



Published in final edited form as:

*Vaccine*. 2013 October 1; 31(42): . doi:10.1016/j.vaccine.2013.07.033.

## Human Papillomavirus Vaccine Communication: Perspectives of 11–12 Year-Old Girls, Mothers, and Clinicians

Tanya L. Kowalczyk Mullins, M.D., M.S.<sup>a,b</sup>, Anne M. Griffioen, B.A.<sup>c</sup>, Susan Glynn, B.A.<sup>a</sup>, Gregory D. Zimet, Ph.D.<sup>d</sup>, Susan L. Rosenthal, Ph.D.<sup>d</sup>, J. Dennis Fortenberry, M.D.<sup>d</sup>, and Jessica A. Kahn, M.D., M.P.H.<sup>a,b</sup>

<sup>a</sup>Division of Adolescent Medicine, Cincinnati Children's Hospital Medical Center, 3333 Burnet Ave, MLC 4000, Cincinnati, OH, 45229, USA

<sup>b</sup>University of Cincinnati College of Medicine, 3235 Eden Avenue, CARE/Crawley Building Suite E-870, Cincinnati, OH 45267, USA

<sup>c</sup>Johns Hopkins University, Bloomberg School of Public Health, 615 N. Wolfe Street, Baltimore, MD 21205, USA

<sup>d</sup>Division of Adolescent Medicine, Indiana University, 410 West 10th Street, HS 1001, Indianapolis, IN 46202, USA

<sup>e</sup>Departments of Pediatrics and Psychiatry, Columbia University and New York Presbyterian Morgan Stanley Children's Hospital, 622 West 168 Street, Vanderbilt Clinic 4th Floor — Room 402, New York, NY 10032, USA

© 2013 Elsevier Ltd. All rights reserved.

**Corresponding Author** Tanya L. Kowalczyk Mullins, M.D., M.S., Division of Adolescent Medicine, MLC 4000, Cincinnati Children's Hospital Medical Center, 3333 Burnet Avenue, Cincinnati, OH 45229 USA, Phone 1 (513) 636-2245, Fax 1 (513) 636-1129, tanya.mullins@cchmc.org.

NOTE: For first author, "L. Kowalczyk" are middle names. "Mullins" is last/family name.

**Publisher's Disclaimer:** This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**Conflicts of Interest:** Dr. Mullins, Ms. Griffioen, Ms. Glynn, and Dr. Fortenberry have no financial disclosures or conflicts of interest relevant to this research to report. Dr. Zimet and Dr. Rosenthal have received investigator initiated grants from Merck, Dr. Zimet has served as a consultant to Sanofi Pasteur and has received unrestricted program development funding from GlaxoSmithKline, and Dr. Rosenthal has served on a Merck advisory board. Dr. Kahn is a co-primary investigator for an NIH-funded clinical trial of HPV vaccine in HIV-infected individuals, in which immunogenicity testing and HPV vaccines are provided by Merck. Dr. Kahn also serves as project principal investigator and committee chair for a grant awarded to the Society for Adolescent Health and Medicine from Merck which is designed to fund public health demonstration projects addressing barriers to vaccination among adolescents.

### Author contributions:

All of the listed authors made substantive intellectual contributions to this study. All of the authors have approved the final article for submission.

Dr. Mullins: 1) analysis and interpretation of data; 2) drafting of article; and 3) final approval of version to be submitted.

Ms. Griffioen: 1) analysis and interpretation of data; 2) critical revision of article; and 3) final approval of version to be submitted.

Ms. Glynn: 1) acquisition of data and analysis and interpretation of data; 2) critical revision of article; and 3) final approval of version to be submitted.

Dr. Zimet: 1) conception and design of study, interpretation of data; 2) critical revision of article; and 3) final approval of version to be submitted.

Dr. Rosenthal: 1) conception and design of study, interpretation of data; 2) critical revision of article; and 3) final approval of version to be submitted.

Dr. Fortenberry: 1) conception and design of study, interpretation of data; 2) critical revision of article; and 3) final approval of version to be submitted.

Dr. Kahn: 1) conception and design of study, analysis and interpretation of data; 2) critical revision of article; and 3) final approval of version to be submitted.

Each author participated sufficiently in the work to take public responsibility for appropriate portions of the content.

## Abstract

**Objectives**—Because little is known about the content of human papillomavirus (HPV) vaccine-related discussions with young adolescent girls in clinical settings, we explored communication between 11–12 year-old girls, mothers, and clinicians regarding HPV vaccines and concordance in reports of maternal and clinician communication.

**Methods**—We conducted individual interviews with 33 girls who had received the quadrivalent HPV vaccine in urban and suburban clinical settings, their mothers, and their clinicians. Data were analyzed using qualitative methods.

**Results**—From the perspectives of both girls and mothers, clinicians and parents were the preferred sources of HPV vaccine information for girls. Vaccine efficacy and risks/benefits of vaccination were the most commonly reported desired and actual topics of discussion by mothers, girls, and clinicians. Clinician recommendation of vaccination was reported by nearly one-fifth of girls and nearly half of mothers. The most common concordant messages were related to efficacy of the vaccine, with concordance in 70% of triads. The most common discordant messages were related to sexual health. Approximately half of clinicians (16) reported discussing sexual health, but only 5 mothers (15%) and 4 girls (12%) reported this. Triads recruited from suburban (vs. urban) practices had higher degrees of concordance in reported vaccination communication.

**Conclusions**—HPV vaccine efficacy and safety are important topics for clinicians to discuss with both girls and mothers; educating mothers is important because parents are a preferred source of vaccine-related information for girls. Because girls may be missing important vaccine-related messages, they should be encouraged to actively engage in vaccine discussions.

## Keywords

Adolescents; Human papillomavirus (HPV); HPV vaccination; Communication

## Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the U.S., with a prevalence of 32.9% among 14–19 year-old women.[1] The introduction of the quadrivalent and bivalent HPV vaccines provides an opportunity to prevent HPV infection and related sequelae, including genital warts and cervical cancer. Both vaccines provide protection against infection with HPV types that cause cervical cancer (types 16 and 18),[2, 3] and the quadrivalent vaccine protects against two additional types that cause genital warts (types 6 and 11).[2] The Advisory Committee on Immunization Practices recommends that the HPV vaccine series be initiated at age 11–12 years for girls.[4] Girls should be vaccinated before the onset of sexual activity because HPV infection is acquired rapidly following sexual initiation,[5] and the vaccines are not effective against established vaccine-type HPV infection.[6] However, 11–12 year-old girls are among those with the lowest HPV vaccination rates.[7] Clinicians are less likely to consistently recommend vaccination to 11–12 year-old compared to older girls,[8, 9] and parents are less likely to agree to vaccination for younger compared to older daughters.[10, 11]

Communication with a healthcare provider is one of the most important factors in parental vaccination decisions.[12–14] Thus, the nature of conversations between clinicians, parents, and girls about HPV vaccination may be driving, in part, the lower rates of clinician recommendations for and parental acceptance of vaccination in 11–12 year-old compared to older girls. However, few studies have explored the content of such conversations from the perspectives of adolescents, parents, and clinicians. Furthermore, although studies have examined perceptions of the HPV vaccine among youth[15–18] and parents,[15, 19, 20], little is known about perceived informational needs of 11–12 year-old girls and how those

compare to the needs of parents. Understanding what information about HPV vaccines girls and mothers believe to be important could enhance clinician delivery of developmentally appropriate vaccine-related messages, which may lead to improved vaccine uptake. Finally, effective communication about the HPV vaccine requires accurate and convincing delivery of information by the clinician, as well as understanding and acceptance of that information by girls and their mothers. Messages that are perceived and retained by the recipient of communication may differ from messages that are intended to be communicated, and retained messages may be more salient in the context of vaccination decisions. Concordance can serve as a proxy for the degree to which the information the clinician intends to communicate is actually communicated and its saliency to the recipients. However, little is known about concordance between clinicians', mothers', and girls' reports of communication about HPV vaccines in the context of a vaccination visit or whether specific sociodemographic characteristics are associated with concordance. Thus, we conducted a study with the following aims: 1) to examine girls' and mothers' perspectives on maternal communication, 2) to examine girls', mothers', and clinicians' perspectives on clinicians' communication, 3) to examine concordance by girls, mothers, and clinicians in reports of actual maternal and clinician communication with girls about vaccination, and 4) to explore whether participant characteristics are associated with concordance in communication.

## Methods

Between 6/30/08 and 11/3/09, we enrolled 11–12 year-old girls within 2 days after they received the first dose of the quadrivalent HPV vaccine as part of a routine clinical visit (N=33), their mothers or adult female primary caregivers (N=32), and their clinicians (N=19) into an ongoing longitudinal study examining the impact of HPV vaccination on girls' attitudes and behaviors. In order to ensure sample diversity, we recruited from one urban, hospital-based general pediatric resident clinic and two suburban private pediatric practices. Girls and their mothers were approached about the study by their clinician. If both agreed to participate, the mother provided written informed consent for herself and her daughter, and the girl provided written assent. Clinicians provided written informed consent. The hospital's Institutional Review Board approved the study.

Girls, mothers, and clinicians were interviewed separately by the trained research coordinator in a private location. One mother was interviewed twice, once for each daughter enrolled in the study. Some clinicians were interviewed more than once because more than one of their patients was enrolled. All interviews were analyzed independently because each one focused on communication between a particular girl, mother, and clinician. Therefore, this analysis of baseline interviews included 33 girl/mother/clinician triads; 17 triads were recruited from the urban practice and 16 from suburban practices. Nearly half of girls (n=16) were white; 17 girls were non-white (15 African-American/Black, 2 multiracial).[21] In this sample, girls' race and practice location were 100% correlated: all white girls were recruited at a suburban practice and all non-white girls were recruited from an urban practice. Interview guides were designed to explore: 1) girls' and mothers' perspectives on *girls'* informational needs about HPV vaccines (i.e. what information should be communicated to girls and by whom); 2) girls' and mothers' perspectives on *maternal* communication with girls about HPV vaccines (i.e. what information mothers should communicate to girls and reports of actual communication); and 3) girls', mothers', and clinicians' perspectives on *clinician* communication about vaccines (i.e. information that clinicians should communicate to girls and mothers, and reports of actual communication). The semi-structured interviews, which lasted 15–30 minutes, were audio-taped and transcribed by an independent transcriptionist. Field notes were recorded by the research coordinator and added to the cleaned transcripts for analysis. A team of researchers analyzed the data using the 5-stage Framework Analysis, which produces a thematic framework.[22, 23] To

examine concordance in communication, we focused on participant responses to the open-ended questions regarding communication (i.e., girls were asked “Has your mother told you anything about HPV vaccines/shots? If so, what did she tell you about the vaccine?”) Concordant messages were defined as those reported by more than one member of the girl-mother dyad or the girl-mother-clinician triad. The relationship between concordant messages and race and recruitment location (urban vs. suburban) was examined.

## Results

### Perspectives on girls’ informational needs about HPV vaccines

Girls’ and mothers’ perspectives regarding what topics should be discussed with girls about the HPV vaccine and by who were generally similar (Table 1). The most commonly reported topic by both girls and mothers was vaccine efficacy in preventing infection and disease, especially cervical cancer. The second most commonly reported topic by both girls and mothers was information about the risks/benefits of vaccination. In contrast, several mothers, but no girls, noted that education about sexual health (including topics such as sexuality, STIs, and HPV) should be communicated to girls in the context HPV vaccination. A few mothers noted that girls should be aware that vaccination is not permission to have sex. Both mothers and girls reported that the most important people to communicate this information to girls were clinicians and parents.

### Perspectives on maternal communication with girls about HPV vaccines

Girls’ and mothers’ perspectives regarding what mothers should communicate with daughters about HPV vaccines, and what was actually communicated, were largely similar (Table 2). Just over half of girls reported that mothers should discuss vaccine efficacy in preventing infection and disease, while several reported that mothers should communicate their support for vaccination. When asked about actual maternal communication, approximately half of girls noted that mothers had in fact discussed vaccine efficacy, and several noted that mothers had discussed vaccine risks/benefits. Only one girl reported that her mother had discussed sexual health. Similarly, most mothers reported discussing vaccine efficacy in preventing HPV infection and related diseases, including cervical cancer, and vaccine risks/benefits. However, in contrast to what was reported by girls, more than one-third of mothers reported discussing sexual health.

Concordance in reports of actual maternal communication occurred in 14/33 girl-mother dyads (42%). Most concordant messages were related to the efficacy of HPV vaccines in preventing infection and disease. In 12/33 dyads (36%), both the mother and girl reported discussing that the vaccine prevents infection and disease, while in 14/33 dyads (42%), the mother reported discussing this topic but the girl did not report this discussion. Concordance was low for discussions related to sexual health: in 11/33 dyads (33%), the mother reported discussing sexual health when the girl did not report such discussion. Concordance was also examined by participant characteristics. Concordance in reports of maternal communication was more common among dyads in which the girl was white and recruited from a suburban location (11/16; 69%), compared to dyads in which the girl was non-white and recruited from an urban location (3/17; 18%).

### Perspectives on clinician communication about HPV vaccines

Girls’, mothers’, and clinicians’ perspectives regarding what information clinicians should communicate to girls and mothers were largely similar (Table 3). The two most commonly mentioned topics by girls, mothers, and clinicians were efficacy of the vaccine and risks/benefits of vaccination. Only 1 girl, compared to 10 mothers and 5 clinicians, reported that clinicians should educate girls about sexual health at the time of HPV vaccination. A few

mothers thought that such discussions should take into account differing maturity levels of girls and parental preferences. Very few mothers and clinicians reported that discussions of risk perceptions following HPV vaccination should be part of the vaccine visit. Several mothers noted that clinicians should educate mothers themselves about HPV.

Girls', mothers', and clinicians' reports of what was actually communicated about the HPV vaccine to girls was similar to what participants thought should be communicated: the most commonly reported topics were vaccine efficacy and vaccine risks/benefits. Several girls and nearly half of mothers reported that the clinician recommended the vaccine. Almost half of clinicians reported providing education about sexual health, while only 4 girls and 5 mothers reported that the clinician discussed this topic.

With respect to actual clinician communication, concordant messages were reported by mothers and clinicians in 14/33 (42%) girl-mother-clinician triads and by girls, mothers, and clinicians in 9/33 (27%) triads. Most concordant messages were about vaccine efficacy: in 23/33 triads (70%), there was concordance in the reports of 2 of the 3 triad members. However, in 13/33 triads (39%), the clinician reported discussing vaccine efficacy when this was not reported by the girl or mother. In contrast, only 3/33 triads (9%) reported concordant messages related to sexual health. In 15/33 triads (45%), the clinician reported discussing sexual health when neither the girl nor mother reported such discussion. There was consistently greater concordance among triads recruited from suburban vs. urban practices between girls and clinicians (25% [4/16] vs. 11.8% [2/17]), mothers and clinicians (50% [8/16] vs. 35.3% [6/17]), and girls, mothers, and clinicians (37.5% [6/16] vs. 17.6% [3/17]).

## Discussion

We examined the informational needs of 11–12 year old girls and their mothers with regard to the HPV vaccine, the content of mother-daughter-clinician communication about HPV vaccination, and concordance between reports of communication. This is the first study, to our knowledge, to examine informational needs and actual communication about HPV vaccination among a sample of girls in the target age range for vaccination, their mothers, and their clinicians. We found that both girls and mothers wanted to receive information about vaccine efficacy and risks/benefits, and, while sexual health was not reported to be the most important topic of discussion in the context of HPV vaccination, it was not considered an inappropriate topic by mothers. This improved understanding of girls' and mothers' perspectives regarding girls' informational needs is important for clinicians so that they can tailor their educational messages about HPV vaccination to meet the needs of young adolescent girls in a developmentally appropriate way.

From the perspectives of both girls and mothers in this sample, the most important information that girls should receive is about the vaccine's efficacy in preventing infection and disease and the risks/benefits of vaccination. Our results imply that both girls and their mothers believe that not only is it important for young adolescent girls to receive information about vaccine efficacy, but also that they are capable of understanding such information. Additionally, several mothers believed that sexual health education should be provided as part of the vaccine discussion, although none of the girls reported this. Girls may have been uncomfortable discussing sexual health topics with the interviewer, or girls may perceive that their informational needs related to the vaccine itself (e.g. efficacy, risks/benefits) were more relevant at the time of vaccination. For both girls and mothers, clinicians were the most preferred source of information, consistent with prior studies demonstrating that providers are important, trusted sources of vaccine information.[24–26] Parents were the second most preferred source of information for girls. In order for parents

to provide accurate information, parents themselves need education about the vaccine. Such education is also important because lack of parental knowledge about the HPV vaccine has been associated with lower vaccination rates.[7] Effective educational interventions targeting parents may lead to improved vaccine knowledge among girls, as well as increased acceptance of the vaccine among parents.

Because parents are a preferred source of vaccine information, understanding communication between mothers and girls is important. Although there was high concordance between girls' and mothers' reports that vaccine efficacy was the most commonly discussed topic, there were differences in their reports of what other topics were discussed. Only one girl reported discussing sexual health with her mother, while over one-third of mothers reported that they discussed this topic with their daughters. Our results are consistent with prior studies demonstrating frequent discordance within parent-adolescent pairs in reports of non-HPV vaccine-related communication about sexual health topics.[27–30] Further exploration of discordance in reported maternal communication may provide insights into how mothers might best present sexual health topics to their daughters in order to maximize retention and comprehension of information. Because mother-daughter communication about sexual health is associated with HPV vaccine uptake,[31] encouraging such discussions may increase vaccine uptake.

Girls', mothers', and clinicians' perspectives with regard to topics they thought should be discussed by clinicians at the time of HPV vaccination were similar; these included vaccine efficacy and risks/benefits of vaccination. In contrast, nearly one-third of mothers, but only one girl, thought that clinicians should use the vaccination visit as an opportunity to discuss sexual health. Although some mothers reported that such discussions should be tailored to each girl's level of cognitive development and understanding of sexual health topics, our finding suggests that many mothers are amenable to clinicians having these conversations with 11–12 year-old girls. Our findings are similar to those of a prior study in which the majority of parents felt comfortable with clinicians discussing sexual health with 11–12 year-olds.[32] Concerns about risk compensation (i.e. girls participating in riskier sexual behaviors after HPV vaccination) were raised by very few mothers and clinicians. These findings are consistent with the results of previous studies demonstrating that very few clinicians voice concerns about risk compensation[33] and, although some parents are reluctant to vaccinate against HPV due to concerns about risk compensation,[34] few parents express worry about risk compensation following HPV vaccination.[35, 36]

Concordance between girls, mothers, and clinicians about actual clinician communication varied by topic and practice location. The most common concordant messages focused on the efficacy of the vaccine. The most common discordant messages were related to sexual health topics. Discordance related to discussion of sexual health may indicate that such communication may not be optimally effective. Alternatively, girls and mothers may have recalled or reported only some of the actual vaccine-related discussion. When we examined concordance by practice location, we found higher concordance among triads that were recruited from suburban vs. urban practices. This difference may be a reflection of the type of practice. Patients in the private suburban practices, versus patients being seen primarily by pediatric residents in the urban practice, may have more continuity with the same physician.[37, 38] This may provide more opportunities for education about vaccines. Lower health literacy has been associated with being in a minority racial group,[39, 40] which may help explain the lower rates of concordance among participants from the urban practice.

This study is subject to several limitations. First, interviews were conducted using a sample from one geographic location. However, the strength of qualitative research is in the ability

to explore the range of viewpoints related to a topic, not to produce generalizable results. We recruited from urban and suburban practices in order to obtain a range of salient attitudes. Second, participants may not remember or report all of the information that was discussed with regard to HPV vaccination, particularly if discussions occurred over several visits. However, participants were only eligible for the study if they had received their first HPV vaccine dose within the previous two days, in order to minimize recall bias. Third, all girls in the study had received the HPV vaccine; girls who did not receive the vaccine, and their mothers, may have different informational needs. Fourth, some clinicians were interviewed more than once; results could be skewed by over-representation of these clinicians. Fifth, informational needs were assessed after participants received the HPV vaccine; thus, reported informational needs may have been influenced by this experience. Sixth, informational needs were assessed 1–2 years after ACIP recommendation for HPV vaccination for girls; informational needs may have changed since this time. Finally, in order to elicit a broad range of responses, the interview questions about communication were open-ended. Therefore, the degree of concordance may be underestimated.

Our findings suggest that clinicians should incorporate information about the efficacy of the HPV vaccine in preventing infection and disease (including prevention of HPV infection, cervical cancer, and genital warts) and risks/benefits of vaccination (such as local site pain and vaccine safety) into discussions about the vaccine with both girls and their mothers. In addition, although many mothers and clinicians reported discussing sexual health topics with girls in the context of HPV vaccination, most girls did not report such discussions. Because girls may be missing important messages about sexual health, clinicians may wish to ensure that girls are actively engaged in HPV vaccination discussions. Finally, because parents are an important source of vaccine-related information for girls receiving the vaccine, clinicians should provide education about the vaccine and HPV infection to parents and encourage parents to discuss the vaccine with their daughters. Providing accurate vaccine-related information to parents in turn may lead to improved understanding of the health benefits of vaccination among girls.

## Acknowledgments

**Funding Support:** This study was supported through National Institutes of Health (NIAID) grant R01 073713 (PI: Jessica Kahn, M.D., M.P.H.) and the Cincinnati Children’s Hospital Research Foundation Procter Scholar Award (Mullins). Funding sources had no involvement in study design, data acquisition or analysis, writing of report, or decision to submit for publication.

## Abbreviations

<b>HPV</b>	human papillomavirus
<b>STIs</b>	sexually transmitted infections
<b>STDs</b>	sexually transmitted diseases

## References

1. Hariri S, Unger ER, Sternberg M, Dunne EF, Swan D, Patel S, et al. Prevalence of genital human papillomavirus among females in the United States, the National Health And Nutrition Examination Survey, 2003–2006. *J Infect Dis.* 2011; 204(4):566–73. [PubMed: 21791659]
2. U.S. Food and Drug Administration. Gardasil. Available online at <http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm094042.htm> Last updated 10/21/11. Accessed on 11/22/11

3. Webb PM, Zimet GD, Mays R, Fortenberry JD. HIV immunization: acceptability and anticipated effects on sexual behavior among adolescents. *J Adolesc Health*. 1999; 25(5):320–2. [PubMed: 10551661]
4. Kroger A, Sumaya CV, Pickering LK, Atkinson WL. Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep*. 2011; 60(RR02):1–60.
5. Winer RL, Feng Q, Hughes JP, O'Reilly S, Kiviat NB, Koutsky LA. Risk of female human papillomavirus acquisition associated with first male sex partner. *J Infect Dis*. 2008; 197(2):279–82. [PubMed: 18179386]
6. Future II Study Group. Quadrivalent vaccine against human papillomavirus to prevent high-grade cervical lesions. *New Engl J Med*. 2007; 356(19):1915–27. [PubMed: 17494925]
7. Dorell CG, Yankey D, Santibanez TA, Markowitz LE. Human papillomavirus vaccination series initiation and completion, 2008–2009. *Pediatrics*. 2011; 128(5):830–9. [PubMed: 22007006]
8. Daley MF, Crane LA, Markowitz LE, Black SR, Beaty BL, Barrow J, et al. Human papillomavirus vaccination practices: a survey of US physicians 18 months after licensure. *Pediatrics*. 2010; 126(3):425–33. [PubMed: 20679306]
9. Vadaparampil ST, Kahn JA, Salmon D, Lee JH, Quinn GP, Roetzheim R, et al. Missed clinical opportunities: provider recommendations for HPV vaccination for 11–12 year old girls are limited. *Vaccine*. 2011; 29(47):8634–41. [PubMed: 21924315]
10. Dempsey AF, Abraham LM, Dalton V, Ruffin M. Understanding the reasons why mothers do or do not have their adolescent daughters vaccinated against human papillomavirus. *Ann Epidemiol*. 2009; 19(8):531–8. [PubMed: 19394865]
11. Kahn JA, Ding L, Huang B, Zimet GD, Rosenthal SL, Frazier AL. Mothers' intention for their daughters and themselves to receive the human papillomavirus vaccine: a national study of nurses. *Pediatrics*. 2009; 123(6):1439–45. [PubMed: 19482752]
12. Gust DA, Darling N, Kennedy A, Schwartz B. Parents with doubts about vaccines: which vaccines and reasons why. *Pediatrics*. 2008; 122(4):718–25. [PubMed: 18829793]
13. Gust DA, Kennedy A, Shui I, Smith PJ, Nowak G, Pickering LK. Parent attitudes toward immunizations and healthcare providers the role of information. *Am J Prev Med medicine*. 2005; 29(2):105–12.
14. Smith PJ, Kennedy AM, Wooten K, Gust DA, Picering LK. Association between health care providers' influence on parents who have concerns about vaccine safety and vaccination coverage. *Pediatrics*. 2006; 118(5):e1287–92. [PubMed: 17079529]
15. Das A, Madhwapathi V, Davies P, Brown G, Dearnley E, Spencer A, et al. Knowledge and acceptability of the HPV vaccine by school children and their parents in Birmingham. *Vaccine*. 2010; 28(6):1440–6. [PubMed: 20005317]
16. Forster AS, Marlow LA, Wardle J, Stephenson J, Waller J. Understanding adolescents' intentions to have the HPV vaccine. *Vaccine*. 2010; 28(7):1673–6. [PubMed: 20015446]
17. Kahn JA, Rosenthal SL, Jin Y, Huang B, Namakydoust A, Zimet GD. Rates of human papillomavirus vaccination, attitudes about vaccination, and human papillomavirus prevalence in young women. *Obstet Gynecol*. 2008; 111(5):1103–10. [PubMed: 18448742]
18. Ratanasiripong NT, Cheng AL, Enriquez M. What college women know, think, and do about human papillomavirus (HPV) and HPV vaccine. *Vaccine*. 2013; 31(10):1370–6. [PubMed: 23313658]
19. Bernat DH, Harpin SB, Eisenberg ME, Bearinger LH, Resnick MD. Parental support for the human papillomavirus vaccine. *J Adolesc Health*. 2009; 45(5):525–7. [PubMed: 19837360]
20. Hertweck SP, LaJoie AS, Pinto MD, Flamini L, Lynch T, Logsdon MC. Health care decision making by mothers for their adolescent daughters regarding the quadrivalent HPV vaccine. *J Pediatr Adolesc Gynecol*. 2013; 26(2):96–101. [PubMed: 23518189]
21. Griffioen AM, Glynn S, Mullins TK, Zimet GD, Rosenthal SL, Fortenberry JD, et al. Perspectives on decision making about human papillomavirus vaccination among 11- to 12-year old girls and their mothers. *Clin Pediatr*. 2012; 51(6):560–8.
22. Kahn JA, Slap GB, Bernstein DI, Tissot AM, Kollar LM, Hillard PA, et al. Personal meaning of human papillomavirus and Pap test results in adolescent and young adult women. *Health Psychol*. 2007; 26(2):192–200. [PubMed: 17385971]



23. Ritchie, J.; Spencer, L. Qualitative data analysis for applied policy research. In: Bryman, A.; Burgess, R., editors. *Analyzing Qualitative Data*. Routledge; 1994. p. 731-194.
24. Baker LM, Wilson FL, Nordstrom CK, Legwand C. Mothers' knowledge and information needs relating to childhood immunizations. *Issues Compr Pediatr Nurs*. 2007; 30(1-2):39-53. [PubMed: 17613141]
25. Freed GL, Clark SJ, Butchart AT, Singer DC, Davis MM. Sources and perceived credibility of vaccine-safety information for parents. *Pediatrics*. 2011; 127(Suppl 1):S107-12. [PubMed: 21502236]
26. Kennedy A, Basket M, Sheedy K. Vaccine attitudes, concerns, and information sources reported by parents of young children: results from the 2009 HealthStyles survey. *Pediatrics*. 2011; 127(Suppl 1):S92-9. [PubMed: 21502253]
27. Aspy CB, Vesely SK, Oman RF, Rodine S, Marshall L, Fluhr J, et al. Youth-parent communication and youth sexual behavior: implications for physicians. *Fam Med*. 2006; 38(7):500-4. [PubMed: 16823676]
28. Jaccard J, Dittus PJ, Gordon VV. Parent-adolescent congruency in reports of adolescent sexual behavior and in communications about sexual behavior. *Child Dev*. 1998; 69(1):247-61. [PubMed: 9499570]
29. Miller KS, Fasula AM, Dittus P, Wiegand RE, Wyckoff SC, McNair L. Barriers and facilitators to maternal communication with preadolescents about age-relevant sexual topics. *AIDS Behav*. 2009; 13(2):365-74. [PubMed: 17985227]
30. Newcomer SF, Udry JR. Parent-child communication and adolescent sexual behavior. *Family Plann Perspect*. 1985; 17(4):169-74.
31. Roberts ME, Gerrard M, Reimer R, Gibbons FX. Mother-daughter communication and human papillomavirus vaccine uptake by college students. *Pediatrics*. 2010; 125(5):982-9. [PubMed: 20385645]
32. Rand CM, Schaffer SJ, Humiston SG, Albertin CS, Shone LP, Heintz EV, et al. Patient-provider communication and human papillomavirus vaccine acceptance. *Clin Pediatr(Phila)*. 2011; 50(2):106-13. [PubMed: 20837607]
33. Sussman AL, Helitzer D, Sanders M, Urquieta B, Salvador M, Ndiaye K. HPV and cervical cancer prevention counseling with younger adolescents: implications for primary care. *Ann Fam Med*. 2007; 5(4):298-304. [PubMed: 17664495]
34. Kahn JA, Cooper HP, Vadaparampil ST, Pence BC, Weinberg AD, LoCoco SJ, et al. Human papillomavirus vaccine recommendations and agreement with mandated human papillomavirus vaccination for 11-to-12-year-old girls: a statewide survey of Texas physicians. *Cancer Epidemiol Biomarkers Prev*. 2009; 18(8):2325-32. [PubMed: 19661092]
35. Dorell CD, Yankey D, Strasser S. Parent-reported reasons for nonreceipt of recommended adolescent vaccinations, National Immunization Survey – Teen, 2009. *Clin Pediatr(Phila)*. 2011; 50(12):1116-1124. [PubMed: 21856964]
36. Schuler CL, Reiter PL, Smith JS, Brewer NT. Human papillomavirus vaccine and behavioural disinhibition. *Sex Transm Infect*. 2011; 87(4):349-53. [PubMed: 21357601]
37. Darden PM, Ector W, Moran C, Quattlebaum TG. Comparison of continuity in a resident versus private practice. *Pediatrics*. 2001; 108(6):1263-68. [PubMed: 11731646]
38. McBurney PG, Gustafson KK, Darden PM. Effect of 80-hour workweek on continuity of care. *Clin Pediatr*. 2008; 47(8):803-808.
39. Weekes CM. African Americans and health literacy: A systematic review. *ABNF J*. 2012; 23(4):76-80. [PubMed: 23311265]
40. Bailey SC, Pandit AU, Yin S, Federman A, Davis TC, Parker RM, et al. Predictors of misunderstanding of pediatric liquid medication instructions. *Fam Med*. 2009; 41(10):715-21. [PubMed: 19882395]

### Highlights

- Clinicians and parents were preferred sources of HPV vaccine information for girls.
- Vaccine efficacy and risks/benefits were the most commonly reported discussion topics.
- Girls may be missing important vaccine-related messages about sexual health topics.
- Clinicians should ensure that girls actively engage in HPV vaccination discussions.
- Educating parents may help reduce vaccine-related misperceptions among girls.

**Table 1**

## Girls' and mothers' perspectives on girls' informational needs about HPV vaccines

<b>Girls' Perspectives</b>	<b>N (%)</b>	<b>Illustrative Quotations</b>
<b>Information to be communicated to girls about HPV vaccines</b>		
Vaccine efficacy in preventing infection and disease	14 (42)	"It's good to get 'em [HPV vaccinations] because it'd be worse to have cancer than just get some shots."
Vaccine risks and benefits	4 (12)	"And it really doesn't hurt, but you should get it."
Recommendation for vaccination	1 (3)	"That you should get 'em."
Timing of vaccination, i.e. rationale for target age	1 (3)	"...And it works better, if you get it now. And then, like 11, 12 [years of] age, it works better that way."
<b>Who should communicate such information to the girl</b>		
Healthcare providers (i.e. doctors, nurses)	25 (76)	"Doctors are the ones giving you the vaccine and know more about it."
Parents	20 (61)	"Well, because their parents, maybe they would want you to get that [HPV vaccine] so you are safe..."
Other girls who have received HPV vaccine	2 (6)	"Maybe like your friend that has gotten it or something that can relate to it."
Other	3 (9)	"The people who made it [HPV vaccine]."
<b>Mothers' Perspectives</b>		
<b>Information to be communicated to girls about HPV vaccines</b>		
Vaccine efficacy in preventing infection and disease	24 (73)	"I think they need to know what I needed to know. That it prevents – or it's to help prevent cervical cancer."
Vaccine risks and benefits	7 (21)	"That it can be painful. I think that's important to tell 'em"
Education about sexual health	6 (18)	"They need to know a lot about STDs [sexually transmitted diseases] and sex."
Message that vaccination is a way to take care of oneself	2 (6)	"It's [HPV vaccine] gonna help keep them safe there, down there for one."
Message that HPV vaccination is not permission to be sexually active	4 (12)	"I definitely feel they need to know that it ... by no means it's giving them permission to have sex. It's letting them know that there is something out there to protect them in case they decide that's what they want to do."
Importance of vaccination	2 (6)	"I think they need to know that it's very helpful to get it [HPV vaccine] because it's [cervical cancer] very serious, that you need it."
<b>Who should communicate such information to the girl</b>		
Doctors	32 (97)	"The doctors oversee their [patients'] general health care and have that relationship with the parent and the child." "They [doctors] have their best interests in mind."
Parents	29 (88)	"I think parents because of how close we are with the kids. ... I give 'em my uneducated version, and then they come in and the pediatrician can give 'em their educated version."
Multiple sources ("team effort")	11 (33)	"I always think parents should have open line of communication and talk to their kids. But then I know that parents don't always. They might not know the information or they don't feel comfortable. So I think teachers... they can teach sex education at school. But then not all schools teach it. So then I think the doctors have an important role too... Well hopefully kids are seeing doctors for well checks and, they can do it. So, between the three, hopefully all girls are covered with that information."
Teachers/school	11 (33)	"I honestly believe you know like the school, teaching. I'm all for sex education."
Nurses	8 (24)	"I think the kids are more comfortable with the school nurse rather than a teacher because the school nurse has a little bit more education on healthcare than a teacher would."
Other	3 (9)	"The girls who just had the [HPV] vaccines. Or people who's had cancer."

HPV: human papillomavirus; STDs: sexually transmitted diseases

**Table 2**

## Girls' and mothers' perspectives on maternal communication with girls about HPV vaccines

<b>Girls' Perspectives</b>	<b>N (%)</b>	<b>Illustrative Quotations</b>
<b>Information mothers should communicate about HPV vaccine to daughters</b>		
Vaccine efficacy in preventing infection and disease	17 (52)	"That it'll help you from getting cervical cancer... in the future."
Recommendation for/support of vaccination	8 (24)	"That they [girls] should get it cause they [mothers] don't want their daughters to grow up and have cancer or warts."
Importance of safer sexual behaviors	1 (3)	"That you should always be protective and safe."
Message that the social norm is to receive vaccine	1 (3)	"That everybody does it, so it's not really a huge deal."
<b>Girls' report of actual maternal communication</b>		
Discussed vaccine efficacy in preventing infection and disease	16 (48)	"She told me it was basically to keep me from getting certain disease and cancer in the future."
Discussed vaccine risks and benefits	4 (12)	"She said that the shots can hurt but it only hurts for like a second or so."
Offered reassurance about getting vaccine	1 (3)	"She told me not to stress, that everything's gonna be okay."
Discussed sexual health	1 (3)	"She said if you have sex you can get a lot of diseases. And some diseases you can't really make them go away. They stay."
Informed girl that her older sister received vaccine	1 (3)	
<b>Mothers' Perspectives</b>		
<b>Mothers' report of actual maternal communication</b>		
Discussed vaccine efficacy in preventing infection and disease	26 (79)	"I just explained to her what it is about, that it is prevention against cervical cancer."
Discussed sexual health	12 (36)	"I discussed more that it [HPV] is sexually transmitted, that it is the only sexually transmitted disease that I'm aware of that actually has the result of cancer on a woman... pregnancy is not the worst thing that you can come home with from sex." "Of course we talked about safe sex and hopefully she won't be making that decision any time soon."
Discussed vaccine risks and benefits	4 (12)	"I told her that, you know, from what I've heard and what I've read it can be painful."
Discussed vaccine logistics, i.e. series of 3 vaccinations	3 (9)	"...I told her that it's just like the Hepatitis B, that you get a series of three, and then it prevents [infection]."
Discussed timing of vaccination, i.e. before sexual activity, more effective if given at a younger age	3 (9)	"I told her since she hasn't had intercourse yet, that getting the HPV vaccine especially helps that way."
Discussed vaccination as a way to keep body healthy	1 (3)	"It's just to help, for her, to keep her body healthy."
Notified girl she was getting vaccine	1 (3)	"I told her she had to get a HPV shot."
Discussed mother's own health experiences	1 (3)	"...I was describing my last doctor's visit. And I was like mommy has cancer but it's in my uterus..."
Discussed family history of cervical cancer	1 (3)	"There's been cancer before in our family"
Discussed doctor's recommendation to receive vaccination	1 (3)	"That it's [HPV vaccine] recommended by her doctor."
Shared that girl's sibling had received the vaccine	1 (3)	"Your sister had it last month."

HPV: human papillomavirus

**Table 3**

Girls', mothers', and clinicians' perspectives on clinician communication about HPV vaccines

<b>Girls' Perspectives</b>	<b>N (%)</b>	<b>Illustrative Quotations</b>
<b>Information clinicians should communicate about HPV vaccine to girls</b>		
Vaccine efficacy in preventing infection and disease	11 (33)	"It prevents cancer." "It's to prevent a certain disease that you can get. So it's basically to keep you from getting that throughout your life."
Vaccine risks and benefits	6 (18)	"Like, what could happen, ...what could go wrong."
Recommendation for vaccination	6 (18)	"[Doctors should tell girls] that they should do it [be vaccinated]... because it's best for their health."
Details about logistics of vaccination, i.e. number of vaccinations needed	1 (3)	"That you'll get it [HPV vaccine] more than once."
Education about sexual health	1 (3)	"That if you wait to have sex you won't really have that problem [STIs]."
Nothing – mothers should provide information	1 (3)	"I don't think anything."
<b>Girls' report of actual clinician communication</b>		
Discussed vaccine efficacy in preventing infection and disease	14 (42)	"She [clinician] said that it helped prevent cervical cancer in the future."
Discussed vaccine risks and benefits	7 (21)	"She [clinician] said it hurt a little bit."
Supported vaccination	7 (21)	"She said it's good that I'm doing it."
Discussed sexual health	4 (12)	"We talked about sex" "She [the clinician] told me how you can get it [HPV] and what you do to get cervical cancer and warts. She said that when you have sex it can cause that cervical cancer."
Discussed timing of vaccination, i.e. optimal age of vaccination	4 (12)	"They [clinician] were saying they recommended it for 11–13 year olds..., and they said I should get it now."
Discussed vaccination logistics, i.e. series of vaccinations	1 (3)	"He [clinician] was telling me about it's a series of shots."
<b>Mothers' Perspectives</b>		
<b>Information clinicians should communicate about HPV vaccine to girls</b>		
Vaccine efficacy in preventing infection and disease	17 (52)	"[The HPV vaccine is] something they [clinicians] think can prevent cancers and sexually transmitted diseases."
Vaccine risks and benefits	12 (36)	"Just the benefits of it. And if they feel there are any negatives, what those negatives would be."
Education about sexual health	10 (30)	"This is not like a birth control pill that you take it and you're not gonna get pregnant. You can still get sexually transmitted diseases."
Details about logistics of vaccination, i.e. number of vaccines needed, need for boosters	2 (6)	"[If] another vaccine [is] needed."
Education about vaccination to keep body healthy	2 (6)	"I think they [clinicians] should tell em [girls] that it [HPV vaccination] is going to keep them healthy"
Recommendation for vaccination	1 (3)	"If you can have something that prevents it [HPV] they should go ahead and get vaccinated to prevent it."
Recommendation for vaccination to girl but give additional information to parents privately	1 (3)	"[Clinicians should] talk to the parent in private and not in front of the child ... Let the parent make the decision. Not being put on the spot in front of the child ..."
<b>Information clinicians should communicate about HPV vaccine to mothers</b>		
Vaccine efficacy in preventing infection and disease	15 (45)	"I guess just emphasize why would you not give your child a chance to prevent cancer?"
Vaccine risks and benefits	8 (24)	"[Clinicians should discuss] why it's [HPV vaccine] important and any risks, benefits, side effects."

<b>Mothers' Perspectives</b>	<b>N (%)</b>	<b>Illustrative Quotations</b>
Education about HPV and HPV-related disease	4 (12)	"I think it would be good for a doctor to talk about it with the daughter and the mother together and explain what the HPV virus is."
Details about logistics of vaccination	2 (6)	"The dates of when to give it [HPV vaccine]."
Recommendation for vaccination	2 (6)	"If they would have their own child vaccinated. To me that reassured me right there."
Provision of a choice about vaccinating to parents	2 (6)	"Just to kind of give them [parents] the choice. Cause I think it still is a choice."
Inform about availability of vaccine	1 (3)	"And if somebody that might not of had that information [about the HPV vaccine from TV and internet] available [they] may not know that the vaccination is available."
Explanation of vaccine in same way as other vaccines to decrease stigma	1 (3)	"I think that they [clinicians] should talk to them [mothers] just like they would with any other vaccination, thinking you know if your child doesn't get the chicken pox vaccination then they could get the chicken pox when they get older and it could be serious if they don't get this vaccination... I don't see that HPV virus, or vaccination being different."
Education about cervical cancer detection and symptoms	1 (3)	"They should tell them [girls] the symptoms to look for and what causes it [cervical cancer]."
Provision of information to mothers on where to get the vaccine themselves	1 (3)	"They [clinicians] should tell them [mothers]... where to get it [HPV vaccine]. If it is from a clinic or whatever, and they should be able to get it themselves."
Timing of vaccination	1 (3)	"I didn't understand it [timing of HPV vaccination], thinkin why are we immunizing when it's a sexually transmitted virus, why can't we wait till later on."
<b>Mothers' report of actual clinician communication</b>		
Discussed vaccine efficacy in preventing infection and disease	14 (42)	"It helps prevent cervical cancer. Like 70%. And that it could help with prevent[ing] genital warts and stuff like that."
Discussed recommendation for vaccination	14 (42)	"He [clinician] recommended it; it would be good for her."
Discussed vaccine risks and benefits	10 (30)	"She [clinician] explained what she thought the benefits were."
Discussed timing of vaccination, i.e. receipt prior to sexual activity, recommended age for vaccination	8 (24)	"That it's something that they should get before they get sexually active."
Educated about sexual health	5 (15)	"She just said that ... mostly like everybody that has the virus [HPV], and it's better to get the vaccine cause, don't know who has it."
Discussed logistics of vaccination	4 (12)	"It's a three part shot, kinda like the Hep-B series."
Informed that HPV vaccine is new vaccine	1 (3)	"The reason why the shot is new. She explained how long it'd been out."

<b>Clinicians' Perspectives</b>	<b>N (%)</b>	<b>Illustrative Quotations</b>
<b>Information clinicians should communicate about HPV vaccine to girls and mothers</b>		
Efficacy of vaccine in preventing infection and disease	23 (70)	"I think the most important thing is about the prevention of HPV and cervical cancer."
Vaccine risks and benefits	9 (27)	"It's [HPV vaccine] very safe."
Education about sexual health	5 (15)	"The first thing I usually do is explain what HPV is, how it's transmitted, and then I go over that HPV can be spread [by] skin to skin contact, sexually transmitted, oral sex, and all of that."
Address concerns about risk perceptions, sexuality	3 (15)	"I think unfortunately you [have to] speak specifically about the diseases. They think, 'Oh, my child's not sexually active' or 'I'm not encouraging sexuality so I'm not going to get it.'"
Recommend vaccination	3 (15)	"I just think about how important the vaccine is. I mean, how important is it that there's finally something that you can do to prevent cancer?"
Provide tailored information to individual girl and her parent(s)	2 (6)	"It [the information] kinda depends on what kinda questions they ask."
Education about cervical cancer	2 (6)	"A lot of times girls don't know what a cervix is, they've never had a vaginal exam, so they don't know what a pap smear is, so I generally go over all of that."
Discussion of HPV vaccination as option for daughter	1 (3)	"It's [HPV vaccine] an option ... and the girls in some point in time should get the vaccine before they at least go to college."

Clinicians' Perspectives	N (%)	Illustrative Quotations
Education about availability of vaccine	1 (3)	"I think they should know that the vaccine's available."
Discussion that vaccine is covered by insurance	1 (3)	"It's covered by your insurance."
<b>Clinicians' report of actual clinician communication</b>		
Discussed efficacy of vaccination in preventing infection and disease	27 (82)	"[We discussed] that this [HPV vaccine] was to try to prevent any infection which may then lead to cervical dysplasia or cervical cancer."
Educated about sexual health	16 (48)	"...We talked about infections and infections that can cause cancer. And this [HPV] is one of them. You get this one from sexual activity."
Discussed vaccine risks and benefits, including safety	7 (21)	"We did talk about safety issues. Only that I had not heard of any serious adverse event that was directly related to the vaccine, other than local swelling, or there's always a risk of allergic reaction, but that's true of any vaccine."
Discussed timing of vaccination, i.e. receipt prior to sexual activity, recommended age of vaccination	6 (18)	"We did talk about how it's [HPV] transmitted and why you should vaccinate early."
Discussed family history of HPV/cervical cancer	1 (3)	"There's a grandmother who had cervical cancer. So, it actually was part of the discussion."
Recommended vaccine	1 (3)	"[Getting the HPV vaccine] was a good idea."
Discussed Pap screening for cervical cancer prevention	1 (3)	"It [HPV vaccine] protects against most strains of HPV and those of genital warts, but it doesn't cover 100% of those strains so she would need to go through regular screening and regular health visits despite getting this vaccine."
Discussed HPV vaccine in the context of other vaccines	1 (3)	"We were actually talking about many vaccines and went through the list of things that she [the girl] needed and really talked about it [HPV vaccine] like I talked about the other vaccines, why it was needed and so forth."

HPV: human papillomavirus; STIs: sexually transmitted infections