

Catching Up With the HPV Vaccine: Challenges and Opportunities in Primary Care

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ABSTRACT

PURPOSE Data confirm that high rates of human papillomavirus (HPV) vaccination have not been achieved despite strong clinician endorsement of the vaccine. We conducted a study of primary care clinicians to assess the broad range of health care delivery, health policy, and attitudinal factors influencing vaccination uptake and opportunities for informed decision making.

METHODS We implemented a mixed methods study in RIOS Net, a primary care practice-based research network in New Mexico. We first conducted qualitative, in-depth interviews with primary care clinicians, health policy makers, and immunization experts, and followed up with a confirmatory survey distributed to RIOS Net clinician members.

RESULTS Health service delivery challenges emerged as the greatest barrier to HPV vaccination, specifically the lack of capacity to track and distribute reminders to eligible patients. Clinicians also reported variations in counseling approaches attributable to both age and emphasis on the cancer prevention benefits of the vaccine. There was no evidence of sociocultural influences on vaccine decision making, nor did concerns about perceived overprotection emerge.

CONCLUSIONS Our findings, based on a long-term program of research, suggest that both patients' attributes and health system delivery are most influential in HPV vaccination coverage challenges. Interventions targeting innovative communication techniques, as well as health system changes that build on efforts toward coordinated care and utilization of other venues to promote vaccination, will be necessary to address these challenges.

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INTRODUCTION

The Centers for Disease Control and Prevention (CDC) reports that the human papillomavirus (HPV) vaccine rates trail those of other vaccines for teenagers: tetanus, diphtheria, and pertussis (Tdap), and meningitis.¹ Nationally, 57.3% reported getting the first dose of HPV in 2013, a modest increase from 2012 rates (53.8%). Full coverage (not considering the time frame in which the doses were given) is also less than ideal: among girls aged 13 to 17 years, 37.6% received all 3 doses.² National HPV vaccination data for younger eligible recipients (eg, aged 9 to 12 years) are not provided by the CDC. Given new challenges in the health service delivery environment,³ innovative approaches for increasing HPV vaccination coverage are needed.

In the period before the vaccine's release, research was aimed at understanding factors that might predict vaccination uptake. Although identification of such factors varied, there was strong consensus that primary care clinicians would play an important role in HPV vaccine dissemination.⁴⁻⁶ During the precensure period, we conducted a qualitative study in primary care settings to better understand and anticipate the challenges and opportunities for HPV vaccination. In this journal, we reported the 4 major domains that emerged from our research, which included (1) the complexity of HPV counseling in the clinical encounter, (2) the recom-

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mended age, (3) system/compliance issues, and (4) external factors.⁷

Given the lower-than-anticipated uptake of the HPV vaccine and associated challenges with promoting shared decision making, we followed up on our original study that examined the conditions into which the HPV vaccine would be introduced. The purpose of this research was to assess the broad range of health policy and health service delivery factors that influenced HPV vaccine in the postlicensure period and to identify opportunities for strategic interventions to enhance both uptake and shared decision making. In this article, we report findings from the current mixed methods study that provides a unique basis from which to understand a range of attitudinal, counseling, and practice-system perspectives about HPV vaccination over an 8-year period.

METHODS

Study Design and Setting

We conducted a sequential mixed methods study, including exploratory key informant interviews and a subsequent survey designed to confirm and expand upon these qualitative findings. This study (similar to our earlier research) was conducted in RIOS Net, a practice-based network in New Mexico. The University of New Mexico Human Research Protections Office approved the research protocol.

Key Informant Interviews

Sample and Recruitment

In addition to conducting semistructured interviews with RIOS Net clinicians based in academic, community, and school-based health settings, we also purposefully sampled and interviewed key informant stakeholders from state government, professional coalitions, and advocacy organizations focused on immunizations. We utilized a snowball sampling approach for recruitment, first contacting key informants known to the research team for their clinical and/or health policy interest in the HPV vaccine, who then identified other individuals with similar interests and/or involvement in HPV vaccination efforts.⁸

Data Collection

We conducted interviews from May 2009 to March 2010, mostly in person, with the exception of 2 completed over the telephone. Our semistructured interview guide covered a range of topics, including clinicians' views and experiences implementing the HPV vaccine, perceived attitudes and decision-making influences of parents and caregivers, and health policy implications (ie, mandates for school entry). We ended

data collection when we reached consensus that no new information was being provided. We digitally recorded and transcribed all interviews verbatim and offered participants a \$50 gift card in appreciation of their time.

Data Analysis

The research team utilized an iterative analytic process by organizing the transcripts into categories reflecting the roles of stakeholders who participated in the interviews (see above). Each research team member reviewed 2 to 3 transcripts to identify key themes, after which time the group met to compare emergent themes and develop initial coding structures. Subsequently, 4 members of the team (A.L.S., C.M.G., A.S., A.B.) coded the remaining transcripts from each participant category independently and finalized the coding structure by reaching agreement about the application of codes. Transcripts were imported into NVivo 8 (QRS International). We first analyzed the data without reference to the findings from our earlier research. Once this initial period of analysis was completed, we then integrated the 4 domains from our previous work as a starting point from which to compare and contrast emergent themes and identify new areas as relevant.

Network Survey

Sample and Survey Development

After we analyzed the qualitative data, we developed a survey questionnaire to address the general themes that emerged from the qualitative findings. Included were questions about clinicians' attitudes about the vaccine, their experience with implementing the Advisory Committee on Immunization Practices (ACIP) recommendations, and their views about the influence of health policy (eg, mandatory vaccination) on their practices. We used visual analog scales to indicate strength of agreement (or disagreement), with 0 = strongly disagree and 100 = strongly agree. It was administered in both electronic and paper formats. The electronic version utilized the Web-based application Research Electronic Data Capture (REDCap). The entire questionnaire can be found in Supplemental Appendix 1, at <http://www.annfammed.org/content/13/4/354/suppl/DC1>.

We took 2 steps to ensure that the questionnaire captured the perspectives of clinicians who administer the HPV vaccine for adolescent patients aged 9 to 18 years. First, we did not send the questionnaire to internal medicine clinician members of the network who were unlikely to order the HPV vaccine for adolescent patients. Second, we included a screening question that invited participants to complete the questionnaire only after confirmation that they currently ordered the vaccine.

Table 1. Survey Respondent Demographics (n = 98)

Clinician Characteristics	No. (%)
Sex, female	49 (50.0)
Practice specialty	
Family physician	62 (63.3)
Pediatrician	21 (21.4)
Nurse practitioner	7 (7.1)
Physician assistant	8 (8.2)
Practice setting	
Community health center	29 (29.6)
Indian Health Service	27 (27.6)
Academic medical center	27 (27.6)
Private practice	10 (10.2)
School-based health center	1 (1.0)
Other	4 (4.1)

Data Collection

We conducted the survey from May to August 2011. We administered the questionnaire through 4 weekly e-mail solicitations with an embedded survey link. We then sent out 2 more rounds of the questionnaire in paper format to clinicians' at their practice locations. Two randomly selected respondents were drawn from each solicitation round and received \$50 gift certificates.

Data Analysis

The Web-based questionnaires were automatically captured in REDCap; we hand-entered the paper-based questionnaires, double entering 25% of them to ensure data entry reliability. We exported data from REDCap into SAS 9.2 software (SAS Institute) for analysis. We computed descriptive statistics for all items including means and standard deviations of continuous variables and frequencies of categorical items.

As a final analytic step, we integrated the survey findings with our qualitative thematic template to assess the degree to which these data supported and/or modified the 4 major domains.

RESULTS

We conducted key informant interviews with 25 individuals and a total of 98 of 158 eligible RIOS Net clinicians responded to the survey (62%). Demographic characteristics are displayed in Table 1. We provide a comparison of the findings described below with our prelicensure findings in Table 2 and a full summary of survey results in Tables 3 and 4.

HPV Counseling in the Clinical Encounter

Clinicians reflected on their challenges about discussing HPV infections with their adolescent patients, sim-

Table 2. Pre- and Postlicensure Comparison Table

Domain	Prelicensure (2004-2005)	Postlicensure (2009-2012)
HPV counseling in the clinical encounter	High clinician receptivity Low patient/parent HPV knowledge Complexity of topic challenging HPV infection counseling typically not part of guidance about STI prevention	High clinician receptivity High patient/parent receptivity Low patient/parent HPV knowledge Topic ever more complex with 2 competing vaccines and approval for boys Framing of HPV vaccine as cancer prevention rather than STI prevention
Recommended age	Preference for vaccinating older adolescents Topics discussed with younger girls different from older girls Parents accompany younger adolescents to most primary care visits (though clinicians prefer them not to be present)	Mixed results about age range that clinicians are comfortable vaccinating Framing of HPV vaccine as cancer prevention rather than STI prevention (to get around discomfort of discussing sex with younger girls) Challenges in talking about sex (avoidance of discussion), including parents being present
System and compliance issues	Challenges speculated: Wide range of topics to cover Time constraints Getting adolescents to return for 2 subsequent doses within 6 month	Challenges borne out: Adolescents less likely to return for well-person visit Wide range of topics to cover Time constraints Getting adolescents in for second and third shots difficult Inadequate tracking systems and lack of a reminder system Lack of knowledge about 6-month time frame
External factors	Anticipated impact of mass media advertising campaigns Concern that diverse social or religious beliefs about sexual activity would influence acceptability; fear that adolescents would feel overprotected	Media campaign influential, but brought awareness, not necessarily knowledge Mandatory vaccination proposals generated controversy Less concern about adolescent overprotection; responses to mandatory vaccination proposals negative Bundling of HPV vaccine into adolescent platform

HPV = human papillomavirus; STI = sexually transmitted infection.

ilar to those they had anticipated in the preclosure period. They reported having difficulty offering the vaccine during acute episodic care visits, which constitute most of their encounters with adolescents. Counseling about the vaccine has become more complex with the introduction of Cervarix (a vaccine designed to prevent HPV types 16 and 18 infections), and conversations to distinguish between vaccine choices raises challenges. For example, in response to the statement, "I am prepared to provide counseling to patients about the difference between Gardasil [a vaccine designed to prevent HPV types 6, 11, 16, and 18 infections, appropriate for boys also] and Cervarix," the mean response on the questionnaire was 42.1, based on a scale from 0 (strongly disagree) to 100 (strongly agree).

Clinicians reported emphasizing the cancer prevention benefits of the vaccine to avoid what they perceive as a potentially uncomfortable discussion about adolescent sexual behavior, particularly with parents in the examination room. As one clinician stated, "I talk about it as preventing cervical cancer. If they want to discuss the sexual aspects, they're going to have to bring it up, because I won't." Survey respondents strongly endorsed the statement, "In presenting the HPV vaccine, I emphasize its cancer prevention benefits" (mean = 87.2). An adolescent immunization advocate strongly promoted not explicitly linking the vaccine with sexual activity, saying, "We don't want this to be the sex vaccine because it's not. It's a cervical cancer-preventing vaccine or a HPV vaccine or a warts vaccine...."

Recommended Age

Clinicians differentiated between having discussions about the vaccine's benefits and offering the vaccine to adolescent patients. Survey respondents reported that a discussion about the vaccine is useful to initiate sexual risk counseling for older adolescents, as exemplified by response to the question, "In presenting the HPV vaccine, I see it as an opportunity to open up a discussion about adolescent sexual activity (mean = 73.9)." In the qualitative interviews, clinicians expressed a preference to have these discussions

with older adolescents (eg, those aged 15 to 18 years) because the conversation was more in line with their developmental status. As one clinician stated, "To me, 11 and 12 is a little bit young...because [for] some, their body is barely starting to change. And lots of times they're even afraid to ask. And it's like, 'What do you mean, I've got to protect myself from cervical cancer? I've never even had a period.'"

The average age at which clinicians reported offering the HPV vaccine to adolescent patients was 10.7, however, even younger than the earliest ACIP-recommended age (11 to 12 years). When asked at what age they felt most comfortable first offering the vaccine, the vast majority stated that they preferred younger ages: 21.4% chose 9 to 10 years, whereas 65.3% chose the recommended age of 11 to 12 years; only 13.3% selected categories that included adolescents aged 13 years and older.

System and Compliance Issues

Clinicians strongly endorsed the role of system-level barriers to HPV vaccination, noting that opportunities to offer the vaccine to their adolescent patients are limited, especially in the context of visits addressing other acute health issues or behavioral or mental health needs. Exactly one-half of clinician respondents

Table 3. Summary of Questionnaire Responses

Item	Mean	Range	SD
Attitudes about HIP vaccine			
12. Compared with other vaccines, I prioritize the HPV vaccine	65.9	0-100	24.4
13. HPV vaccine offers the most benefit before intercourse	89.2	0-100	19.5
14. Is it worthwhile to give HPV vaccine after intercourse	75.0	0-100	26.2
Perceived influence on patient and/or parent decision making			
15. Side effects	38.0	0-100	27.7
16. Duration of protection	35.9	0-100	29.6
17. Adolescents feel overprotected and more likely to engage in risky sexual behavior	23.3	0-91	26.5
19. Don't have enough time to discuss HPV vaccine	37.2	0-94	27.0
20. I have sufficient information about HPV vaccine to explain to my patients	73.0	0-100	25.0
21. I strongly endorse the HPV vaccine	88.0	5-100	17.3
22. Parents make the decision without input from their daughters	64.4	0-100	24.0
23. Patients get second and third doses whenever they come in	50.6	0-100	31.0
24. In presenting the HPV vaccine, I emphasize cancer prevention benefits	87.2	14-100	16.6
25. Presenting HPV vaccine is opportunity to discuss adolescent sexual behavior	74.0	0-100	23.1
26. Patients will feel overprotected and not come back for cervical cancer screening	17.7	0-86	19.5
29. I am prepared to provide counseling about differences between HPV vaccines	42.0	0-100	32.5
30. Parents of my male patients will be receptive to the HPV vaccine	61.0	0-100	27.2

HPV = human papillomavirus.

Note: Responses are on a scale from 0 to 100, in which 0 = strongly disagree and 100 = strongly agree.

Table 4. Clinician Questionnaire Summary

Item	%
7. Age you feel the most comfortable first offering the HPV vaccine,	
9-10 y	21.4
11-12 y	65.3
13-14 y	10.2
15-16 y	3.1
8. Does your clinic report to Statewide Immunization System	
Yes	80.6
No	3.1
Don't know	16.3
9. Way to track patient HPV vaccination status	
Electronic health record	68.4
Paper charts	20.4
Don't know	5.1
Other	6.1
10. Does your clinic send reminders to patients for second and third doses	
Yes	21.4
No	57.1
Don't know	20.4
11. For patients who received all 3 doses, timing of series completion	
By 6 mo	9.2
By 9 mo	30.6
By 12 mo	29.6
>12 mo	13.3
Don't know	16.3
31. Should the HPV vaccine be mandated for school entry for all 11- to 12-year-old girls	
Yes	27.6
No	49.0
Don't know	21.4

HPV = human papillomavirus.

indicated that they do not schedule appointments to offer the second and third doses. Clinicians responding to the questionnaire estimated that only 9% of their patients received all 3 doses in the recommended 6-month time period, and that 28% of their adolescent patients aged 9 to 18 years had received the first dose. Few clinicians (22%) reported having reminder systems in their clinics. As one family physician noted, "The burden's on the patients. To be honest, I don't have the personnel to be calling the patients."

External Factors: Sociocultural Beliefs, Media, and Policy

Despite well-publicized concerns that adolescents might feel overprotected from HPV (and even other sexually transmitted diseases) upon vaccination in the prelicensure period, clinicians reported that this fear did not play a major role in actual HPV vaccination decisions. Consistent with the literature, most clini-

cians reported that parents had not raised such concerns during discussions about the vaccine,⁹ and recent findings from a national sample of girls aged 12 to 18 years old confirm that incidence of sexually transmitted infections does not increase with HPV vaccination.¹⁰ When asked on the questionnaire to anticipate whether "the HPV vaccine will lead females aged 9 to 18 years to feel overprotected and more likely to engage in risky sexual behavior," the mean response was 23.2. Further, despite concerns that diverse cultural considerations (eg, religious or social conservatism) would influence vaccination uptake, clinicians did not report variations in receptivity to the vaccine across the different populations that they serve (mostly Hispanic and American Indian).

DISCUSSION

In this follow-up to our original study, we triangulated data from a mixed methods approach that led us to examine the range of implementation challenges which affect current HPV vaccination practices and to compare and contrast these circumstances with those identified in our previous research. Based on this longitudinal program of research situated in a Southwestern practice-based research network, we offer recommendations about how this information can be used to develop contextually appropriate interventions.

Age-Based Counseling Strategies

Similar to the findings of Vadaparampil et al,¹¹ we found that primary care clinicians continue to struggle with many, though not all, of the challenges anticipated from our earlier study. Perhaps the most prescient concern was that clinicians recognized the likelihood of framing the HPV vaccine differently based on patient age. Indeed, this prediction emerged as a central theme as clinicians in this current study expressed a preference for introducing the vaccine through a cancer prevention lens to younger girls (aged 9 to 12 years), while opportunistically integrating sexual risk behavior counseling with older adolescents (aged 15 to 18 years). This finding is consistent with other recently published qualitative research that found lower self-reported vaccination rates when clinicians considered the timing of sexual activity as compared with clinicians who emphasized a cancer prevention message.^{12,13} Further, a recent (2013) CDC report found that 3-dose completion rates are 25.8% at 13 years and 48.2% by 17 years,² and results from 2 national surveys of physicians found that clinicians were more likely to offer HPV vaccines to older female adolescents¹⁰ and reported more vaccine refusals among parents of younger adolescents.¹⁴ This pattern is especially trou-

bling, given that the antibody response is more robust in younger adolescents (aged 9 to 15 years).¹³

The data we report show there are subjective interpretations of what constitutes the most appropriate strategy, and interventions that provide guidance to health care professionals might include criteria for choosing one approach rather than another. It may be necessary to tailor counseling strategies in such a way that emphasize cancer prevention or sexual risk reduction based on consideration of patient and contextual attributes (eg, age, cultural group, and level of parental involvement).¹⁵ Furthermore, parents and their vaccine-eligible adolescent children may be attracted to interactive media (computer kiosks) or applications for electronic devices that would help them to independently review information and make decisions before they reach the examination room.¹⁶ Although clinicians did not detect differences in vaccine receptivity based on ethnicity and socioeconomic status, our published research¹⁷ and that of other researchers¹⁸ show that even within ethnic groups, parents and adolescents have different decision-making approaches.

System Issues

In our current study, health system delivery issues, including the lack of flexible tracking and reminder capabilities, were identified as the most important barriers to achieving broader HPV vaccination coverage. These barriers lead to missed opportunities, because adolescents come to the clinic most often for acute, episodic care.¹¹ Most clinicians in this study reported having an electronic medical record system, though most respondents did not rely on this system to encourage vaccination visits. Limitations in tracking can lead to further problems, including potential overvaccination and avoiding mixing the 2 available vaccines, as it is difficult to verify vaccination history.

Implications for Intervention

A major focus of our work is to address the tension between increasing vaccination uptake and ensuring informed decision making. Two strategies emerged from the research: improved communication and health systems change.

Improved Communication

Experience has shown that messages disseminated through various social media channels for teenagers, starting with the ACIP-recommended age and older, can be helpful. Social marketing and Internet-based interventions, however, can also be designed to support brief discussions between primary care clinicians with parents and teenagers in the clinical encounter, as well as dissemination of preventive health recommendations.¹⁹

Health System Changes

Health system delivery barriers, more than any other single factor, were identified by participants as the greatest limitation to achieving shared goals of increased vaccination uptake and informed decision making. Given the strong endorsement of the HPV vaccine among both clinicians and the general public, efforts to enhance vaccination may be best served by interventions aimed at improving delivery mechanisms rather than those strategies that focus on individual behavior change.

Optimizing newly required electronic medical systems to enhance tracking and generate timely reminders has been shown to increase vaccination rates.²⁰ Other promising health system approaches include the creation of dedicated nurse appointments for the second and third dose of the HPV vaccine. There may be trade-offs to consider in such approaches, however, as these efforts to increase vaccine coverage may decrease opportunities for patient-clinician communication. Given that very few adolescents complete the 3-dose series in the recommended 6-month period, our previous research suggests that many adolescents and parents may need a basic refresher about the HPV vaccine, and it will be important for staff to be comfortable with these counseling needs.

Another approach to increasing compliance with the vaccine would be to incorporate the HPV vaccine as part of an adolescent immunization platform (Tdap, meningococcal vaccines).²¹⁻²⁴ The infrequency of adolescent visits to primary care clinics during the ages of 13 to 17 years makes it all the more important to bundle immunizations as a package to ensure initiation and multidose completion.

Finally, further research is needed to reduce the burden on the primary health care system by identifying other venues for vaccination, such as school-based health centers. Students in these settings are easier to access, and the school year is long enough to complete vaccination in a multidose series.^{24,25}

Limitations

Given that this research reflects the views and experiences of clinicians and immunization experts who work with underserved ethnic minority and rural populations, it is possible that these findings are relevant to these circumstances and not to conditions of vaccine delivery across the country. Our findings, however, are widely consistent with those reported in the broader literature while offering perspectives that may be uniquely relevant to primary care clinicians and researchers working in similar contexts.

In our earlier study, before the approval and release of the HPV vaccine, we sought to identify the range of issues relevant to implementing the vaccine in primary

care settings. Now that the vaccine has been available for more than 8 years, persistent gaps in vaccination coverage show the need to overcome both implementation and informed decision-making barriers. Contextually sensitive interventions will be needed to address these challenges. Findings from this current study, based in a long-term program of research examining these evolving dynamics, provide guidance toward that goal.

To read or post commentaries in response to this article, see it online at <http://www.annfam.org/content/13/4/354>.

Key words: health care delivery; cervical cancer; mixed methods research; health services research; vaccination; adolescent health services

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