may reflect misunderstandings about vaccination; for example, 26% of respondents who were aware of the influenza vaccine but did not receive it as recommended were concerned about getting the disease from the vaccine.

Of the 3 vaccines surveyed, the 1 that the most consumers (70%) recalled having received as an adult was the tetanus vaccine. In all, 62% of respondents reported having had an influenza vaccination as an adult. Rates for pneumococcal vaccination for those in recommended groups were low: 61% among people aged ≥ 65 years and 52% among those with chronic illness. For all 3 vaccines, the self-reported rates of vaccination were higher among at-risk groups for whom each vaccine is recommended (Figure 1).

Reasons for not Receiving Vaccines. Most consumers (79% to 85%, depending on the vaccine) indicated that they were likely to receive a vaccination if their healthcare provider recommended it. However, when given a list of possible reasons for not being immunized, 51% of consumers who were aware of the tetanus vaccine but had not received it, chose: "Doctor hasn't told me I need it." This explanation was selected by 38% with regard to the influenza vaccine and 57% with regard to the pneumococcal vaccine (Figure 2). Among consumers who knew of the vaccines, "Don't know when to get it" was cited as a reason for not having a vaccination by 37% of consumers for tetanus immunization, by 21% for influenza immunization, and by 26% for pneumococcal immunization.

The most consistent reason for not receiving a vaccine was the belief that a healthy person does not need it (60% or 61%, depending on the vaccine). Concern about side effects was cited by 22% of consumers as a reason for avoiding tetanus immunization, by 43% for influenza immunization, and by 40% for pneumococcal immunization.

Other frequently selected explanations for not receiving vaccinations were specific to the particular vaccine. The most common reason for not having a recent tetanus vaccine was the belief that it was necessary only when an injury occurred, an explanation chosen by 74% of respondents. For influenza vaccination, 59% cited a short supply which should be used by others who need it more—despite widely disseminated predictions of ample vaccine supply at the time of the survey.

Financial concerns were not a deterrent to immunization for most consumers. "No, this is not a reason" was the response to "Costs too much" by 80% to 82% of consumers as an explanation for not having each of the 3 immunizations. Only 14% to 17% of respondents stated that they failed to receive 1 of the 3 vaccines because their insurance did not cover it. When asked whether they would probably receive a vaccine if their out-of-pocket costs were \$25 to \$30, 72% of consumers said they were willing to pay that amount of money for the tetanus vaccine, 67% for the influenza vaccine, and 76% for the pneumococcal vaccine. An immunization costing \$25 to \$30 that could prevent missed days from work or hospitalization would be highly valuable, according to 83% of consumers.

Healthcare Providers Survey

Among the 100 physician practices included in the survey, 23% were urban, 57% suburban, and 20% rural. For the 100

nonphysician providers (a mix of physician assistants, nurse practitioners, and registered nurses [PA/NP/RN]), the practice locations were 25% urban, 38% suburban, and 37% rural.

Recommendations to Patients. Almost all healthcare providers (90% of physicians and 94% of the PA/NP/RN group) believed that all of their adult patients should be immunized. They also claimed to discuss recommended vaccinations with their adult patients, especially during annual exams or well-care office visits. Physicians in particular were less likely to discuss immunizations during acute-care or sick visits, with only 29% (95% CI, 20% to 38%) of physicians reporting this practice compared with 42% (95% CI, 32% to 52%) of the PA/NP/RN group ($P = 0.03$).

When asked about specific vaccines, 85% of physicians and 88% of the PA/NP/RN group said they recommend the tetanus vaccine to all adults. Recommendations were much less frequent for influenza and pneumococcal immunizations, as shown in Table 1. The responses in this table indicate that healthcare providers are not routinely following recommended immunization practices for adults. Some may not even be aware of the recommendations, as only 60% of physicians and 56% of the PA/NP/RN group stated that the official guidelines were their personal sources of information about adult immunizations.

Most healthcare professionals indicated that they have systems in place to ensure that patients receive recommended vaccines. These systems include an immunization sheet or reminder in patient charts and office protocols. Many practices post fliers in waiting rooms and exam rooms and instruct staff to remind patients about immunizations. Only ~33% of providers had ever conducted an objective evaluation, such as a chart review, of their adult immunization rates.

Perceived Barriers to Immunization. Healthcare professionals were presented reasons why patients might not receive tetanus, influenza, and pneumococcal immunizations (Table 2). According to healthcare providers, failure of patients to come for regular well-care visits and lack of an effective reminder system were among the more common reasons that adults do not receive recommended immunizations.

Healthcare providers also indicated that patients' dislike of needles, fear of adverse effects, and lack of knowledge about disease prevention were frequently responsible for missed immunizations. Yet >50% of the providers acknowledged that they do not always inform patients about the consequences of missing vaccinations. The PA/NP/RN providers were significantly more likely than physicians to always talk to patients about the consequences of not receiving recommended vaccines: 56% versus 34% ($P < 0.001$), 61% versus 47% ($P = 0.02$), and 59% versus 40% ($P = 0.004$) for tetanus, influenza, and pneumococcal vaccines, respectively.

Additionally, healthcare providers frequently cited inadequate insurance coverage and, to a lesser extent, con-

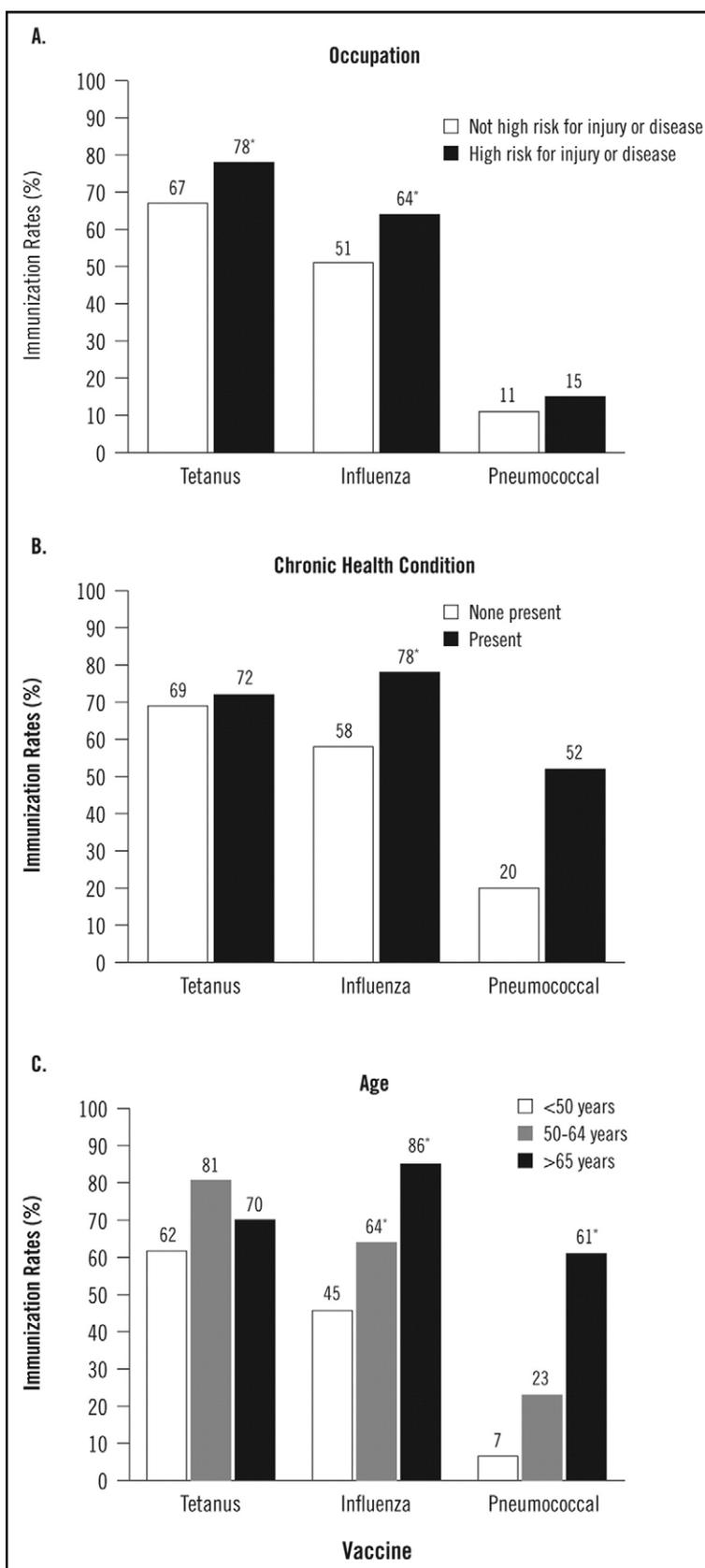


Figure 1 (A-C) Immunization rates reported in consumer survey, by risk factor (Vaccinations ever received as adults, as reported by 2,002 consumers). * $P < 0.05$ vs. nonrisk groups.

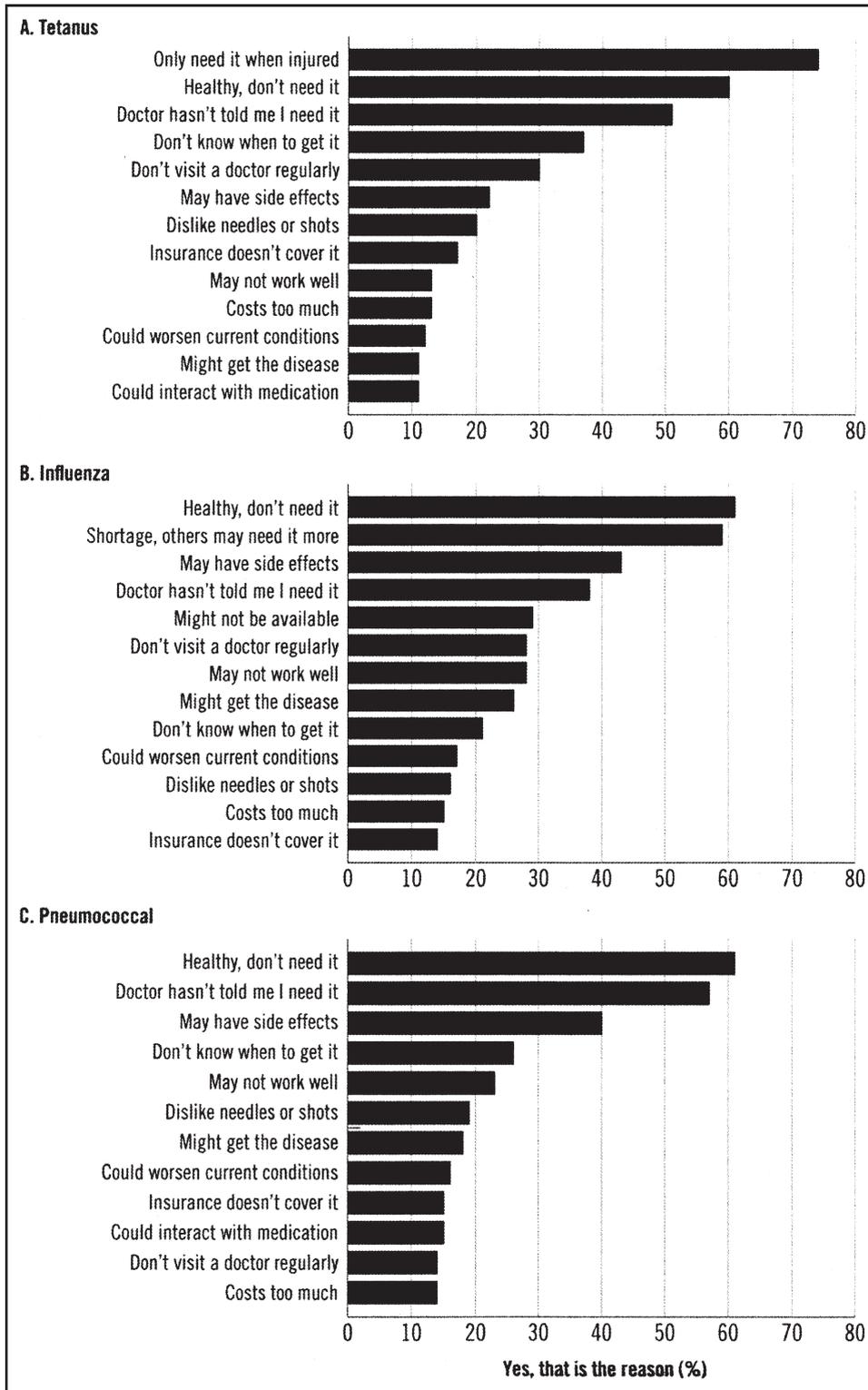


Figure 2 (A-C) Reasons consumers acknowledge for not receiving immunizations, by vaccine type. Scale shown is the percent of consumers who were aware of the immunization and who agreed that this is a reason they have not received it or will not receive it.

cern about the cost of vaccines as reasons adults might forgo immunizations. Depending on the vaccine and the professional group, between 61% and 79% of healthcare

professionals thought their adult patients would be likely to receive a vaccine if their out-of-pocket costs were \$25 to \$30.

Table 1 Healthcare provider recommendations for influenza and pneumococcal vaccinations by patient type

Patient Type	Influenza Vaccine		Pneumococcal Vaccine	
	Physicians (n = 100)	PA/NP/RNs (n = 100)	Physicians (n = 100)	PA/NP/RNs (n = 100)
All adults	39%	59%*	—	—
Aged ≥50 yr	28*	15	4%	18%*
Aged ≥65 yr	37	28	65	55
Chronic lung disease	45	40	68	55
Diabetes mellitus	31	25	44*	26
Heart disease	20	11	29*	12
Chronic liver disease	22	16	27	20
Chronic kidney disease	22	12	25	17
Weak immune system	17	20	24	29
Radiation/chemotherapy	14	9	17	10
Asplenia	—	—	27*	8
Complications or risk from other illness	25	17	28	23
Smoker	—	—	13	11
Close contact with someone at high risk	24	22	11	10

NP = nurse practitioner; PA = physician assistant; RN = registered nurse.

*Significantly greater ($P < 0.05$) than other provider group.

DISCUSSION

Our surveys confirmed that many adults do not receive immunizations as recommended. This is not the first time barriers to adult immunization have been examined. However, many studies are a decade old,⁶⁻⁸ and attitudes, beliefs, and knowledge about immunization may have changed. Some previous studies were limited to particular populations, such as the elderly^{6,9,10} or economically disadvantaged,¹¹ whereas the sample in our consumer survey covers people in all economic groups and the entire adult age span. In general, our study confirms findings from previous studies and adds to our understanding about why adults do not receive immunizations.

False assumptions, such as a belief that healthy people do not need immunizations, are important reasons that consumers fail to receive vaccinations. Efforts to inform and educate the public occasionally misfire. For example, publicity about past influenza vaccine shortages appears to have had a lasting negative effect. In our survey, consumers cited the desire to save a vaccine in short supply for others who needed it as a reason to skip influenza immunization, although there was no shortage at the time.

The Medicare Current Beneficiary Survey has consistently found that people fail to receive influenza vaccinations because they do not know they should be immunized.¹² Most of the consumers in our study said they were likely to follow their physician's recommendations for immunization, echoing earlier research.⁷ Both groups of healthcare providers in our study acknowledged that they were more likely to discuss immunization during well-care visits than during sick visits. Similarly, Szilagyi and associates¹³ found that the most significant practice barrier to immunization was other urgent concerns that dominated the office visit. However, a mild acute illness, even a febrile

illness, is not a contraindication for immunization.¹⁴ In recognition of this missed opportunity, hospitals have established standard operating procedures and protocols to offer vaccinations to inpatients and those treated in emergency rooms.^{15,16}

A comprehensive review of the literature found patient reminder/recall systems to be 1 of the strongest ways to increase community demand for immunizations.¹⁷ A review of 41 studies looking exclusively at patient reminder/recall interventions also found this to be an effective strategy.¹⁸ However, >70% of the providers in our survey noted the ineffectiveness of their reminder systems for tetanus and pneumococcal immunizations.

Although responses from our 2 different surveys should be compared with caution, it appears that healthcare providers and consumers do not always agree on reasons that adults go unvaccinated, especially those reasons related to consumer attitudes and beliefs. For example, >66% of providers thought that consumers avoid vaccinations because of concern about side effects, dislike of needles, or fear that the vaccine would make them ill. Consumers mentioned these concerns far less frequently as reasons that they did not receive immunizations.

Economic factors were another area where providers' perception of barriers differed from consumers' concerns. Most consumer respondents had insurance coverage for vaccinations, and only 13% to 15% stated that immunizations cost too much. But 50% to 66% of healthcare providers thought that monetary concerns were a major barrier to immunization. Some providers may not have been aware that immunizations are covered under Medicare. The program has been paying for pneumococcal immunization since 1981 and for influenza immunization since 1993.¹⁹

Table 2 Healthcare providers' explanations for why adults may not receive tetanus, influenza, and pneumococcal vaccines*

Explanation	Tetanus Vaccine		Influenza Vaccine		Pneumococcal Vaccine	
	Physicians (n = 100)	PA/NP/RN (n = 100)	Physicians (n = 100)	PA/NP/RN (n = 100)	Physicians (n = 100)	PA/NP/RN (n = 100)
Patient does not make regular well visits	85%	80%	83%	73%	88%†	77%
Concern about side effects, that it will cause illness	65	68	87	87	65	77
Lack of knowledge about illness prevention	73	76	62	75†	73	83
No effective reminder system	73	77	62	63	71	72
Fear of needles	71	68	71	68	69	67
Inadequate insurance coverage	66	71	61	67	68	79
Not going to same physician regularly	65	73	59	65	62	71
Unaware of vaccination schedule	64	70	50	56	70	68
Confused about recommended vaccination schedule	63	61	50	45	68	62
Think healthy people don't need it	49	55	66	63	68	68
Not receiving physician's recommendation	59	55	53	54	58	60
Vaccine too expensive	51	46	52	43	62	54
Think won't work if sick	38	33	58	58	46	52
Could worsen current conditions	31	28	58	53	37	43
Believe lifetime protection from childhood vaccines	49	45	28	29	35	31
Not enough time in office visit to discuss it	40	30	37	27	39	30
Think it's ineffective	24	22	48	46	31	30
Could interact with current medications	25	29	26	33	21	37†
Think only for elderly	—	—	56	57	68	73
Vaccine shortage	—	—	87	83	—	—
Need only when injury or open wound	80	82	—	—	—	—

NP = nurse practitioner; PA = physician assistant; RN = registered nurse.

*Percent of providers who agreed when presented a list of reasons adult patients might not receive the vaccine.

†Significantly greater ($P < 0.05$) than other provider group.

Lack of knowledge on the part of healthcare providers was a surprising finding in this study. Almost 50% of those surveyed did not rely on the CDC/ACIP guidelines, which are widely available in both print and electronic media.

Our surveys have several limitations. The response (willingness to participate) rates in both surveys were low, which could bias the findings. The healthcare provider sample was small. Although the consumer sample was large, it was mostly non-Hispanic whites. Studies have found differences in barriers to immunization among other ethnic groups.^{20,21} The immunization history in the consumer survey was based completely on patient recall. Finally, survey respondents often underreport behaviors that may be perceived negatively and overestimate behaviors perceived as good.

Although patient and provider education is needed to fill knowledge gaps and misunderstandings, knowledge by it-

self is not sufficient to improve immunization practices.²² Efforts should be made to make administration of recommended immunizations a routine part of all healthcare encounters. Based on the evidence in 118 studies involving 17 intervention strategies, the Task Force on Community Preventive Services recommended a variety of strategies to increase immunization rates in adults.²³

The National Vaccine Advisory Committee has called for identification and minimization of barriers to receiving vaccines.²⁴

SUMMARY

Findings from the consumer and provider surveys reported here may help distinguish the real reasons adults forego immunizations from the presumed barriers. This knowledge has the potential to further inform and refine policies established to increase adult immunization rates.

AUTHOR DISCLOSURES

The authors who contributed to this article have disclosed the following industry relationships:

David R. Johnson, MD, MPH, is a full-time employee of Sanofi Pasteur Inc.

Kim Lipczynski, PhD, has served as a consultant to Sanofi Pasteur Inc.; and is a full-time employee of Adelphi Research by Design.

Kristin L. Nichol, MD, MPH, has served as a consultant to CSL Biotherapies, GlaxoSmithKline, MedImmune, Novartis, and Sanofi Pasteur Inc; and has received research funding from GlaxoSmithKline and Sanofi Pasteur Inc.

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