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## HPV Vaccine Information-Seeking Behaviors among US Physicians: Government, Media, or Colleagues?

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### Abstract

The multiple information sources available may pose a challenge to physicians in providing accurate human papillomavirus (HPV) vaccine information to patients. The purpose of this study was to describe physicians' HPV vaccine information-seeking behaviors and assess if these behaviors differ by physician specialty and sociodemographic characteristics. In 2009, 1,008 Family Physicians (FPs), Pediatricians (Peds), and Obstetric/Gynecologists (OBGYNs) completed a survey to assess their HPV vaccine information-seeking behaviors and vaccination practices. The largest proportion obtained HPV vaccine information from professional organizations (50.0%), followed by the Advisory Council on Immunization Practices (ACIP) (36.0%), and medical conferences (33.1%). Peds and FPs were more likely to obtain vaccine information from the ACIP ( $p$ -values < 0.05). OBGYNs, non-White/Caucasian physicians and those aged 40–49 were more likely to obtain vaccine information from internet websites ( $p$ -values < 0.05). There is a need for targeted HPV vaccine communication approaches based on sociodemographic and physician specialty characteristics.

### Keywords

Human papillomavirus (HPV) vaccines; information-seeking; physicians; health communication; United States

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## Introduction

Human papillomavirus (HPV) vaccination is an effective public health tool to prevent cervical cancer and other HPV-associated diseases.<sup>1</sup> However, the public health impact of HPV vaccines is contingent upon widespread uptake. As physician recommendation is an important predictor of HPV vaccine uptake<sup>2-5</sup>, the medical community plays a central role in educating patients about HPV vaccination. The vast number of information sources available and the rapidly changing dynamics of vaccination guidelines<sup>6</sup> continually challenge physicians in providing their patients with evidence-based HPV vaccine information. A critical component of promoting patient-oriented informed decision-making is that physicians are equipped with current and accurate information about vaccine guidelines, safety, and other relevant information.<sup>7</sup> Few published studies have examined physicians' information-seeking behaviors<sup>8,9</sup> and none have assessed physicians' HPV vaccine information-seeking behaviors. Examining physicians' HPV vaccine information sources may inform interventions to optimize HPV vaccine delivery in clinical practice. Therefore, the purpose of this study was to describe physicians' HPV vaccine information-seeking behaviors and assess if these behaviors differ by physician specialty, gender, race, and age.

## Methods and Material

### Study Design

Data from this study are part of a larger study that assessed HPV knowledge, attitudes, information-seeking behaviors, and vaccination practices among United States (US) physicians. In 2009, surveys were mailed to a nationally representative sample of 1,538 physicians obtained using the American Medical Association Masterfile, including 818 Family Physicians (FPs), 393 Pediatricians (Peds), and 327 Obstetricians/Gynecologists (OBGYNs). Completed surveys were received from 1,013 physicians. The overall response rate was calculated as the number of physicians completing the survey ( $N = 1,013$ ) divided by the initial sample minus the undeliverables and ineligible [1538 - (33 + 10)] which yielded a 67.8% response rate. Five surveys were received after the deadline and were not included in the analyses; therefore, the final sample used for this study was 1,008. A more detailed explanation of the study design as well as methodological justifications are described elsewhere.<sup>10</sup> The study was approved by the University of South Florida Institutional Review Board.

### Measures

**HPV vaccine health information-seeking**—Participants were asked “How often do you use the following sources to obtain information about the HPV vaccine:” professional organizations, Advisory Council on Immunization Practices (ACIP), state/local immunization programs, colleagues, pharmaceutical representatives, internet websites, media, medical conferences, and grand rounds/local institutional lectures. At the time of the study Gardasil was the only licensed vaccine in the US, therefore, vaccine questions only referred to Gardasil licensed for females. Physicians were asked to respond to the items on a 5-point Likert response scale (1= rarely use to 5 = always use). Because we were interested in identifying the most common sources of HPV vaccine information-seeking, the five response categories were collapsed into two, “never/rarely/sometimes” and “often/always”.

**Physician practice characteristics**—Physicians were asked to indicate the location of the primary practice (e.g. private practice, urgent clinic, community health center), the racial composition of their patients (e.g., non-Hispanic White, non-Hispanic Black, Asian),

insurance status of patients (private, Medicaid, uninsured), daily patient load (e.g., <15, 15–19, ≥30), and the geographical location of their primary clinic (e.g., urban, rural).

**Sociodemographic characteristics**—Physicians' age, race, gender, and specialty (FPs, Peds, OBGYNs) were obtained.

### Statistical Analysis

Descriptive statistics summarized physicians' sociodemographic and practice characteristics. Chi-square tests were used to explore differences in HPV information-seeking by specialty (FPs, Peds, OBGYNs), gender, race, and age. Due to the small number of physicians comprising non-White/Caucasian categories, race was collapsed into two categories (White/Caucasian versus Other). Age was categorized into three groups (25–39, 40–49, and ≥50). All analyses were conducted using PASW 18.0 (Chicago, IL). Statistical tests were two-tailed, with an alpha level of 0.05.

### Results

Of the 1,008 physicians, the largest proportion were FPs (49.5%), White/Caucasian (73.1%), and male (52.4%). Physicians' mean age was 47.27±8.87; age range from 25–65. See Table 1 for physicians' sociodemographic and practice characteristics.

As shown in Table 2, physicians were most likely to seek HPV vaccine information from professional organizations (50.0%) followed by ACIP (36.0%). OBGYNs (61.1%) compared to Peds (58.5%) and FPs (40.3%) were significantly more likely to seek HPV vaccine information from professional organizations, ( $\chi^2 = 37.58, p < 0.01$ ). Peds (62.0%) compared to FPs (31.8%) and OBGYNs (11.2%) were significantly more likely to seek vaccine information from ACIP, ( $\chi^2 = 144.57, p < 0.01$ ). A complete list of differences in HPV vaccine information-seeking behaviors by physician specialty is presented in Table 2.

Additional analyses (data not shown) demonstrated that female physicians were significantly more likely than males to get their HPV vaccine information from ACIP (39.6% vs. 28.3%), ( $\chi^2 = 5.32, p = 0.02$ ); colleagues (37.4% vs. 28.3%), ( $\chi^2 = 8.70, p < 0.01$ ); and medical conferences (37.7% vs. 28.9%), ( $\chi^2 = 8.23, p < 0.01$ ). Physicians of other races compared to White/Caucasian physicians were significantly more likely to get their HPV vaccine information from internet websites (20.8% vs. 13.3%), ( $\chi^2 = 6.98, p < 0.01$ ); media (6.7% vs. 3.4%), ( $\chi^2 = 4.82, p < 0.01$ ); medical conferences (39.0% vs. 31.1%), ( $\chi^2 = 4.50, p = 0.03$ ); and grand rounds/local institutional lectures (25.5% vs. 15.5%), ( $\chi^2 = 10.69, p < 0.01$ ).

Physicians aged 25–39 (18.7%) were significantly more likely to use internet websites to obtain HPV vaccine information compared to physicians aged 40–49 (16.8%) and ≥ 50 (11.8%), ( $\chi^2 = 6.67, p = 0.03$ ). Compared to those aged 25–39 (27.1%) and 40–49 (32.4%), physicians aged ≥ 50 years (36.6%) were significantly more likely to obtain HPV vaccine information from medical conferences, ( $\chi^2 = 6.12, p = 0.05$ ).

### Discussion

The largest proportion of physicians often/always obtained HPV vaccine information from professional organizations. This is a promising finding given that such organizations provide consensus statements that are evidence-based. Professional organizations may therefore provide an optimal venue for continued health education and communication efforts. One-third of physicians reported seeking vaccine information from ACIP and fewer sought information from state/local immunization programs. Professional organizations, ACIP, and

state programs generally provide the most up-to-date and evidence-based HPV vaccine information. Continued efforts to promote widespread use of evidence-based information-seeking among physicians are essential.<sup>11</sup> One-fourth of physicians obtained HPV vaccine information from pharmaceutical representatives. It is possible that information received from commercial sources may present an unbalanced view of the current evidence of vaccine efficacy and safety.<sup>12</sup> A larger than expected proportion of physicians obtained vaccine information from the internet. Many health care providers lack proficiency in internet navigation<sup>13, 14</sup> and the time needed to identify accurate sources of information<sup>15</sup> which poses a challenge to optimizing clinical outcomes. Increasingly the media has been identified as a less than credible source of health information.<sup>16-18</sup> It is reassuring that only a small number of physicians rely on media for vaccine information.

OBGYNs compared to FPs were more likely to obtain HPV vaccine information from the internet. This finding is inconsistent with some research indicating that FPs compared to specialists such as OBGYNs more often seek information from online sources.<sup>14</sup> In the current study, OBGYNs and Peds compared to FPs were more likely to seek vaccine information from professional organizations, while an earlier study found no difference in physician information-seeking from such organizations.<sup>14</sup> Younger physicians more often obtained HPV vaccine information from the internet, while older physicians were more likely to get such information from medical conferences. Although the internet may not be an ideal source of health information gathering,<sup>13-15</sup> it is important to recognize and adjust for the changing dynamics of information-seeking behaviors particularly among younger physicians. Female physicians compared to males were more likely to seek vaccine information from ACIP, colleagues, and medical conferences. However, there was no gender difference in vaccine information-seeking from professional organizations. These findings may have implications for both gender-neutral and gender-specific intervention approaches.

There are limitations to this study that should be considered when interpreting results. First, all data were self-reported which may have introduced recall and reporting error. Second, data on internet site usage were not obtained; therefore we were unable to assess the credibility of HPV vaccine information obtained on the internet.

## Conclusion

In order to promote quality care and build trusting patient-provider relationships it is essential that patients are provided with balanced and relevant information that makes sense to them. Results presented here have important implications for public health practice, clinical care, and targeted communication approaches based on physician specialty, gender, race, and age characteristics. In efforts to improve the transfer of evidence-based knowledge from provider to patient, it is important to consider physicians characteristics in the information delivery and dissemination process. Targeted efforts to promote widespread use of evidence-based HPV vaccine information should be central to these efforts. Additionally, as electronic health information retrieval may be increasingly used by physicians, enhancing their web-based search skills will better ensure accurate and evidence-based information retrieval. Integration of emerging information technologies in the medical school curriculum may be of great importance to optimizing vaccine delivery in clinical practice. Largely, the medical community has an important role to play in ensuring that physicians are equipped with the necessary information to improve patient care in clinical practice.

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## References

1. Centers for Disease Control and Prevention. FDA licensure of bivalent human papillomavirus vaccine (HPV2, Cervarix) for use in females and updated HPV vaccination recommendations from the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep.* May 28; 2010 59(20):626–629. [PubMed: 20508593]
2. Do H, Seng P, Talbot J, Acorda E, Coronado GD, Taylor VM. HPV vaccine knowledge and beliefs among Cambodian American parents and community leaders. *Asian Pac J Cancer Prev.* Jul–Sep; 2009 10(3):339–344. [PubMed: 19640169]
3. Caskey R, Lindau ST, Alexander GC. Knowledge and early adoption of the HPV vaccine among girls and young women: results of a national survey. *J Adolesc Health.* Nov; 2009 45(5):453–462. [PubMed: 19837351]
4. Conroy K, Rosenthal SL, Zimet GD, et al. Human papillomavirus vaccine uptake, predictors of vaccination, and self-reported barriers to vaccination. *J Womens Health (Larchmt).* Oct; 2009 18(10):1679–1686. [PubMed: 19785564]
5. Gamble HL, Klosky JL, Parra GR, Randolph ME. Factors influencing familial decision-making regarding human papillomavirus vaccination. *J Pediatr Psychol.* Aug; 2010 35(7):704–715. [PubMed: 19966315]
6. Hillenbrand KM. What is going on with vaccines: keeping up with the childhood immunization schedule. *J Public Health Manag Pract.* Nov–Dec; 2007 13(6):544–552. [PubMed: 17984706]
7. Pickering LK, Baker CJ, Freed GL, et al. Immunization programs for infants, children, adolescents, and adults: clinical practice guidelines by the Infectious Diseases Society of America. *Clin Infect Dis.* Sep 15; 2009 49(6):817–840. [PubMed: 19659433]
8. Al-Habashneh R, Barghout N, Humbert L, Khader Y, Alwaeli H. Diabetes and oral health: doctors' knowledge, perception and practices. *J Eval Clin Pract.* Jul 21.2010
9. Younger P. Internet-based information-seeking behaviour amongst doctors and nurses: a short review of the literature. *Health Info Libr J.* Mar; 2010 27(1):2–10. [PubMed: 20402799]
10. Vadaparampil ST, Kahn JA, Salmon D, et al. Prevalence of HPV Vaccine Recommendation for Females among a National Sample of U.S. Primary Care Physicians. *Lancet Infectious Disease.* under-review.
11. Davies KS. Physicians and their use of information: a survey comparison between the United States, Canada, and the United Kingdom. *J Med Libr Assoc.* Jan; 2011 99(1):88–91. [PubMed: 21243061]
12. Ziegler MG, Lew P, Singer BC. The accuracy of drug information from pharmaceutical sales representatives. *JAMA.* Apr 26; 1995 273(16):1296–1298. [PubMed: 7715044]
13. Lappa E. Undertaking an information-needs analysis of the emergency-care physician to inform the role of the clinical librarian: a Greek perspective. *Health Info Libr J.* Jun; 2005 22(2):124–132. [PubMed: 15910583]
14. Bennett NL, Casebeer LL, Kristofco R, Collins BC. Family physicians' information seeking behaviors: a survey comparison with other specialties. *BMC Med Inform Decis Mak.* 2005; 5:9. [PubMed: 15784135]
15. Verhoeven F, Steehouder MF, Hendrix RM, van Gemert-Pijnen JE. Factors affecting health care workers' adoption of a website with infection control guidelines. *Int J Med Inform.* Oct; 2009 78(10):663–678. [PubMed: 19577956]
16. Wilson A, Bonevski B, Jones A, Henry D. Media reporting of health interventions: signs of improvement, but major problems persist. *PLoS One.* 2009; 4(3):e4831. [PubMed: 19293924]
17. MacKenzie R, Chapman S, Barratt A, Holding S. “The news is [not] all good”: misrepresentations and inaccuracies in Australian news media reports on prostate cancer screening. *Med J Aust.* Nov 5; 2007 187(9):507–510. [PubMed: 17979615]
18. Hochman M, Hochman S, Bor D, McCormick D. News media coverage of medication research: reporting pharmaceutical company funding and use of generic medication names. *JAMA.* Oct 1; 2008 300(13):1544–1550. [PubMed: 18827211]

**Table 1**

Sociodemographic and Practice Characteristics of a Nationally Representative Sample of United States Physicians (N=1,008), 2009

	Characteristics	n (%)
<b>Age Categories</b>		
	25–39	239 (23.7)
	40–49	327 (32.4)
	≥ 50	422 (41.9)
	Unknown	20 (2.0)
<b>Race</b>		
	White/Caucasian	737 (73.1)
	Black/African American	45 (4.5)
	Asian	112 (11.2)
	American Indian/Alaskan Native	0
	Native Hawaiian/Pacific Islander	2 (0.2)
	Other (including multiracial)	69 (6.9)
	Unknown	43 (4.3)
<b>Gender</b>		
	Male	528 (52.4)
	Female	466 (46.2)
	Unknown	14 (1.4)
<b>Physician Specialty</b>		
	Family Physicians (FPs)	499 (49.5)
	Pediatricians (Peds)	287 (28.5)
	Obstetricians/Gynecologist (OBGYNs)	222 (22.0)
<b>Office Location</b>		
	Private Practice Office (solo or group)	728 (72.2)
	Ambulatory Care Clinic/Primary Care	122 (12.1)
	Urgent Care Clinic	27 (2.7)
	Community Health Center	47 (4.7)
	University/College Student Health Services	6 (0.6)
	Hospital Emergency Department	9 (0.9)
	Institutional Setting/Clinic	8 (0.8)
	Other	48 (4.8)
	Unknown	13 (1.3)
<b>Racial/Ethnic Distribution of Patients</b>		
	Non-Hispanic White	735 (72.9)
	Non-Hispanic Black	55 (5.3)
	Hispanic	100 (9.9)
	American Indian/Alaskan Native	3 (0.3)
	Asian	12 (1.2)
	Native Hawaiian/Pacific Islander	1 (0.1)

Characteristics	n (%)
Other (including multiracial)	87 (8.7)
Unknown	17 (1.7)
<b>Patient Primary Payment Method</b>	
Private Insurance	527 (52.3)
Medicaid/Children's Health Insurance Program	118 (11.7)
Uninsured/Self-Pay	11 (1.1)
Medicare	42 (4.2)
Other	30 (3.0)
<b>Daily Patient Load</b>	
< 15	88 (8.7)
15–19	170 (16.9)
20–29	500 (49.6)
≥ 30	232 (23.0)
Unknown	18 (1.8)
<b>Geographical Location of Clinic Practice</b>	
Urban	289 (28.7)
Suburban	506 (50.2)
Rural	182 (18.1)
Other	7 (0.7)
Unknown	18 (1.8)

<sup>a</sup>Patient primary payment method is presented as percentages of greater than 50%.

Nationally Representative Sample of United States' Physicians' HPV Vaccine Information-Seeking Behaviors by Practice Specialty, 2009

Table 2

HPV Vaccine Information Sources	Total (%)	FPs (%)	Peds (%)	OBGYNs (%)	$\chi^2$	df	P
Professional Organizations	50.0	40.3	58.5	61.1	37.58	2	< 0.01*
Advisory Council on Immunization Practices (ACIP)	36.0	31.8	62.0	11.2	144.57	2	< 0.01*
Medical Conferences	33.1	28.7	32.2	44.0	16.19	2	< 0.01*
Colleagues	32.4	26.3	42.5	33.2	21.41	2	< 0.01*
State/Local Immunization Programs	28.4	27.9	41.1	13.0	47.19	2	< 0.01*
Pharmaceutical Representative	23.7	19.7	23.2	33.5	15.74	2	< 0.01*
Grand Rounds/Local Institutional Lectures	18.1	11.1	22.9	27.6	34.03	2	< 0.01*
Internet Websites	15.4	15.4	11.7	20.2	6.72	2	0.04*
Media	4.2	4.1	3.9	4.9	0.24	2	0.89

Notes: Percentages represent the proportion of physicians' who reported often/always seeking HPV vaccine information from the indicated information source.

<sup>a</sup> HPV is human papillomavirus.

<sup>b</sup>  $\chi^2$  is chi-square.

<sup>c</sup> df is degree of freedom.

<sup>d</sup>  $p$  is  $p$ -value for  $\chi^2$  significance.

\*  $\chi^2$  significance at  $p \leq 0.05$ .