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Vaccine. 2016 July 29; 34(35): 4229–4234. doi:10.1016/j.vaccine.2016.06.037.**Provider-reported acceptance and use of the Centers for Disease Control and Prevention messages and materials to support HPV vaccine recommendation for adolescent males****C.L. Scherr, PhD^a, B. Augusto^b, K. Ali^b, T.L. Malo, PhD^c, and S.T. Vadaparampil, PhD^b**^aNorthwestern University, School of Communication, Department of Communication Studies, Center for Communication and Health, 710 North Lake Shore Drive 15th Floor, Chicago, IL 60611, USA^bMoffitt Cancer Center, Health Outcomes and Behavior, 120902 Magnolia Drive, MRCCANCONT, Tampa, FL 33612, USA^cUniversity of North Carolina, Lineberger Comprehensive, Cancer Center and Department of Health Behavior, 324 Rosenau Hall CB# 7440, Chapel Hill, NC 27599 USA**Abstract**

Purpose—We evaluated Florida-based physicians’ awareness and use of the Centers for Disease Control and Prevention’s (CDC) “You are the Key” campaign website, including messages to support physicians’ human papillomavirus (HPV) vaccine recommendations.

Methods—Using closed-ended and free-text survey items, physicians’ ($n = 355$) practices related to HPV vaccination recommendations for males and use of the CDC’s materials were assessed. Descriptive statistics were calculated for closed-ended questions, and thematic analysis was conducted on free-text responses.

Results—Over half of physicians were aware of the CDC’s website ($n = 186$; 57.9%); of those aware, fewer than half reported using the website ($n = 86$; 46.2%). Slightly more than half reported awareness of the CDC’s messages ($n = 178$; 55.3%); however, less than one-third of those aware reported using them ($n = 56$; 31.5%). Physicians’ comments on the CDC’s messages were favorable; 78.6–93.2% said they would use a message in clinic.

Conclusion—Additional research is needed to identify the best mechanisms for resource dissemination and to understand why physicians do not use these messages, despite favorable attitudes.

Keywords

Human papillomavirus; vaccination; provider recommendation; reach; patient provider communication

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The authors declare they have no conflicts of interest.

Introduction

Approximately 63% of penile cancers, 91% of anal cancers, and 72% of oropharyngeal cancers are linked to vaccine-type human papillomavirus (HPV) infection [1]. The three-dose series of quadrivalent HPV (HPV4) vaccine tested in clinical trials demonstrated high immunogenicity levels, reductions in genital lesions, and reductions in precancerous anogenital lesions in males [2, 3]. Recent studies confirmed high immunogenicity levels from the three-dose series of 9-valent HPV (9vHPV) vaccine [4, 5]. Consequently, the Advisory Committee on Immunization Practices (ACIP) recommends routine HPV vaccination for males ages 11–12; beginning at age 9 with catch-up vaccination ages 13–21, and up to age 26 for immunocompromised men or men who have sex with men [6]. In 2014, HPV vaccine coverage with 3 doses among males ages 13–17 was 22% in the United States (US) and 18% in Florida (range: 9% in Alabama to 43% in Rhode Island) [7]. Florida has among the nation’s highest rates of HPV-related diseases in males, including the 5th highest rate of anal cancer [8]. Given the established efficacy of preventing HPV infections that cause anal and penile cancer [2, 3], HPV vaccination has tremendous potential for primary prevention in males [9, 10].

HPV vaccination among adolescent males is strongly predicted by physician recommendation [11–13]. Organizations including the Centers for Disease Control and Prevention (CDC) [14] and the President’s Cancer Panel [15] advocate increasing physician recommendation as the primary approach to achieve the Healthy People 2020 goal of 80% of 13–15 year old adolescents receiving 3 doses of HPV vaccine [16]. However, physicians’ self-reported rates of strongly recommending HPV vaccine for males ages 11–12 in the US remains low for pediatricians (52%) and family medicine physicians (41%) [17]. Guidance for physicians’ communication with parents about HPV vaccine is critical to increasing vaccination [11, 18]. Given the limited time in the medical encounter [19], providing physicians with brief messages that address parents’ main concerns about HPV vaccine may effectively promote vaccine recommendation in clinic [20].

To support physicians’ recommendations, the CDC launched the “You are the Key” campaign in May 2013 [21]. This campaign included the website, “HPV Vaccine Resources for Healthcare Professionals” to support healthcare professionals provide HPV vaccination recommendations to parents of adolescent patients (<http://www.cdc.gov/hpv/hcp/index.html>). One page entitled, “*Tips and Time-savers for Talking with Parents about HPV Vaccine*” (referred to hereafter as “Tips and Time-savers”) includes nine messages addressing common parental concerns to use when discussing HPV vaccine with parents. However, little is known about physicians’ use of the messages in practice.

We evaluated pediatric and family physicians’ use of the CDC’s “You are the Key” campaign by exploring the reach component of **RE-AIM**, an evaluation model that provides framework for appraising impact of a multilevel health intervention in a real-world setting [22]. In this model, reach refers to the number and representativeness of the target population who receive and adopt the intervention/program. We evaluated reach in this study by assessing the number and representativeness of physicians who were aware of and used the campaign messages when recommending HPV vaccine for their adolescent male

patients. In addition, physicians' feedback was solicited on the campaign messages to inform our understanding of messages' appeal to physicians.

Methods

Procedure

Participant recruitment and the survey instrument are described in detail elsewhere [23, 24] and are summarized below.

Recruitment

A mailing list of Florida-based pediatricians and family medicine physicians from an American Medical Association Physician Masterfile licensee was obtained. Study exclusion criteria were: 1) trainee status (i.e., residents and fellows), 2) locum tenens, 3) non-patient care reported as their primary activity, 4) age 65 years or older, and 5) post office box listed as an address. Pediatric and family physicians ($n = 770$) were randomly selected based on their proportional representation in the Florida physician primary care workforce. After receiving institutional review board approval, we began a six-wave mailing approach with pre-notice postcards mailed in May 2014, and ending with a final reminder to non-responders in August 2014. We received 367 completed surveys; after accounting for undeliverable surveys ($n = 36$) and ineligible respondents ($n = 10$), the overall response rate was approximately 51% ($367 / [770-36-10]$).

Measurement

The 49-item survey assessed physicians' HPV vaccination recommendation practices, personal and perceived parental barriers to HPV vaccination, HPV-related knowledge, demographic characteristics, practice setting, strategies for remembering to discuss HPV vaccine with male patients, and current use of information/support regarding HPV vaccination. Specifically, the CDC's "You are the Key" campaign resources reach was assessed using the following questions: (1) *Do you use the "HPV Vaccine Resource for Healthcare Professionals" website provided by the Centers for Disease Control and Prevention to guide your discussion of HPV vaccination with parents of male patients?* (2) *Do you use the "Tips and Time-savers for Talking with Parents about HPV vaccine" tip sheet provided by the Centers for Disease Control and Prevention to guide your discussion of HPV vaccination with parents of male patients?* Response options were: yes, no, or I am unaware of this website. Awareness was operationalized by combining the "yes" and "no" responses.

The CDC's "Tips and Time-savers" document includes nine messages for physicians to use when addressing parents' questions about HPV. To reduce potential respondent burden, we created and randomly assigned physicians to one of three survey versions (referred to as versions A, B, C in this manuscript). Each survey had three of the nine messages; A1-A3, B1-B3, and C1-C3. Following each message, physicians were asked: *Would you use this message when discussing HPV vaccine with parents of male patients in your clinical practice?* Response options were: yes, no, or unsure. In addition, after each message,

physicians were asked to: *Please provide any additional feedback that you feel is important regarding the recommended message.*

Data Analysis

Frequencies for demographic information and closed-ended responses were calculated using SPSS (version 21). All free-text responses were provided in direct response to one of the “Tips and Time-savers” messages. However, upon initial review of all comments, themes were found across messages. Therefore, rather than analyzing specific responses to individual messages, the comments were considered holistically to identify particular message features. For example, the response “Needs to be simplified in laymen’s terms for most patients” was categorized as: messages need to consider audiences’ literacy level. Using thematic analysis, one researcher reviewed and categorized all free-text responses. All responses were independently coded a second time by a research assistant to assess coding scheme reliability and validity. Cohen’s Kappa of .862 was achieved, an acceptable level of agreement.

Results

Participants

Of the 770 physicians invited to participate in this study, 367 completed the survey. Individuals who reported not providing care to males age 9–26 were excluded from analysis for a final analytic sample of 355. Approximately half of physicians were female (51.0%), age 50 years (46.1%), specialized in family medicine (49.3%), and saw between 20–29 patients per day (44.5%). The majority was White (67.7%), non-Hispanic (75.1%), practiced for 16 years (51.9%), and worked in private practice (67.2%). Approximately one-third practiced in an urban setting (37.7%; Table 1). We found no statistically significant difference between responding physicians and the larger population of Florida physicians for age, sex, and clinical specialty (all $p > .05$) [24].

Closed-Ended Responses

Over half of physicians were aware of the CDC’s “HPV Vaccine Resources for Healthcare Professionals” website ($n = 186$; 57.9%). A slightly higher proportion of pediatricians ($n = 94$; 62.3%) than family medicine physicians ($n = 92$; 54.1%) reported awareness of the website. More than half of family medicine physicians ($n = 55$; 59.8%) and slightly fewer than half of pediatricians ($n = 45$; 47.9%) who were aware of the website reported not using.. Similarly, just over half were aware of the “Tips and Time-savers” messages ($n = 178$; 55.3%). Slightly more pediatricians reported being aware of the messages ($n = 91$; 59.9%) compared with family medicine physicians ($n = 87$; 51.1%); a slightly lower proportion of pediatricians ($n = 58$; 63.7%) compared with family medicine physicians ($n = 64$; 73.6%) who were aware of the messages, reported not using them.

Approximately equal numbers of participants responded across survey conditions: 112 (of 257 surveys mailed) responded to survey version A; 120 (of 256) responded to version B; and 117 (of 257) responded to version C. Across all conditions, participants indicated they would use the messages provided by the CDC when talking with adolescent males’ parents.

Responses to each of the nine messages ranged from 78.6% - 93.2% as yes they would use the message, 2.6% - 11.1% as no they would not use the message, and 3.4% - 11.1% indicating they were unsure if they would use the message (Table 3).

Two messages the highest proportion of participants (93.2%) indicated they would use were message C3 about ensuring the patient receives all three doses of the vaccine, and message B3 about the efficacy of HPV vaccine. The message the highest proportion of respondents (11.1%) indicated uncertainty about using was message C1 regarding the high incidence of HPV in the US population. The message the highest proportion of participants (11.1%) indicated they would *not* use was message C2 supporting a personal and professional organization endorsement for HPV vaccination (see Table 3 for messages).

Free-Text Responses

Twenty-nine respondents to survey version A, 30 respondents to survey version B, and 29 respondents to survey version C provided at least one free-text response to the messages. Using the 137 free-text responses in conjunction with the closed-ended responses, five overarching themes emerged. The themes are organized according to: would use, unsure about using, or would not use the message in practice.

Would use the message

Participants were positive about the message: The first theme, approval and perceived message utility, reinforced participants' closed-ended response. For example, the message was "Excellent" (B1), or "Simple, yet probably the most important message to get across about HPV vaccine" (A1). Participants agreed with the content and message value for their patients.

Participants wanted more details or emphasis on message content: Although participants reported they would use the message in practice, requests for additional information emerged in the written comments. Most requested information related to indications: "need to specify what kind of cancer it prevents and safety, efficacy, doses" (A1), or clarification about protection against other types of sexually transmitted infections (STIs): "add that HPV does not protect against other STDs or pregnancy" (B1).

Messages about cancer prevention resonated with participants; some advised cancer prevention should be stressed: "I emphasize the cancer prevention aspect of the vaccine" (A1). If the message did not include prevention, participants wrote it should be added.

Participants were uncertainty about the message: Despite indicating they would use the message, written responses demonstrated uncertainty about the information in the message: "Is it true that it is more effective long term when given at a younger age? This is the reason I give 'on time' rather than wait, if this is true" (B3), and concern about their understanding and vaccine acceptance: "I would, but I'm not sure about giving it to my own twin 12 year old boys" (C2).

Unsure about using the message

Participants anticipated parental skepticism: Participants predicted parental pushback, especially related to vaccination for males: “The vaccine has been marketed as preventative for cervical cancer. Parents tend to be skeptical about the message of cancer prevention in males. Especially if the cancer type is anal cancer” (A1). Other comments focused on concerns about vaccine efficacy compared with potential side effects: “Parents are already asking me about the recent reports of more serious reactions” (A3).

Participants had personal hesitations about the vaccine: Physicians’ concerns ranged from apprehension about the number of vaccines: “Too many vaccines!!! Do you plan to make one for all STDs?” (C1), to their suspicions about government organizations: “Do not trust the CDC” (A3), to their concerns about vaccine safety relative to HPV-related disease susceptibility: “Penile and anal cancers are rare, yet there are recent reports of vaccine adverse reactions” (A1).

Would not use the message

Participants worried about the literacy level of the messages: Participants unfavorable to the messages were sensitive about the health literacy of the patient population they serve, for example: “too long and scientific” (C1) or “too advanced – information should be at a 3rd grade level for Medicaid families – this is too difficult” (B3).

Participants were skeptical about the message or the vaccine: Alternatively participants wrote in strong personal opinions about their distrust of the vaccine: “too many shots and more toxins in these shots???” (C3), and organizations promoting vaccination: “I do not agree with organizations that profit from vaccines and pharmaceuticals” (C2). Participants also reported disagreement with the messages and the research cited in the messages: “I don’t agree with statements” (C1), and “I don’t agree with that research, clinical observation says otherwise” (B2). In addition, participants commented on the message about having their own children vaccinated, stating: “I do not use myself or family as an example why they should or should not be vaccinated” (C2).

Discussion

Physicians are the preferred information source about HPV vaccine [25–27]. Professional organizations recommended consistent and strong provider recommendation for HPV vaccine [28, 29] as a primary approach to improving HPV vaccination. However, reported elsewhere [23], only 30.6% of physicians in this study strongly and consistently recommended HPV vaccination for males ages 11–12. Yet few studies explored messages promoting HPV vaccination for physicians to use with parents. Thus, we examined reach of CDC materials to pediatric and family medicine physicians in Florida.

When presented with the CDC’s messages, 78.6–93.2% of participants indicated they would use one of the messages. However, close to half of physicians were unaware of (44.7%) and approximately one third did not use (37.9%) the messages. Similarly, close to half were unaware of (42.0%) or did not use (31.1%) the CDC’s website. Family medicine physicians’

were less likely to report awareness and use of CDC focused materials than pediatricians. It is possible the greater emphasis on prevention in training and practice in pediatrics, compared with family medicine [30], resulted in increased awareness and utilization of CDC resources among pediatricians. Thus, to reach family medicine physicians, attention should be given information source preference.

A study of physicians' preference for information sources about HPV vaccination found the majority of family medicine physicians (~40%) preferred professional organizations [31]. Although the CDC campaign was referenced in an article and "Dear Colleague letter" from the American Academy of Family Physicians [32], it may have been more effective to append the messages to the letter. Alternatively, the CDC mandates the vaccine information sheet (VIS) be provided to all parents of children who receive vaccines, pairing the messages with the VIS may increase reach.

There are several possible explanations for the contradictory finding that physicians were favorable toward the messages, but did not use them in practice. Physicians might have previously encountered the CDC website and messages, but did not remember the messages until they read them later in the survey. Alternatively, physicians may have developed and use messages similar to CDC messages, forget about CDC messages in practice, or do not regularly provide HPV vaccine recommendation for adolescent males. The low rates of strong and consistent recommendations [23], and findings that physicians' hold positive attitudes toward male HPV vaccination, but do not provide strong recommendations for their adolescent male patients [20], suggests the answer may be the latter.

In the current study, physicians aware of, but who would not use the CDC messages described concerns about vaccine safety and efficacy and some stated personal skepticism about studies referenced in the messages, possibly indicating limited education about HPV vaccine for males. Consistently, a review of studies found gaps in provider knowledge about HPV vaccine indications in males negatively affected HPV recommendation [33]. Additional educational opportunities for physicians in these areas may increase the consistency and strength of HPV vaccine recommendation for male adolescents.

Responses reflected physicians' consideration of their patient population. First, physicians were concerned about parental resistance. Previous findings indicate physicians are favorable toward, yet are reluctant to recommend HPV vaccine to adolescent males due to potential negative parental reactions [34–36]. However, research suggests physicians' estimates of parental attitudes toward HPV vaccine importance are lower than parent reports [37, 38]. In addition, physicians were concerned about the literacy levels of the message. Thus, developing training modules addressing providers' misperceptions about parental attitudes, self-efficacy to overcome parental resistance [36], and skills to develop or modify messages to accommodate low health literacy may increase the frequency of HPV vaccine recommendation. Finally, participants wanted messages to clarify STI protection from HPV vaccine. An earlier study identified cases in which both adolescents and their parents believed HPV vaccine was protective against herpes, gonorrhea, and HIV [39]. Thus, such requests may stem from participants' clinical experience, and should be considered in future messages.

Overall, information requests in this study parallels results from previous studies [23, 39], and are consistent with findings that adolescents' parents require substantial amounts of information prior to consenting to HPV vaccination [11]. Research is needed to understand why physicians are not using these messages, despite favorable attitudes. Specifically, the use of semi-structured interviews and clinic observation may uncover barriers to message use in clinical settings and identify potential intervention strategies to address such barriers. Furthermore, additional testing should be conducted with patients to assess whether or not the messages promote HPV vaccination among adolescent males, ultimately improving HPV vaccine coverage [33].

Limitations

This study is limited to the opinions and perspectives of physicians who completed this study; those more interested in, favorable attitudes toward, or opposed to HPV vaccine may have been more likely to complete the survey. The low rate of response to the open-ended comment section is a limitation. Furthermore, the open-ended section did not provide a deeper understanding of respondents' beliefs that might have been achieved through a semi-structured interview and follow-up questions. Additional qualitative studies can draw upon the results reported here as preliminary evidence for beliefs physicians might hold regarding HPV vaccination messages for use with adolescent males and their parents.

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Table 1Sample characteristics ($n = 355$)

		<i>n</i> (%) [*]
<u>Physician Characteristics</u>		
Gender	Female	178 (51.0)
	Male	171 (49.0)
Age, groups	30–39	64 (18.3)
	40–49	124 (35.5)
	50 and older	161 (46.1)
Race	White/Caucasian	233 (67.7)
	Asian	38 (11.1)
	Black/African American	22 (6.4)
	Other	51 (14.8)
Ethnicity	Non-Hispanic	259 (75.1)
	Hispanic	86 (24.9)
<u>Practice Characteristics</u>		
Clinical Specialty	Family Medicine	174 (49.3)
	Pediatrics	155 (44.4)
	Other	20 (5.7)
Patients Seen per Day	Less than 15	41 (11.8)
	15–19	96 (27.6)
	20–29	155 (44.5)
	30 or more	56 (16.1)
Years Practicing	10 or fewer	100 (29.3)
	11–15	64 (18.8)
	16 or more	177 (51.9)
Type of Practice	Private Practice office	229 (67.2)
	Other	112 (32.8)
Geographic Location	Urban	129 (37.7)
	Suburban	180 (52.6)
	Rural/Other	33 (9.7)

* Responses may not sum to 100% due to missing data.

Table 2
Physicians' use of the CDC's website and "Tips and Time-savers" messages

	Website (<i>n</i> = 321) †			Tip Sheet (<i>n</i> = 322) †		
	FM* <i>n</i> (%)	Peds* <i>n</i> (%)	Total <i>n</i> (%)	FM <i>n</i> (%)	Peds <i>n</i> (%)	Total <i>n</i> (%)
Aware						
Use	37 (21.7)	49 (32.5)	86 (26.8)	23 (13.5)	33 (21.7)	56 (17.4)
Do not use	55 (32.4)	45 (29.8)	100 (31.1)	64 (37.6)	58 (38.2)	122 (37.9)
Unaware	78 (45.9)	57 (37.7)	135 (42.0)	83 (48.8)	61 (40.1)	144 (44.7)

* Family medicine physicians (FM) and Pediatric physicians (Peds)

† Please note, N values differ for each category: Website and Tip Sheet - missing values are excluded.

Table 3

Total Sample Use of Messages (n = 355)

Survey Version / Message Number	Message	Would you use this message in practice?		
		Yes n (%) [*]	No n (%) [*]	Unsure n (%) [*]
A1.	"HPV vaccine is very important because it prevents cancer. I want your child to be protected from cancer. That's why I'm recommending that your daughter/son receive the first dose of the HPV vaccine today."	96 (85.7)	5 (4.5)	11 (9.8)
A2.	"We're vaccinating today so your child will have the best protection possible long before the start of any kind of sexual activity. We vaccinate people well before they are exposed to an infection, as is the case with measles and the other recommended childhood vaccines. Similarly, we want to vaccinate children well before they get exposed to HPV."	99 (89.2)	5 (4.5)	7 (6.3)
A3.	"HPV vaccine has been carefully studied by medical and scientific experts. HPV vaccine has been shown to be very effective and very safe. Like other shots, most side effects are mild, primarily pain or redness in the arm. This should go away quickly, and HPV vaccine has not been associated with any long-term side effects. Since 2006, about 57 million doses of HPV vaccine have been distributed in the U.S., and in the years of HPV vaccine safety studies and monitoring, no serious safety concerns have been identified."	99 (87.6)	7 (6.2)	7 (6.2)
B1.	"HPV can cause cancers of the cervix, vagina, and vulva in women, cancer of the penis in men, and cancers of the anus and the mouth or throat in both women and men. There are about 26,000 of these cancers each year - and most could be prevented with HPV vaccine. There are also many more precancerous conditions requiring treatment that can have lasting effects."	109 (90.8)	4 (3.3)	7 (5.8)
B2.	"Research has shown that getting the HPV vaccine does not make kids more likely to be sexually active or start having sex at a younger age."	102 (85.0)	9 (7.5)	9 (7.5)
B3.	"In clinical trials of boys and girls, the vaccine was shown to be extremely effective. In addition, studies in the U.S. and other countries that have introduced HPV vaccine have shown a significant reduction in infections caused by the HPV types targeted by the vaccine."	110 (90.9)	5 (4.1)	6 (5.0)
C1.	"HPV is so common that almost everyone will be infected at some point. It is estimated that 79 million Americans are currently infected with 14 million new HPV infections each year. Most people infected will never know. So even if your son/daughter waits until marriage to have sex, or only has one partner in the future, he/she could still be exposed if their partner has been exposed."	101 (86.3)	3 (2.6)	13 (11.1)
C2.	"I strongly believe in the importance of this cancer-preventing vaccine, and I have given HPV vaccine to my son/daughter/grandchild/niece/nephew/friend's children. Experts (like the American Academy of Pediatrics, cancer doctors, and the CDC) also agree that this vaccine is very important for your child."	92 (78.6)	13 (11.1)	12 (10.3)
C3.	"I want to make sure that your son/daughter receives all 3 shots of HPV vaccine to give them the best possible protection from cancer caused by HPV. Please make sure to make appointments on the way out, and put those appointments on your calendar before you leave the office today!"	109 (93.2)	4 (3.4)	4 (3.4)

* Responses may not sum to 100% due to missing data.