



Physician communication about adolescent vaccination: How is human papillomavirus vaccine different?



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ABSTRACT

Background. Low human papillomavirus (HPV) vaccination coverage stands in stark contrast to our success in delivering other adolescent vaccines. To identify opportunities for improving physicians' recommendations for HPV vaccination, we sought to understand how the communication context surrounding adolescent vaccination varies by vaccine type.

Methods. A national sample of 776 U.S. physicians (53% pediatricians, 47% family medicine physicians) completed our online survey in 2014. We assessed physicians' perceptions and communication practices related to recommending adolescent vaccines for 11- and 12-year-old patients.

Results. About three-quarters of physicians (73%) reported recommending HPV vaccine as highly important for patients, ages 11–12. More physicians recommended tetanus, diphtheria, and acellular pertussis (Tdap) (95%) and meningococcal vaccines (87%, both $p < 0.001$) as highly important for this age group. Only 13% of physicians perceived HPV vaccine as being highly important to parents, which was far fewer than perceived parental support for Tdap (74%) and meningococcal vaccines (62%, both $p < 0.001$). Physicians reported that discussing HPV vaccine took almost twice as long as discussing Tdap. Among physicians with a preferred order for discussing adolescent vaccines, most (70%) discussed HPV vaccine last.

Conclusions. Our findings suggest that primary care physicians perceived HPV vaccine discussions to be burdensome, requiring more time and engendering less parental support than other adolescent vaccines. Perhaps for this reason, physicians in our national study recommended HPV vaccine less strongly than other adolescent vaccines, and often chose to discuss it last. Communication strategies are needed to support physicians in recommending HPV vaccine with greater confidence and efficiency.

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Introduction

Human papillomavirus (HPV) vaccination rates among U.S. adolescents are not on track to meet the Healthy People 2020 goal of 80% coverage (Department of Health and Human Services, 2015). By 2013, only 35% of adolescent girls and 14% of adolescent boys completed the three-dose HPV vaccine series (Centers for Disease Control and Prevention, 2014). For girls, this level of coverage represents an increase of just three percentage points since 2010 (Centers for Disease Control and Prevention, 2011, 2014). By contrast, coverage levels for two other adolescent vaccines, tetanus, diphtheria, and acellular pertussis (Tdap) and meningococcal vaccines, have risen dramatically over the same time period, reaching 86% and 78%, respectively (Centers for Disease Control and Prevention, 2014). This success demonstrates that delivering vaccines to adolescents is possible and raises questions

about why HPV vaccination coverage remains so low (Centers for Disease Control and Prevention, 2014).

Research suggests that improving healthcare providers' communication is among the most important strategies for increasing HPV vaccine uptake in the U.S., where the vast majority of HPV vaccine doses are delivered in the context of primary care (Stokley et al., 2014; President's Cancer Panel Annual Report, 2014). Although a provider's recommendation is a strong and consistent predictor of HPV vaccination (Brewer et al., 2011; Gerend et al., 2009; Reiter et al., 2009, 2013; Lau et al., 2012), many parents of age-eligible adolescents do not receive recommendations (Stokley et al., 2014). Furthermore, the available evidence suggests that providers often give weak HPV vaccine recommendations (Perkins et al., 2014; Hughes et al., 2011; McRee et al., 2014; Hamlish et al., 2012). For example, in a survey we conducted with primary care providers, one-quarter reported that they do not recommend HPV vaccine as strongly as other adolescent vaccines for 11- and 12-year-old girls, and over half indicated that they prefer to offer HPV vaccine as an "optional" vaccine for this age group (McRee et al., 2014). Weak recommendations for HPV vaccine are problematic because

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they likely convey ambivalence to adolescents and their parents, particularly when juxtaposed against stronger recommendations for other adolescent vaccines (Perkins et al., 2014; Hughes et al., 2011; McRee et al., 2014; Hamlish et al., 2012).

To better understand HPV vaccination in relation to other adolescent vaccines, we surveyed a national sample of primary care physicians to assess perceptions and communication practices related to recommending HPV, Tdap, and meningococcal vaccines. As one of the first studies to locate HPV vaccination within the broader context of adolescent immunization, our research aims to identify opportunities for better aligning communication about HPV vaccination with the successful strategies providers already employ to support Tdap and meningococcal vaccination.

Methods

Participants and procedures

We conducted a national, online survey of pediatricians and family physicians in April to June 2014. Physicians were members of a standing panel maintained by a survey research company (GfK, 2015). Identified through American Medical Association lists, panel members included similar numbers of family physicians (51%) and pediatricians (49%) who were located in all regions of the U.S. (22% Northeast; 23% Midwest; 37% South; 18% West). For this study, panel members were eligible to participate if they provided preventive care, including vaccinations, to 11- and 12-year-old patients. Our survey focused on patients in this age range because national guidelines recommend ages 11 and 12 for the routine administration of adolescent vaccines.

The survey company emailed invitations to all 2368 panel members with pediatric or family medicine specialties, and 1022 physicians (43%) responded by visiting the survey website. Of these, 776 (76%) met eligibility criteria, provided informed consent via the website, and completed the online survey. Physicians received incentives of \$25 to \$45 for completing our survey, with higher incentives used to maximize participation later in the fielding process. The University of North Carolina Institutional Review Board approved the study protocol.

Measures

Our survey assessed physicians' perceptions and communication practices with regard to adolescent vaccines. Separately for HPV, Tdap, and meningococcal vaccines, physicians indicated how important they say each vaccine is when recommending it for patients, ages 11–12. Physicians also indicated how important they believe parents feel each vaccine is for their 11- and 12-year-old children. We categorized responses of “extremely” or “very” important as indicating high vaccine endorsement, while responses of “moderately,” “slightly,” or “not” important indicated low vaccine endorsement.

Physicians indicated which of the three adolescent vaccines they usually discuss first and last. They estimated, in minutes and seconds, how long it usually takes to talk about each vaccine. One item assessed which of the three vaccines, if any, physicians discuss during sick visits for patients with mild complaints. For physicians who did not indicate all three vaccines, a follow-up item assessed their reason(s) for not discussing adolescent vaccines during sick visits. As in the case of vaccine endorsement, the items in this section of the survey were specific to 11- and 12-year-old patients.

To explore the broader context of physician communication, our survey addressed two vaccine-related policies. First, physicians indicated whether their clinics or practices have a policy to dismiss families who refuse vaccines for their children. If yes, a follow-up item assessed whether the policy applies to refusal of each of the adolescent vaccines. Second, physicians indicated the extent to which having school entry requirements for Tdap, but not HPV vaccine, makes some parents think HPV vaccine is less important. For this item, a five-point response scale ranged from “strongly disagree” to “strongly agree.”

On sample characteristics, our survey assessed physicians' sex, medical specialty, and years of experience in practice. Physicians indicated the number of adolescent patients, ages 11 through 17, they see in a typical week, as well as the percentage of adolescent vaccine doses they deliver through the Vaccines for Children (VFC) program. VFC is a federally-funded program that provides free vaccines for vulnerable populations, including uninsured and Medicaid-eligible youth (Centers for Disease Control and Prevention, 2015a). Physicians indicated their clinic or practice type (private versus other), size in terms of

total number of physicians, and geographic location by state. We categorized locations into national regions using U.S. Census classifications (U.S. Census Bureau, 2015).

To assess and improve the clarity of survey items, we conducted cognitive testing with nine physicians. The survey company subsequently pilot tested the survey with 60 additional physicians to ensure proper functioning. The survey instrument is available at www.unc.edu/~ntbrewer/hpv.htm.

Statistical analysis

To compare physicians' responses about HPV vaccine to their responses about Tdap and meningococcal vaccines, we used McNemar's tests for dichotomous variables and paired *t*-tests for continuous variables. In exploratory analyses, we repeated these tests for key variables after stratifying by physician specialty. Statistical tests were two-tailed with a critical alpha of 0.05. We conducted analyses using Stata Version 12.0 (College Station, TX).

Results

Sample characteristics

Respondents were pediatricians (53%) and family physicians (47%) (Table 1). About two-thirds (68%) were male. Over half (55%) had 20 or more years of experience, and most (85%) were in private practice. The sample included physicians working in 48 of 50 U.S. states, and each geographic region was well represented.

HPV vaccine perceptions and communication practices

Physicians' perceptions of adolescent vaccine endorsement varied by vaccine type and by whether they were rating themselves or parents

Table 1
Sample characteristics, 2014, USA (*n* = 776).

	<i>n</i>	(%)
Physician characteristics		
Medical specialty		
Pediatrics	410	(53)
Family practice	366	(47)
Sex		
Male	526	(68)
Female	250	(32)
Years in practice		
≤19	352	(45)
≥20	424	(55)
Adolescent patients seen in typical week		
≤9	129	(17)
10–24	351	(45)
≥25	296	(38)
Vaccine doses through VFC		
≤9%	290	(37)
10%–49%	274	(35)
≥50%	152	(20)
Not sure	60	(8)
Clinic or practice characteristics		
Type		
Private practice (solo, group, HMO)	660	(85)
Other ^a	116	(15)
Total physicians		
1–4	398	(51)
5–9	217	(28)
≥10	161	(21)
Region		
Northeast	184	(24)
Midwest	165	(21)
South	275	(35)
West	152	(20)

Note. HMO: health maintenance organization. HPV: human papillomavirus. VFC: Vaccines for Children.

^a Includes hospital- and university-based clinics, Federally Qualified Health Centers, and community, rural, migrant, Indian, military, public health, and school health clinics.

(Fig. 1). In terms of their own communication, about three-quarters of physicians (73%) reported highly endorsing HPV vaccine when recommending it for patients, ages 11–12. By comparison, more physicians highly endorsed Tdap (95%) and meningococcal (87%) vaccines (both $p < 0.001$). Just 13% of physicians indicated that parents highly endorse HPV vaccine for their 11- and 12-year-old children. Physicians more often perceived parents as highly endorsing Tdap (74%) and meningococcal (62%) vaccines (both $p < 0.001$). For each of the three vaccines, physicians more often rated their own endorsement highly than parents' (all $p < 0.001$).

About two-thirds of physicians (64%) reported that, for patients ages 11–12, they usually discuss adolescent vaccines in a particular order. Of those 494 physicians with a preferred order, 361 physicians (73%) discussed Tdap first, and 347 (70%) discussed HPV vaccine last (Fig. 2). On average, physicians estimated that talking about HPV vaccine for 11- and 12-year-old patients usually takes 3.7 min (standard error [SE] = 0.12), which was longer than their estimates for Tdap (mean = 1.9 min, SE = 0.09, $p < 0.001$) and meningococcal (mean = 2.2 min, SE = 0.12) vaccines (both $p < 0.001$, Fig. 3).

Fewer than half of physicians (41%) reported discussing adolescent vaccines at sick visits for 11- and 12-year-old patients with mild complaints. Of those 322 physicians who did, 235 physicians (73%) indicated that they discuss HPV vaccine. Physicians more often discussed other adolescent vaccines at sick visits, with 288 (89%, $p < 0.001$) indicating that they discuss Tdap and 263 (82%, $p < 0.01$) indicating meningococcal vaccine. Among 567 physicians who did not discuss one or more adolescent vaccines during sick visits, 418 physicians (74%) reported that vaccination is better suited for a well visit, 192 (34%) reported that vaccination takes too long to discuss, and 188 (33%) reported that parents may blame the vaccine if the child's illness worsens. Among less commonly endorsed reasons for not discussing adolescent vaccines at sick visits, 60 physicians (11%) indicated inadequate reimbursement and 24 (4%) indicated extra paperwork.

Vaccine-related policies

One-quarter (25%) of physicians worked in practices or clinics with a policy to dismiss families who refused early childhood or adolescent vaccines. Among those 193 physicians who did, 24 (12%) indicated the dismissal policy applied to HPV vaccine. Dismissal policies are more often applied to other adolescent vaccines, with 88 physicians (46%) indicating that the policy applied to Tdap and 72 (37%) indicating meningococcal vaccine (both $p < 0.001$). About three-quarters of physicians (74%) somewhat or strongly agreed that having a school entry requirement for Tdap, but not HPV vaccine, makes some parents think that HPV vaccine is less important.

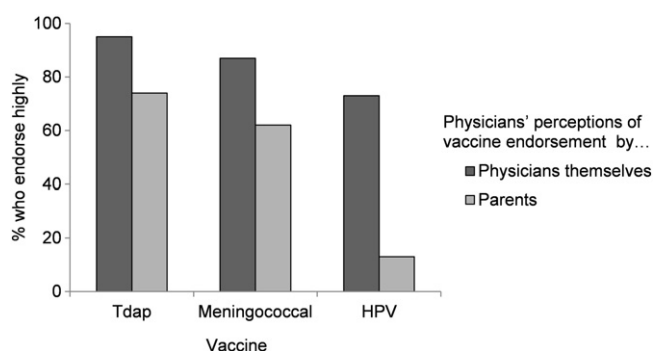


Fig. 1. Physicians' perceptions of adolescent vaccine endorsement for patients, ages 11 and 12, 2014, USA ($n = 776$). Standard error for each proportion was less than 0.02.

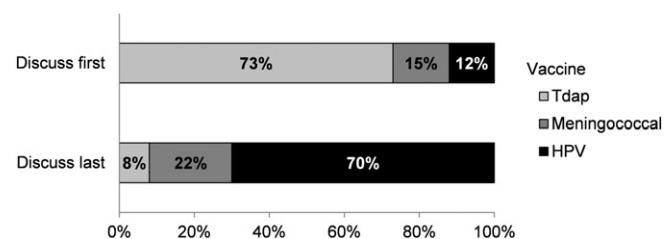


Fig. 2. Vaccines physicians discussed first and last, among those with a preferred order, for patients, ages 11 and 12, 2014, USA ($n = 494$).

Differences by physician specialty

In exploratory analyses stratified by physician specialty, pediatricians generally rated their perceptions and communication practices related to adolescent vaccination more positively than family physicians did; however, both specialties consistently rated HPV vaccine more negatively than other adolescent vaccines. On physician endorsement, 77% of pediatricians and 69% of family physicians reported recommending HPV vaccine as highly important for patients, ages 11–12. Pediatricians and family physicians more often recommended Tdap (99% and 91%, respectively, both $p < 0.001$) and meningococcal vaccines (96%, $p < 0.001$ and 76%, $p < 0.01$) as highly important for this age group. On parental endorsement, 9% of pediatricians and 17% of family physicians believed that parents feel that HPV vaccine is highly important for their 11- and 12-year-old children. A higher percentage of pediatricians and family physicians perceived parental endorsement for Tdap (83% and 63%, both $p < 0.001$) and meningococcal vaccines (72% and 49%, both $p < 0.001$). Pediatricians and family physicians estimated that talking about HPV vaccine for 11- and 12-year-old patients usually took 3.4 min and 3.9 min, respectively, which was longer than their estimates for Tdap (1.6 and 2.2 min, both $p < 0.001$) and meningococcal vaccines (1.9 and 2.6 min, both $p < 0.001$).

Discussion

Pediatricians and family physicians in our national study reported communicating about HPV vaccine differently from other adolescent vaccines. For 11- and 12-year-old patients, physicians indicated that they endorsed HPV vaccine less strongly than Tdap or meningococcal vaccines and often discussed it last. These findings add to a growing literature which suggests that, although physicians generally support HPV vaccination (Perkins et al., 2014; Feemster et al., 2008; Kahn et al., 2007), they discuss it in ways that likely discount its value (Perkins et al., 2014; Hughes et al., 2011; McRee et al., 2014; Hamlish et al., 2012). To the extent that physicians' strong endorsements of Tdap or

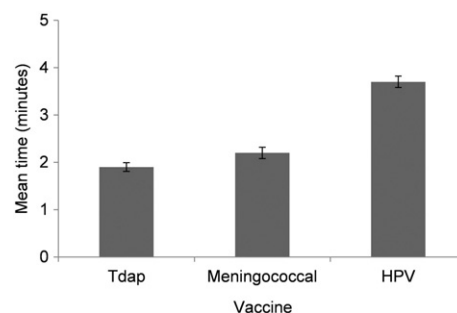


Fig. 3. Time physicians usually take to discuss adolescent vaccines for patients, ages 11 and 12 ($n = 776$), 2014, USA. Error bars show standard errors.

meningococcal vaccines serve as a reference point for decision making (Kahneman and Tversky, 1979; Brewer and Chapman, 2003), parents may perceive more moderate endorsement of HPV vaccine as indicative of physicians' ambivalence or even concern. Similarly, discussing HPV vaccine last may signal to parents that it is less important than other vaccines. Given that these communication practices are modifiable, future studies should investigate the extent to which relative vaccine endorsement and discussion order influence parents' willingness to vaccinate.

Physicians in our study perceived little support for HPV vaccination among parents of 11- and 12-year-old children. Although a majority of physicians reported that parents felt that Tdap and meningococcal vaccines were "very" or "extremely" important, only 13% said the same for HPV vaccine. Prior studies have also shown, albeit less dramatically, that providers view parents as a key barrier to HPV vaccination (Perkins et al., 2014; Hughes et al., 2011; McRee et al., 2014; Holman et al., 2014). For example, in a statewide sample of Minnesotan vaccine providers, we found that half of respondents reported that parents request to delay HPV vaccination for younger adolescents "often" or "most of the time" (McRee et al., 2014). Interestingly, these perceptions of strong parental hesitancy are generally at odds with research among parents themselves, which finds that a majority value HPV vaccine, are willing to vaccinate, and would prefer to receive strong recommendations from their children's providers (Stokley et al., 2014; Perkins et al., 2014; Hamlish et al., 2012; Cates et al., 2012; Healy et al., 2014). Most of the physicians in our study reported that not having school entry requirements for HPV vaccine contributed to parental hesitancy, and this finding may offer one clue as to why physicians perceive communication about HPV vaccine to be burdensome. Without the supportive policy environments which surround Tdap and, to a lesser extent, meningococcal vaccination (Immunization Action Coalition, 2015), physicians are left to make a case for HPV vaccination without recourse to the law.

One of our study's most notable findings is that physicians estimated the average length of discussions for HPV vaccination to be well over 3 min, or almost twice as long as for Tdap. The additional time required to discuss HPV vaccination likely reflects the need to address parental hesitancy, which, as previously noted, physicians perceived as being widespread. Ironically, physicians' own hesitancy may also play a role. Research suggests that more circumspect or open-ended communication styles prompt questions and concerns among parents when compared to directive approaches that "expect a yes" (Perkins et al., 2014; Opel et al., 2013). To the extent that physicians use open-ended communication styles to recommend HPV vaccination, they may be inadvertently contributing to parental hesitancy and, in turn, discussion length. Whatever its cause, a discussion length of over 3 min constitutes a substantial time commitment in the context of a standard 15- to 20-minute well-child visit and likely poses a considerable barrier to HPV vaccination (Halfon et al., 2011). Our findings suggest that strategies are urgently needed for helping physicians communicate about HPV vaccination more efficiently.

Fewer than half of the physicians in our study usually discussed adolescent vaccination at sick visits for 11- and 12-year-old patients with mild complaints, and only about one-third usually discussed HPV vaccination specifically. When prompted to give a reason for not broaching adolescent vaccination at sick visits, physicians most often reported believing that vaccination is better suited to well-child visits. This view is at odds with practice guidelines which state that mild illnesses, such as upper respiratory tract infections with or without fever, do not constitute grounds for delaying vaccination (Centers for Disease Control and Prevention, 2015b). Our findings suggest that immunization quality improvement programs that encourage physicians and other vaccine providers to "use every opportunity" to deliver HPV vaccine will likely encounter resistance (Centers for Disease Control and Prevention, 2015c). Additional education on contraindications and precautions for HPV vaccine administration may be needed to overcome

physicians' preference for delaying adolescent vaccination until well-child visits.

In terms of differences by physician specialty, both pediatricians and family physicians viewed HPV vaccine more negatively than other adolescent vaccines. Both groups reported that they recommended HPV vaccine less strongly than Tdap or meningococcal vaccines, perceived less parental support for it, and took longer to discuss it. At the same time, except in the case of parental endorsement for HPV vaccination, family physicians reported more negative perceptions than pediatricians across the adolescent platform, and sometimes dramatically so. For example, although almost all pediatricians reported recommending meningococcal vaccine strongly for 11- and 12-year-old patients, only about three-quarters of family physicians did so. Family physicians also reported perceiving far less parental support for Tdap and meningococcal vaccines than pediatricians did. These findings are consistent with prior studies which have shown that pediatricians are generally more supportive of vaccination, including adolescent vaccination, than other physicians (Vadaparampil et al., 2014; Dempsey et al., 2009). In terms of communication interventions, our findings suggest that family physicians may benefit from programs with a focus on adolescent vaccination more broadly, rather than on HPV vaccination alone. Future research is needed to explore other potential sources of subgroup variation in physician communication about adolescent vaccination such as practice setting, patient mix, or perceptions of vaccine cost.

Strengths of this cross-sectional study include data from a large, national sample of pediatricians and family physicians. Physicians practicing in these specialties are particularly important to immunization quality improvement because they deliver the majority of HPV vaccine doses in the U.S. Limitations to this study include a modest response rate, which is a common challenge for physician surveys (Flanigan et al., 2008). The self-reported nature of physician communication variables, such as strength of vaccine endorsement, is also a limitation because social desirability may have prompted physicians to overestimate their support for vaccines. Nevertheless, by collecting data on all three adolescent vaccines, we were able to describe relative differences, thereby contextualizing communication about HPV vaccination and somewhat offsetting the limitations of individual measures. Future research can extend the present study by exploring differences in physician communication about adolescent vaccination from other perspectives, including those of adolescent patients and their parents. Finally, this study is limited to communication about vaccines in the adolescent platform. Physician communication about early childhood vaccination likely differs from our findings in important ways and may hold additional insights into strategies that physicians can use for partnering with parents to increase vaccination coverage.

Conclusions

Parents do not make decisions about HPV vaccination in a vacuum, but rather consider HPV vaccine alongside other vaccines and health services as they negotiate medical encounters with their children's healthcare providers. The findings of this study suggest that the messages parents receive about HPV vaccine, relative to other adolescent vaccines, are not encouraging. Pediatricians and family physicians in our national sample reported that they endorse HPV vaccine less strongly than Tdap or meningococcal vaccines, often discuss it last, and rarely recommend it for patients with mild illnesses. These suboptimal communication practices likely discourage parents from vaccinating their children and may also contribute to the extended discussion length and profound parental hesitancy that physicians in this study reported with regard to HPV vaccination. Our findings suggest that, in the absence of supportive policies, better communication strategies are needed to help physicians recommend HPV vaccine with greater confidence and efficiency. By modifying factors such as relative vaccine endorsement and discussion order, physicians may be able to better communicate that HPV vaccination is not an exception to adolescents' routine

immunization schedule, but rather an effective and safe health service that is critical to the prevention of genital warts and HPV-attributable cancers.

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Conflict of interest

NB has received HPV vaccine-related grants from or been on paid advisory boards for GlaxoSmithKline, Merck and Pfizer; he served on the National Vaccine Advisory Committee Working Group on HPV Vaccine and is chair of the National HPV Vaccination Roundtable. TCB has received HPV vaccine-related grants from Merck. The remaining authors (MG, JM, MH, and PS) have no conflicts of interest to report.

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