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Paediatricians' attitudes and practices towards HPV vaccination

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Abstract

Aim—In June 2006, the human papillomavirus (HPV) vaccine, *Gardasil*, was licensed for use in the United States. We examined whether paediatricians would recommend the vaccine, obstacles they encountered and characteristics associated with not recommending the HPV vaccine to all eligible patients.

Methods—Four hundred fifty general paediatricians, 200 members of the section of infectious diseases and 200 members of the section of adolescent medicine of the American Academy of Pediatrics web-based directory were surveyed.

Results—Of 752 eligible paediatricians, 373 (50%) responded. Eighty-eight percent (292 of 332) of respondents stated that they would give the vaccine to all, 36 (11%) would give it to some and 4 (1%) would give it to none of their eligible patients. The main obstacles were cost and safety; a minority expressed concern about the vaccine's potential impact on adolescent sexual activity. Physicians who would not recommend HPV vaccination to all eligible patients were more likely to be generalists, have higher intrinsic religiosity, self-describe as conservative, report later adoption of new drugs/vaccines, and would not encourage vaccinating their own daughter or the daughter of a close friend.

Conclusion—Although paediatricians are highly supportive of the HPV vaccine, certain characteristics may predict reluctance to immunize.

Keywords

Attitudes; Beliefs; Human papilloma virus vaccine; Immunization; Policy; Vaccination

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CONFLICTS OF INTEREST

Dr. Alexander serves on the speaker's bureau for Merck, the manufacturers of *Gardasil* (HPV vaccine). He was involved in the design of the study but not in data analysis. Kimiko Ishibashi was responsible for designing the study, recruitment, data collection and data analysis. She helped revise the manuscript. Joy Koopmans was responsible for data analysis and helped write the manuscript. Farr Curlin was responsible for designing the study, data analysis and helped revise the manuscript. Ken Alexander was responsible for designing the survey and helped revise the manuscript. Lainie Ross was responsible for designing the study, overseeing data collection and analysis. Dr. Ross took primary responsibility for writing the manuscript.

INTRODUCTION

In June 2006, the Food and Drug Administration (FDA) licensed the human papillomavirus (HPV) vaccine, *Gardasil*, for use in females aged 9–26 years. Within weeks, the three-dose schedule was unanimously recommended by the Advisory Committee on Immunization Practices (ACIP) for routine use in females aged 11–12 years, with ‘catch up’ immunization for females aged 13–26 years who have not received the vaccine (1). The ACIP recommendations allowed for the administration of the vaccine to girls as young as age 9 (1). The ACIP’s formal report was published 8 months later, in March 2007 (2), and in May 2007, the American Academy of Pediatrics (AAP) published its own provisional recommendations (3). For girls between 11 and 18 years of age, the recommendations are identical. The AAP recommendations do not address vaccination in girls younger than 11 or older than 18 years of age (3).

In anticipation of FDA approval, two surveys were performed in 2004 and 2005 to assess paediatricians’ intentions to administer the HPV vaccine (4,5). To describe paediatricians’ self-reported attitudes and practices regarding this new FDA-approved vaccine, we surveyed paediatricians’ attitudes about the HPV vaccine shortly after the ACIP recommendations for immunization of girls aged 11–26 years were published. We examined whether paediatricians would recommend the HPV vaccine to all eligible patients, how strongly they would encourage those families who were initially reticent and what concerns might prevent them from recommending the HPV vaccine. We then examined the personal characteristics of physicians that are associated with not recommending the HPV vaccine to all eligible vaccine recipients.

METHODS

In October and November 2006, we surveyed 850 paediatricians to assess their experience with and opinions about both the HPV vaccine and a new vaccine for rotavirus. Paediatricians were sampled at random from the AAP web-based directory to include 450 general paediatricians (those with no subsection membership unless the subsection membership was young physician), 200 members of the section of infectious diseases and 200 members of the section of adolescent medicine. Paediatricians were excluded if they resided outside the USA, did not have an email address or fax number listed in the AAP directory or had graduated from medical school prior to 1960. A letter was sent to all paediatricians describing the study and requesting their participation. One week later, an email was sent to each subject with a link to the confidential, web-based survey. A second email was sent 2 weeks after the first. Finally, we attempted to contact all non-respondents to request participation by fax or postal mail.

The survey included questions about physicians’ attitudes and (intended) practices with respect to incorporating HPV and rotavirus vaccines into their patients’ immunization portfolios. Because of uncertain vaccine availability and uncertain insurance reimbursement at the time of our study, physicians were asked if they currently prescribed these vaccines, or if they were planning to prescribe these vaccines within 6 months to all, to some or to none of their eligible patients. If they stated that they would not recommend it to all eligible patients, they were then asked what factors led them to offer it to some and what factors led them not to offer it to others. Physicians were given the option to select from the following concerns as to why they would not recommend the HPV vaccine: safety, cost, potential for vaccination to foster increased adolescent sexual activity and other (please specify). All paediatricians surveyed were also asked how they would discuss each of the two new vaccines with their patients and parents, and whether they would vaccinate their own child

or the child of a close friend. This analysis focuses only on physician responses to the HPV vaccine.

The primary criterion measure was whether paediatricians would recommend the HPV vaccine to all eligible patients (vs. some or none) as defined by ACIP guidelines. Predictor measures included age, gender, specialty training, type of practice, geographic location, religious affiliation and percentage of patients with public aid or no insurance. Additional predictor measures included self-reports about the following: being a relatively early versus a relatively late adopter of new drugs/vaccines, level of tolerance of families who refuse or delay a universally recommended vaccine [measles mump and rubella vaccine (MMR)], tolerance for complementary and alternative medicine (CAM), liberal versus conservative orientation with respect to controversial social issues and 'intrinsic religiosity' as determined by perceived affect of religious beliefs on life approach. The two questions used to assess 'intrinsic religiosity' have been created to specifically measure the extent to which an individual embraces religion as the master motive that guides and gives meaning to his or her life (6).

Statistical analyses were conducted using SPSS for Windows Version 13.0 (SPSS Inc., Chicago, IL). First, descriptive statistics were generated for each survey measure. The χ^2 test was then used to examine differences in the primary criterion measure by each of the predictor measures, and multivariate logistic regression analyses were performed to examine whether bivariate associations persisted after controlling for relevant covariates. Finally, qualitative responses were transcribed and coded for themes by two researchers (KI and LFR). Approval from the University of Chicago Institutional Review Board for the project and for waived written consent was obtained before any subjects were contacted.

RESULTS

Of the 850 potential participants, 59 had non-working email addresses, 38 reported that they were no longer practicing or reported that they did not feel qualified to answer and 1 was excluded because the physician practiced outside of the USA. Of the remaining 752 eligible respondents, 373 (50%) returned completed or partially completed questionnaires.

Demographic data of respondents are listed in Table 1. One hundred seventy respondents were from the general AAP membership, 100 were members of the section of adolescent medicine, 97 were members of the section of infectious diseases and 6 could not be categorized. The average age of the respondents was 48 ± 9 years. Fifty-seven percent of all physicians identified themselves as Christian and another 22% identified themselves as Jewish. Approximately 10% of paediatricians stated that they had no religion. Respondents represent a geographically diverse sample.

There were some significant differences in the demographic characteristics of the general paediatricians and those who were members of the section of infectious diseases and the section of adolescent medicine. General paediatricians were more likely than infectious disease or adolescent medicine physicians to have graduated from medical school after 1985 (65% vs. 48% and 47%, respectively, $p < 0.01$), to work in private practice (73% vs. 43% and 35%, respectively, $p < 0.001$) and were more likely to have less than 20% of their patients with public aid insurance (50% vs. 25% and 33%, respectively, $p < 0.001$). Members of the section of infectious diseases were more likely to be male (61% for infectious diseases vs. 44% for generalists and 45% for adolescent physicians, $p < 0.05$).

Of the 332 physicians who answered whether they would give the HPV vaccine to all, some or none of their eligible patients, 292 (88%), would give it to all of their eligible patients. Only four physicians (1%) said they would not use it at all, while 36 (11%) stated that they

would only give it to some of their patients. Of the physicians who would prescribe the vaccine to only some of their patients, many ($n = 17$) indicated they would recommend it to patients who met any one of the following criteria: over 16 years of age, currently sexually active or likely to become sexually active. Others indicated they would recommend it for only one subset of patients [age > 16 years ($n = 4$), sexually active ($n = 5$) or likely to become sexually active, ($n = 11$)]. Among the 40 respondents who would not recommend the vaccine to all of their eligible patients, 21 reported that they were concerned about the cost of the vaccine, 10 were concerned about the vaccine's safety and 5 were concerned it might lead to increased adolescents' sexual activity. Eight respondents provided written explanations for not giving the vaccine at this time, including five who thought the lower age limit was too young, one who was concerned about reimbursement, one who was undecided and one who stated that 'there are truly some adolescents who do not need the vaccine' but did not elaborate on who those adolescents are.

The personal characteristics of the 40 physicians who would not give it to all of their eligible patients differed in some respect from the rest of the respondents (Table 2). These physicians were more likely to be general paediatricians, more likely to have high intrinsic religiosity and more likely to self-describe as conservative about controversial social issues and as late adopters of new drugs/vaccines. They also were less likely to encourage vaccinating their own daughter or the daughter of a close friend. There was no age or gender difference between those who would recommend the vaccine to all eligible patients and those who would not although all four physicians who would not provide the vaccine to any patient were male. The reasons selected by these four physicians from the options provided in the survey focused on safety and cost, and not sexuality. In multivariate analyses (controlling for gender, intrinsic religiosity, willingness to encourage the vaccine for one's own child, self-described attitudes about controversial social issues and early versus late adoption of new vaccines/drugs), no demographic variable was predictive of not providing the vaccine to all eligible vaccine recipients.

Attitudes about tolerance to CAM and about tolerance of MMR delayers and refusers varied greatly. Tolerance was rated on a scale of 'Not Tolerant' (1) to 'Very Tolerant' (5). There was wide variability with 49% of physicians rating themselves as 4 or 5 for CAM, but only 35% and 15% rating themselves as 4 or 5 for MMR delayers and refusers, respectively. A minority of physicians (3%, 9% and 14%) self-described as 'Not Tolerant' (1) for CAM, MMR delayers and MMR refusers, respectively. These attitudes did not differ between the physicians who would give the vaccine to all of their eligible patients and those who would not.

In response to how the physician would discuss the HPV vaccine with families, most paediatricians (74%) stated that they 'will offer the vaccine and try to persuade those who are reluctant'; an additional 52 physicians (16%) said that they planned to offer it but would not try to persuade one way or the other (see Table 3). Eighty percent of physicians who stated that they would recommend the vaccine for all of their eligible patients would also try to persuade their reluctant patients, compared to only 38% of those who would not recommend the vaccine for all of their eligible patients ($p < 0.001$). A plurality (45%) of the latter group would recommend the vaccine but not attempt to persuade. Only 11 physicians stated that they would not encourage use of the vaccine, and only one would refer the patient elsewhere. No physician indicated that they would discourage use of the vaccine. Twenty-two physicians answered 'other' regarding how they would discuss the HPV vaccine. This included 12 physicians who were not yet offering or discussing because of payment issues, and two who wanted to wait until long-term safety data and/or an official sanction by the AAP were promulgated. Two respondents raised concerns about the population to be immunized with one arguing only for older teenagers and the other stating that they wanted

to include boys. Two respondents stated were very supportive and would offer and persuade patients while four respondents stated that they did not give vaccines due to the clinical setting in which they worked.

DISCUSSION

In the first study examining physician uptake of the HPV vaccine after its FDA approval, we found that virtually all paediatricians (99%) support the use of the HPV vaccine, and 88% would recommend it to all patients who meet ACIP and AAP guidelines. Our data are also the first to examine how specialty affiliation correlates with attitudes towards the HPV vaccine. Members of the sections of infectious diseases and adolescent medicine were more supportive of universal vaccine use than were general paediatricians ($p < 0.05$) but it is the general paediatrician who is most likely to be the one in position to offer and provide the HPV vaccine.

Prior to FDA approval of the vaccine, two studies examined the intentions of general paediatricians to immunize their patients with HPV vaccine. Kahn et al. surveyed members of the AAP in 2004 (4) and asked respondents whether they would endorse the use of two different hypothetical HPV vaccines: one that was at least 70% effective against cervical cancer and the other that was at least 70% effective against both cervical cancer and genital warts. Respondents were also asked whether they would provide the vaccine to both boys and girls at three different ages: 11, 14 and 17 years. Kahn et al. reported that acceptance was greater for girls compared to boys and for older teenagers compared to younger teenagers.

Daley et al. surveyed members of the AAP who had volunteered to be a part of a sentinel network of participants in surveys regarding vaccines. The investigators asked respondents whether they intended to recommend a quadrivalent HPV vaccine for female and male patients in various age groups. Again, they found that paediatricians were more willing to recommend the HPV vaccine for girls than boys at all ages and for older adolescents (5). With respect to potential female vaccine recipients, 37% of general paediatricians stated that they would endorse the HPV vaccine for 10–12 year olds and 82% endorsed vaccinating 16- to 18-year-old adolescents.

Given the similar demographic features between our study and the studies by Kahn et al. and Daley et al., our data provide evidence that general paediatricians are incorporating the HPV vaccine into their practice just as they had stated they would. Our data found that more than four out of five general paediatricians will recommend the vaccine to all eligible patients and another 15% will provide it to some eligible patients. It is possible that even more paediatricians will begin to provide the vaccine to all of their vaccine eligible patients now that the AAP has endorsed its use.

Our data confirmed our hypotheses that certain personal characteristics and beliefs would be more common in those physicians who would not prescribe the vaccine to all eligible patients (i.e. greater intrinsic religiosity, more conservative about social issues and late adopters of new drugs/vaccines). However, our data refuted our hypotheses about other characteristics and beliefs (i.e. male gender, older age, less tolerant towards CAM and less tolerant towards families who delay or refuse the MMR vaccine) which did not correlate with vaccine prescribing practices. The main obstacles for our respondents to vaccine usage appear to be the practical concerns of safety and cost. Daley et al. also found cost a major obstacle. They found that 77% of paediatricians reported that lack of adequate reimbursement would be a barrier to vaccine administration (5). Daley et al. also examined the characteristics of 30 respondents (10%) who reported being unlikely to recommend HPV

vaccination to any patient of any age. These 30 non-adopters were more likely to be male and to express concern that the vaccine would lead to increased sexual activity. In our study, all four non-adopters were male, three of whom expressed concern about cost and safety. None expressed concern about the vaccine's impact on sexual activity although it was a specific option that was offered to explain their refusal.

Physicians in this study who were not going to provide the vaccine to all eligible patients did seek to target those adolescents who were older, and who they thought were or might become sexually active in the near future. Unfortunately, studies suggest that physicians are not very good at targeting at risk individuals in reproductive health care (7–9) such that paediatricians would better serve the community's health by following universal immunization as recommended by the AAP (3).

Although virtually all (99%) of the paediatricians in our survey stated that they would offer the HPV vaccine to at least some of their patients, actual uptake will also depend upon parental acceptance. Studies have shown parental acceptance to be lower than that of physicians. In a Wall Street Journal Online/Harris Interactive Health-Care Poll conducted at the time that the ACIP recommendations were published, only 70% of adults (and 61% of adults with daughters under age 18) stated that they would want their daughters to be vaccinated with the HPV vaccine (10). However, there are data to show that parents value the information and recommendations provided by their children's health care providers (11–13). Therefore, the fact that three-quarters of our respondents will attempt to persuade reluctant parents will likely increase vaccine uptake.

In September 2006, Michigan was the first state to propose mandatory legislation (14). Merck, the makers of *Gardasil*, had campaigned for this but agreed to stop lobbying efforts in February 2007 in response to negative feedback from parents, advocacy groups and public health experts (15). Still, at least 25 states introduced legislation that would require adolescent girls to receive the new HPV vaccine as a condition of school entry (16). Schwartz et al. question 'whether it was prudent public health policy to implement state requirements for HPV vaccination so soon after the vaccine's licensure', particularly given the negative backlash that has erupted about 'price gouging, corporate profits and political motives' (17). Unfortunately these concerns may hamper attempts to reach the populations that would benefit most from it, those with limited access to health care who might benefit from a state requirement, provided that the requirement respected families by including an opt-out provision (17).

A limitation of our study is that, although we only surveyed paediatricians, paediatricians will not be the only ones responsible for providing the HPV vaccine. A study by Raley et al. examined the intention of obstetricians to vaccinate for HPV (18). These authors surveyed obstetricians about vaccinating 13, 17 or 22 year olds using a vaccine focused on cervical cancer, genital warts or both. The study found that, although 79% of their respondents were accepting the HPV vaccine, many were disinclined to use it in a 13-year-old age group although this age group is 1–2 years older than the age currently being recommended for universal immunization (18). Riedel et al. surveyed members of the American Academy of Family Physicians about their intention to use one of two types of HPV vaccines: one that worked against cervical cancer and genital warts and one directed against only genital warts for either girls or adolescents of both genders (19). More family physicians expressed interest in a vaccine against both cancer and genital warts than a vaccine solely against genital warts. Family physicians also expressed more interest in vaccinating girls than boys (19). Both of these surveys were limited by response rates of less than 20% (18,19). Nevertheless, just as our data found differences between general paediatricians and sub-

specialists, these data show that other providers may have different practice patterns in providing the vaccine.

A second limitation of our study is that, although *Gardasil* was FDA-approved at the time of our study, paediatricians were uncertain about vaccine reimbursement by third party payers. Thus, for many of our respondents, the question was more aptly 'will use the vaccine' rather than 'are you using the vaccine'. A third limitation of our study was the response rate of 50%. While this is an excellent response rate for a survey of physicians (20), it is impossible to know whether respondents and non-respondents have similar attitudes. A fourth limitation is that we sampled paediatricians in the AAP directory who had no subspecialty affiliation except young physicians. This is a proxy for general paediatricians although there are some sub-specialists who belong to the AAP but do not belong to their specialty section and may have been included in our sample. We chose to over-sample this group because they are the most likely providers of the HPV vaccine. We also sampled paediatricians who are members of two sections, the section of adolescent medicine and the section of infectious diseases as a proxy for adolescent medicine physicians and infectious disease physicians. However, membership in these sections does not mean that these individuals are fellowship trained or Board-Certified in these areas, just that they have an interest in these areas of medicine and pay dues to affiliate with these sections.

CONCLUSION

The vast majority of paediatricians are highly supportive of recommending the HPV vaccine to all of their vaccine-eligible patients. Despite this strong support for HPV immunization, paediatricians are still grappling with issues including the age at which this vaccine should be offered to girls, vaccine safety, long-term vaccine efficacy and the utility of immunizing males. While there are practical obstacles (e.g. cost and safety) that are being addressed, there may also be some who will not offer this vaccine due to personal beliefs. Although we were not able to ascertain any social or religious objections to the vaccine, there were demographic features (i.e. male gender, strongly religious, socially conservative, late adopters of new drugs/vaccines) found more frequently in those who did not support universal vaccination. Further study is needed to understand what impact these physicians will have on adolescent access to this vaccine in various communities and how or whether their practice changes now that official recommendations from the AAP have been published.

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Abbreviations

AAP	American Academy of Pediatrics
ACIP	Advisory Committee on Immunization Practices
CAM	complementary and alternative medicine
FDA	Food and Drug Administration
HPV	human papillomavirus

References

1. Centers for Disease Control and Prevention, Office of Enterprise Communication. CDC's Advisory Committee Recommends Human Papillomavirus Virus Vaccination. Available at <http://www.cdc.gov/od/oc/media/pressrel/r060629.htm>
2. Markowitz LE, Dunne EF, Saraiya M, Lawson HW, Chesson H, Unger ER. Quadrivalent human papillomavirus vaccine: recommendations of the advisory committee on immunization practices (ACIP). *MMWR Morb Mort Wkly Rep.* 2007; 56:1–23.
3. American Academy of Pediatrics, Committee on Infectious Diseases. Prevention of human papillomavirus infection: provisional recommendations for immunization of females with quadrivalent human papillomavirus vaccine. [Early release May 23, 2007]. Available at <http://www.cispimmunize.org/ill/pdf/HPVprovisional.pdf>
4. Kahn JA, Zimet GD, Bernstein DL, Riedesel JM, Lan D, Huang B, et al. Pediatricians' intention to administer human papillomavirus vaccine: the role of practice characteristics, knowledge and attitudes. *J Adolesc Health.* 2005; 37:502–10.
5. Daley MF, Liddon N, Crane LA, Beaty BL, Barrow J, Babbel C, et al. A National Survey of Pediatrician Knowledge and Attitudes Regarding Human Papillomavirus Vaccination. *Pediatrics.* 2006; 118:2280–89. [PubMed: 17142510]
6. Curlin FA, Chin MH, Sellergren SA, Roach CJ, Lantos JD. The association of physicians' religious characteristics with their attitudes and self-reported behaviors regarding religion and spirituality in the clinical encounter. *Med Care.* 2006; 44:446–53. [PubMed: 16641663]
7. Jenkins TC, Gardner EM, Thrun MW, Cohn DL, Burman WJ. Risk-based human immunodeficiency virus (HIV) testing fails to detect the majority of HIV-infected persons in medical care settings. *Sex Transm Dis.* 2006; 33:329–33. [PubMed: 16547450]
8. Chou R, Smits AK, Huffman LH, Fu R, Korthuis PT. US Preventive Services Task Force. Prenatal screening for HIV: a review of the evidence for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2005; 143:38–54. [PubMed: 15998754]
9. Boyer KM, Holfels E, Roizen N, Swisher C, Mack D, Remington J, et al. Toxoplasmosis Study Group. Risk factors for *Toxoplasma gondii* infection in mothers of infants with congenital toxoplasmosis: implications for prenatal management and screening. *Am J Obstet Gynecol.* 2005; 192:564–71. [PubMed: 15696004]
10. The Wall Street Journal On-Line. Seventy Percent of U.S. Adults Support Use of the Human Papillomavirus (HPV) Vaccine. [Last accessed June 6, 2007]. Available at <http://www.harrisinteractive.com/news/allnewsbydate.asp?NewsID=1080>
11. Zimet GD. Improving adolescent health: focus on HPV vaccine acceptance. *J Adolesc Health.* 2005; 37:S17–23. [PubMed: 16310137]
12. Davis K, Dickman ED, Ferris D, Dias JK. Human papillomavirus vaccine acceptability among parents of 10 to 15 year old adolescents. *J Lower Genital Tract Dis.* 2004; 8:188–94.
13. Gust DA, Kennedy A, Shui I, Smith PJ, Nowak G, Pickering LK. Parent attitudes toward immunizations and healthcare providers: the role of information. *Am J Prev Med.* 2005; 29:105–12. [PubMed: 16005806]
14. Colgrove J. The ethics and politics of compulsory hpv vaccination. *N Engl J Med.* 2006; 355:2389–91. [PubMed: 17151362]
15. Pollack, A.; Saul, S. Merck to halt lobbying for vaccine for Girls. *The New York Times.* [February 21, 2007]. Available at <http://www.nytimes.com/2007/02/21/business/21merck.html?ex=1187582400&en=6d12ad16f3a8de0e&ei=5070>
16. The American Academy of Pediatrics Department of Community, Chapter and State Affairs. State lawmakers face tough decisions on HPV vaccines. *AAP News.* 2007; 28:1–5.
17. Schwartz JL, Caplan AL, Faden RR, Sugarman J. Lessons from the failure of human papillomavirus vaccine state requirements. *Clin Pharmacol Ther.* 2007; 82:760–63. [PubMed: 17971822]

18. Raley JC, Followwill KA, Zimet GD, Ault KA. Gynecologists' attitudes regarding human papilloma virus vaccination: a survey of Fellows of the American College of Obstetricians and Gynecologists. *Infect Dis ObstetGynecol.* 2004; 12:127–33.
19. Riedesel JM, Rosenthal SL, Zimet GD, Bernstein DI, Huang B, Lan D, et al. Attitudes about human papillomavirus vaccine among family physicians. *J Pediatr Adolesc Gynecol.* 2005; 18:391–398. [PubMed: 16338604]
20. Asch DA, Jedrzewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol.* 1997; 50:1129–36. [PubMed: 9368521]

Table 1

Demographics of respondents (N = 375)*

	n (%)
Gender	
Women	181 (52)
Men	170 (48)
Year of graduation from medical school	
Before 1985	151 (44)
1985 or later	189 (56)
Subspecialty affiliation	
General paediatrician	170 (46)
Section of infectious disease	97 (27)
Section of adolescent medicine	100 (27)
Practice setting	
Academic medical centre	109 (31)
Private practice	199 (56)
HMO	10 (3)
Community health centre	12 (3)
Other	26 (7)
Estimated percentage of patients with public aid	
<20%	137 (39)
20–49%	97 (28)
50–79%	63 (18)
>80%	53 (15)
Region [†]	
West	71 (20)
Midwest	76 (21)
Northeast	97 (27)
South	119 (33)
Religious affiliation	
Buddhist	3 (1)
Christian	196 (57)
Hindu	11 (3)
Jewish	74 (22)
Muslim	4 (1)
None	40 (12)
Other	14 (4)
Intrinsic religiosity, n (%)	
High	87 (26)
Moderate	58 (18)
Low	187 (56)

* N varies slightly for each demographic variable due to partial non-response.

† Percentages do not sum to 100 due to rounding error.

Table 2

Characteristics of paediatricians associated with recommending the HPV vaccine*

Characteristics	Recommend to all eligible patients (N = 292)		Recommend to some/none (N = 40)	
	n (%)		n (%)	P (χ^2)
Subspecialty affiliation				
General paediatrician	129 (83)		26 (17)	<0.05
Section of infectious disease	68 (92)		6 (8)	
Section of adolescent medicine	91 (93)		7 (7)	
Gender				
Male	132 (87)		19 (13)	<0.5
Female	152 (88)		20 (12)	
Age in years \pm SD	49 \pm 9		44 \pm 10	<0.2
Intrinsic religiosity				
High	62 (79)		16 (21)	<0.05
Moderate	50 (93)		4 (7)	
Low	157 (90)		17 (10)	
Controversial social issues				
Liberal	222 (91)		21 (9)	< 0.01
Conservative	59 (79)		16 (21)	
Adoption of new drugs/vaccines into practice				
Early	202 (91)		20 (9)	< 0.01
Neutral	69 (84)		13 (16)	
Late	14 (70)		6 (30)	
Would you give the HPV vaccine to your own child or the child of a close friend?				
Yes	283 (92)		25 (8)	< 0.001
No	3 (19)		13 (81)	

* N varies for each demographic feature due to partial non-response.

Table 3

Paediatricians' approaches to discussing the HPV vaccine, stratified by whether or not they would encourage the vaccine for all eligible patients.

Which of the following best summarizes how you would likely discuss the HPV vaccine?	All respondents (N = 332), *, [†] n (%)	Those who will recommend the vaccine for all of their patients (N = 290), n (%) [†]	Those who will recommend the vaccine for some/none of patients (N = 40), n (%) [†]
I will not encourage the vaccine at this time	4 (1)	3 (1)	1 (3)
I will recommend the vaccine and try to persuade those who are reluctant	247 (74)	232 (80)	15 (38)
I will offer the vaccine, but I will not try to persuade one way or the other	52 (16)	32 (11)	18 (45)
I will not promote the vaccine, but if asked, I will discuss it and provide it	6 (2)	2 (1)	4 (10)
I will not promote the vaccine, but if asked, I will refer to another physician or practice	1 (<1)	1 (<1)	0 (0)
I will not promote the vaccine, and if asked, I will try to discourage its use	0 (0)	0 (0)	0 (0)
Other	22 (7)	20 (7)	2 (5)

P<0.001 (χ^2) for this comparison (differences in discussion strategies by differences in recommendations).

* N counts do not all sum to the total due to partial non-response.

[†] Percentages do not add up to 100 due to rounding error.