



NIH Public Access

Author Manuscript

Clin Pediatr (Phila). Author manuscript; available in PMC 2013 June 21.

Published in final edited form as:

Clin Pediatr (Phila). 2012 June ; 51(6): 560–568. doi:10.1177/0009922812443732.

Perspectives on Decision Making About Human Papillomavirus Vaccination Among 11- to 12-Year-Old Girls and Their Mothers

Anne M. Griffioen, BA¹, Susan Glynn, BA^{2,3}, Tanya K. Mullins, MD, MS^{2,3}, Gregory D. Zimet, PhD⁴, Susan L. Rosenthal, PhD⁵, J. Dennis Fortenberry, MD, MS⁴, and Jessica A. Kahn, MD, MPH^{2,3}

¹Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD, USA

²Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA

³University of Cincinnati College of Medicine, Cincinnati, OH, USA

⁴Indiana University, Indianapolis, IN, USA

⁵Columbia University Medical Center College of Physicians and Surgeons, Morgan Stanley Children's Hospital at New York Presbyterian, New York, NY, USA

Abstract

Introduction—The aims of this qualitative study were to explore (a) the factors influencing mothers' decisions to vaccinate 11- to 12-year-old daughters against human papillomavirus (HPV) and (b) the mothers' and daughters' perspectives about HPV vaccine–related decision making.

Methods—Participants were girls ($N=33$) who had received an HPV vaccine and their mothers ($N=32$), recruited from suburban and urban pediatric practices. Semistructured interviews were conducted with girls and mothers separately, and data were analyzed using framework analysis.

Results—The primary factors influencing mothers' decisions to vaccinate daughters against HPV were (a) mother's beliefs and experiences; (b) interactions with clinicians, friends, and family members; and (c) exposure to media reports/marketing. Most daughters believed the decision to be vaccinated was a mutual one, although most mothers believed the decision was theirs.

Conclusions—This study provides novel insights into perspectives on decision making about HPV vaccination among mothers and 11- to 12-year-old daughters, which can be used in interventions to improve vaccination rates.

© The Author(s) 2012

Corresponding Author: Jessica A. Kahn, Division of Adolescent Medicine, MLC 4000, Cincinnati Children's Hospital Medical Center, 3333 Burnet Avenue, Cincinnati, OH 45229, USA, jessica.kahn@cchmc.org.

Reprints and permission: sagepub.com/journalsPermissions.nav

Declaration of Conflicting Interests

The authors declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article:

Dr Zimet is an investigator on HPV vaccine -related research projects funded by Merck & Co., Inc, through their Investigator Initiated Studies Program. In the past year, Dr Zimet served as a paid consultant to Sanofi Pasteur regarding vaccine acceptability issues. Dr Fortenberry has received an honorarium from Merck, Inc., for a training lecture to Merck staff. Dr Kahn is cochair of 2 HPV vaccine trials in HIV-infected individuals funded by the National Institutes of Health, but for which Merck, Inc, is providing vaccine and immunogenicity testing. She also receives funding from the Society for Adolescent Health and Medicine (SAHM) to chair a grant review committee to evaluate proposals for public health demonstration projects; the funding for the SAHM grant program is from Merck, Inc.

Keywords

human papillomavirus; vaccine; mother; daughter; decision-making

Introduction

Human papillomavirus (HPV) is a common sexually transmitted infection (STI) that may cause cervical cancer and anogenital warts.¹ The US Food and Drug Administration has approved 2 safe and effective HPV vaccines that prevent infection with the 2 HPV types that cause the majority of cervical cancers; one of these vaccines also prevents infection with the 2 HPV types that cause almost all genital warts.^{2,3} The vaccines are most effective if administered before sexual initiation because they are not therapeutic^{4–6}; thus, the U.S. Advisory Committee on Immunization Practices (ACIP) recommends 11- to 12-year-old girls as the target age group for vaccination.^{2,3}

Despite these recommendations, studies consistently demonstrate that parents are more willing to vaccinate older (>13 years) versus younger (11–12 years) girls.^{7–9} Parents frequently refuse HPV vaccination,¹⁰ and clinicians who experience more vaccine refusals among parents of young adolescents are less likely to recommend HPV vaccines to 11- to 12-year-old girls.¹¹ Recent studies confirm that HPV vaccination rates are substantially lower among 11- to 12-year-old girls than older girls^{12,13}; data from the 2008 Health Interview Survey in the United States demonstrated that 14.7% of 11- to 12-year-olds, compared with 25.4% of 13- to 17-year-olds, received at least 1 dose of an HPV vaccine.¹³

Previous studies have shown that factors associated with parental acceptance of adolescent HPV vaccination include higher knowledge of HPV and HPV vaccines, personal or family history of an STI or cancer, physician recommendation for vaccination, family or peer endorsement, more positive beliefs about HPV vaccines, comfort communicating with adolescents about sexual topics, and mother's perception that her daughter could be vulnerable to HPV.^{7,9,14–18} These studies have largely focused on adolescents older than 12 years of age. Another factor that has significant potential to influence parental decision making about HPV vaccination of daughters is exposure to HPV vaccine–related media and marketing. Both have played prominent roles in the United States after vaccine licensing. Given the important role of parents in decision making about adolescent vaccination, and the fact that girls older than 13 years are being vaccinated at higher rates than girls in the target age group for vaccination, information about parental attitudes toward vaccination of 11- to 12-year-old girls is essential in order to develop interventions to increase vaccination rates in this age group. Therefore, we designed a qualitative study to explore (a) the factors influencing mothers' decisions to vaccinate 11- to 12-year-old daughters against HPV, including understanding of and attitudes about HPV vaccination, interactions with others about HPV vaccination, and media/marketing exposure and (b) mothers' and daughters' perspectives about HPV vaccine–related decision making.

Materials and Methods

Participants were 11- to 12-year-old girls ($N=33$) and their mothers/primary female guardians ($N=32$, as one mother had 2 daughters in the study), recruited from 2 suburban pediatric practices (51%) and 1 urban hospital-based pediatric clinic (48%). Forty-five percent of 11- to 12-year-old girls self-identified as black, 49% as white, and 6% as multiracial. Mothers' ages ranged from 27 to 41 years with an average age of 36.6 years, and their race and ethnicity were similar to those reported by girls. The study was approved by the hospital's Institutional Review Board.

Girls were eligible for recruitment if they were 11 to 12 years of age and had received their first HPV vaccine dose within the prior 2 days. Eligible girls were approached by the research coordinator with permission of the clinician. If both the mother and girl were willing to enroll, the mother provided written parental permission for her daughter's participation and informed consent for her own participation, and the girl provided written assent. Each participant met separately and in a private area with the research coordinator to participate in a semistructured interview lasting 15 to 30 minutes. The interview guides were designed to explore factors influencing mothers' decisions to vaccinate 11- to 12-year-old daughters against HPV and to characterize beliefs about that decision among mothers and their daughters. Questions were open-ended and categorized according to the following subjects: experience and decision making about HPV vaccination, general communication about HPV vaccines, maternal communication about HPV vaccines, clinical communication about HPV vaccines, media/marketing exposure related to HPV vaccines, perceptions of daughter's sexual risk related to vaccination, and understanding of HPV and HPV vaccines. When appropriate, the research coordinator prompted participants to gain more informative responses.

Interviews were audiotaped and were then transcribed by an independent transcriptionist. The research coordinator cleaned the transcripts and added field notes in preparation for analysis. The research team (AG, JK, TM, and SG) organized and analyzed the interview data using framework analysis, a method for qualitative analysis consisting of 5 sequential analytic phases, which results in the development of a thematic framework,¹⁹ and which is described in detail in our previous manuscripts based on other qualitative studies.²⁰⁻²³

Results

Factors Influencing Mothers' Decisions to Vaccinate 11- to 12-Year-Old Daughters Against HPV

The primary factors influencing mothers' decisions to vaccinate 11- to 12-year-old daughters against HPV included mother's beliefs and experiences regarding vaccination and HPV-related disease; interactions with clinicians, friends, and family members around HPV vaccination; and exposure to media reports or marketing about HPV vaccines (Table 1). These factors did not appear to differ by enrollment site or by demographic characteristics of the participants.

Mothers' health-related beliefs and experiences were the most frequently noted factors in the decision to vaccinate daughters. Although some mothers ($N=7$) stated that their decision to vaccinate was influenced by a general belief that vaccines are beneficial to their child's health, almost all mothers noted that the decision to vaccinate was influenced by favorable beliefs about HPV vaccines specifically. These included beliefs that HPV vaccination has health benefits, the HPV vaccine has favorable characteristics, and vaccinating at 11 to 12 years of age is important. The most commonly noted health benefit of HPV vaccination, mentioned by 12 mothers, was its potential to prevent cervical cancer: "She [daughter's clinician] was explaining how [the vaccine] prevents cervical cancer ... that made my decision right there." In the context of discussing benefits of vaccination, several mothers noted that they did not want to regret having made the decision not to vaccinate: "I think that if you don't vaccinate 'em now and then they're 30 years old and end up with [cervical cancer], then you would so regret not giving her that chance to prevent it." Several mothers also cited prevention of HPV as a factor influencing their decision to vaccinate: "I know that [HPV] is a pretty common STD. [The vaccine is] available. I believe in protecting my kids whenever possible." Favorable vaccine characteristics such as vaccine safety, efficacy, and duration of protection were important drivers of decision making for some mothers. Some of these beliefs about vaccine safety and efficacy were accurate ("She can get ... a little rash or

soreness on her arm, I'm okay with that ..."), whereas others were inaccurate (one mother stated that once she "got the knowledge that it protected them for life" she was in agreement with vaccination). Finally, most mothers noted that their daughter's age was an important factor influencing their decision to vaccinate. Some mothers cited the recommendation to vaccinate at this age ("I just know it's recommended for this age group; so went ahead and did it"), whereas others discussed the importance of vaccinating prior to sexual maturity and sexual initiation ("I feel if it's gonna protect her when she becomes sexually active, do it now. Because with today's day and age you never know when they're going to start having sex"). A few mothers noted that younger daughters may accept vaccination more readily than older daughters: "And when they get a little older they ... don't do what mom wants them to do ... so I figure it's better to do it now than to wait and maybe miss that opportunity to make sure she's protected."

Approximately half of the mothers in this study ($N=16$) also noted that a personal or family history of HPV, other STIs, or cancer (both cervical and other types) influenced her decision to vaccinate. These experiences influenced mothers' decisions to vaccinate by increasing their awareness of the risk of HPV infection or the severity of HPV-related disease, or by increasing their sense that their daughters were vulnerable to HPV or cervical cancer.

Interactions with clinicians, friends, and family members were also important drivers of mothers' decisions to vaccinate their daughters. Almost half of the mothers in this study ($N=15$) noted that the first discussion about HPV vaccination with the clinician occurred prior to the actual vaccination visit, affording mothers an opportunity to explore and consider vaccination before making a decision: "He just told me that when she turns 11 he would recommend it, and why he'd recommend it, and what it can prevent her from getting, as far as genital warts and cervical cancer." According to mothers, clinicians were most influential when they provided a rationale for vaccinating at that age and provided specific information about what the vaccine prevents: "That's what kinda convinced me to have it done ... what the doctor told me made me feel more comfortable ... she was telling me that they should get it done before they become sexually active." Finally, several mothers ($N=7$) noted that a trusting and respectful relationship with their daughter's clinician had a positive influence on their decisions to vaccinate: "She's been seeing my kids since they were born and I respect her opinion and value it very much."

Almost all mothers ($N=28$) reported that they had discussed HPV vaccination with family members including their daughters' fathers, daughters' grandmothers, older daughters, and sisters. These individuals sometimes contributed to a mothers' decision to vaccinate by providing her with differing perspectives, but more frequently they simply supported her decision. Of the mothers who discussed vaccination with their daughter's father ($N=9$), 3 had discussions about vaccine safety that ultimately led to a mutual decision to vaccinate:

Me and her dad sat down and talked about it ... Her dad looked at me and said I don't think we should treat her for something that's fairly new. It's not been studied regularly. And I said yeah it has, and I kinda broke it down on the computer, showed him the commercial on TV they were talking about ... and then I showed him what a young woman looks like with cancer ... He agreed to it and he said well, let's do it then. I just want to protect her.

Exposure to media and marketing about HPV vaccines played a key role in mothers' decisions to vaccinate in the following ways: by raising their awareness of HPV vaccines, providing them with factual information about HPV and HPV vaccines, reassuring them of the benefits of vaccination, triggering discussions with their daughters, and prompting them to seek out more information about HPV and HPV vaccination. Almost all mothers reported exposure to media or marketing information about HPV vaccines— most often through TV

commercials, but also through news programs, magazines, radio, and the Internet. A few mothers ($N=4$) noted that media/marketing exposure simply raised their awareness of HPV vaccines, but most ($N=23$) noted that it provided them with key facts about HPV and the benefits of vaccination: "When I saw those commercials I said I wanna get her protected." These facts included information about HPV infection, transmission, and sequelae; the target age group for vaccination; the vaccine's safety profile; and the vaccine's efficacy in preventing cervical cancer and genital warts. Several mothers reported that media exposure triggered a discussion about HPV vaccination with their daughters, enabling their daughters to be more informed during the decision-making process:

Well this is something that me and my daughter discussed when we started seeing the commercials. She always questioned me: When should I get it? Should I get it? And I told her I didn't see a reason for her to be afraid of it.

Most mothers noted that media/marketing exposure helped convince them of the benefits of vaccination, including the importance of vaccination as a prevention strategy. Eleven mothers stated that the most salient marketing message was a specific tagline in commercials for the quadrivalent HPV vaccine. Some mothers ($N=8$) reported that the commercial prompted them to seek further information about the HPV vaccine, especially its safety profile and target age range. One mother explained,

I had seen the commercials, and I did have questions that weren't answered from the media. As far as, does it wear off? And what are the side effects? ... so I asked my doctor and I got online.

Daughters' and Mothers' Perspectives About the Decision-Making Process

When mothers were asked whether they or their daughters were primarily responsible for the decision to vaccinate, the majority ($N=18$) reported that they were responsible (Table 2). These mothers believed that they generally made decisions about vaccination, and that their daughters didn't tend to question them:

Well, she didn't really have a choice ... I just said, 'Hey, we're coming to the doctor, you're getting your check-up and oh one of the shots you're probably gonna get is [brand name of HPV vaccine],' and that was it ... she doesn't question a lot because she is twelve.

Several of these mothers also discussed the fact that their daughters look to them for guidance and trust them to make health-related decisions: "I mean she trusts me, and if it's something that I think would be beneficial toward her, she never had any questions about it either." Girls ($N=9$) who reported that the decision to vaccinate was primarily their mothers' often described a lack of understanding about HPV vaccination: "My mom agreed to it. I didn't disagree, or I didn't really help make the decision because I wasn't sure what it was for, at the time." Some described having resisted vaccination, mostly because of concerns about the pain associated with vaccination, but being "overruled" by their mothers: "I didn't really have a choice in it ... she asked me like, if I was worried about it and I told her I was worried cause I thought it was gonna hurt."

Although only one third of mothers ($N=11$) reported that the decision to vaccinate was a mutual one, the majority of girls ($N=23$) believed it to be mutual. Some mothers who reported that it was a mutual decision noted that they often discussed general health-related decisions with their daughters, and most noted that the decision-making process regarding HPV vaccination was characterized by a discussion. Topics included the importance of vaccination in preventing cervical cancer and genital warts, clinicians' and relatives' support of vaccination, and STI prevention. One mother noted, "I did leave it up to her if she wanted to get it done or not, but I told her that I thought it would be really good if she got it done, to

help prevent the cervical cancer.” Similarly, daughters who believed that the decision to vaccinate was a mutual one, regardless of whether their mothers believed it was a mutual decision, frequently noted that the decision-making process was characterized by discussion about HPV vaccination, and mentioned topics that were similar to those mentioned by mothers, especially the role of vaccination in prevention of cervical cancer and others’ support of vaccination: “I knew it would help protect me against getting cancer; which I really don’t want, and so I decided that I want to get it done so I can protect me in the future.”

Discussion

In this study, we explored factors influencing mothers’ decisions to vaccinate 11- to 12-year-old daughters against HPV and daughters’ and mothers’ perspectives about the decision-making process. The findings have implications for the design of interventions for mothers, girls, and clinicians to increase vaccination of 11- to 12-year-old girls. We found that the primary factors influencing a mother’s decision to vaccinate her 11- to 12-year-old daughter against HPV were her own health-related beliefs and experiences; interactions with clinicians, friends, and family members; and exposure to media reports or marketing about HPV vaccines. The majority of mothers reported that they had made the decision to vaccinate; in contrast, most girls thought that the decision was mutual.

A mother’s personal health-related beliefs appeared to be the principal factor influencing her decision to vaccinate her daughter. The role of HPV vaccines in protecting her daughter’s health, and especially in preventing cervical cancer, was the most important of these beliefs. This finding is supported by a number of previous studies examining acceptability of HPV vaccines among parents.^{7,9,15–17,24} The concept of anticipated regret—that is, concern about future remorse if a child were to develop HPV-related disease and had not been vaccinated—was commonly noted; this is consistent with the work of Ziarnowski et al.²⁵ Many of the mothers also noted that vaccinating 11- to 12-year-old girls was important, and this belief was often driven by a belief that the vaccine should be administered before sexual maturity and sexual initiation, and thus exposure to HPV. This is consistent with the finding in previous studies that mothers who perceive their daughters to be at risk for HPV are more likely to accept vaccination of younger daughters.^{7,14,16} Furthermore, having had personal experience with HPV or cervical cancer appeared to increase a mother’s perception that her daughter was susceptible to HPV and her acceptance of vaccinating a younger daughter, as has been shown previously.¹⁶ The implications of these findings are that interventions to promote vaccination of 11- to 12-year-old girls should focus on the health benefits of HPV vaccination, especially cancer prevention, and the importance of vaccinating at this age. It is essential for clinicians to be comfortable discussing the specific reasons why vaccination at 11 to 12 years of age is recommended—that is, vaccination prior to HPV exposure is critical to maximize effectiveness and adolescents are susceptible to HPV infection—especially with mothers who wish to delay vaccination.

Interactions with clinicians, friends, and family were a second key driver of a mother’s decision to vaccinate her young daughter. Numerous studies have demonstrated the central importance of a clinician’s recommendation in a mother’s decision to vaccinate her child against HPV,^{9,16,24,26} but few have explored what aspects of the clinician–mother interaction are most important. We found that the most influential features of this interaction included a clinician broaching the topic of HPV vaccination prior to the actual vaccination visit, a clinician providing key information about vaccine safety and efficacy, and a discussion of HPV vaccination in the context of a trusting, respectful relationship. These findings suggest that a mother’s decision to vaccinate a young adolescent is a process, often multistep, that is facilitated by a clinician who educates the mother and elicits her concerns,

and who gives her time to consider the decision and return at a later date for vaccination. These practices may give a mother a sense of empowerment and confidence that she has the information needed to make the best decision for her daughter.

Exposure to media and marketing regarding HPV vaccines, especially television commercials, was a third major factor influencing mothers' decisions to vaccinate. Media and marketing exposure drove a mother's decision by raising her awareness about HPV vaccines, educating her about HPV and HPV vaccines, triggering discussions with her daughter about vaccination, convincing her of the benefits of vaccination, and encouraging her to seek out additional information about HPV vaccines. Our finding that the media plays a significant role in mothers' decision making about HPV vaccination is not surprising, given the central role that the media plays in increasing public awareness about medical advances such as new vaccines.²⁷ However, this information is not always accurate or comprehensive. A study of online media coverage of HPV vaccines conducted in 2006 revealed that critical information about the vaccine, including data about vaccine safety and duration of protection, was consistently missing from media coverage, and that inaccurate information was frequently presented.²⁸ Since that time, a number of unsubstantiated and misleading media stories about the purported risks of HPV vaccination have appeared. It will be important for clinicians not only to advocate for factual, balanced messages about the benefits and risks of vaccination but also to advocate for accurate and responsible media coverage of vaccine-related topics.²⁹ Furthermore, it is essential that clinicians are able to provide parents with accurate information about vaccines, including links to reputable Web sites.

The majority of mothers reported that the decision to vaccinate was primarily theirs and explained that their daughters looked to them for guidance and trusted them to make health-related decisions. Their daughters tended to believe that they had insufficient knowledge about vaccination on which to base a decision about vaccination; this is likely true for other vaccines as well. Previous studies of adolescents similarly found that girls lacked basic knowledge and understanding of HPV vaccines.^{30,31} Mothers who make the decision to vaccinate their daughters without including any discussion or education may believe that their daughters are looking to them to make the decision and that they have her best interests in mind. However, they may be missing a valuable opportunity to educate their daughters about the importance of vaccination in preventing disease and the role that HPV vaccines can play in preventing cervical cancer, as well as to encourage their daughters to begin to make their own health-related decisions. Higher level of vaccine-related knowledge has been shown to be associated with HPV vaccination among high school students,³⁰ and mother–daughter communication about sex has been shown to be positively correlated with HPV vaccination among daughters.³² A barrier to mothers educating their daughters may be their own lack of knowledge and understanding about HPV and HPV vaccines.^{17,30} Clinicians are in a unique position to address these barriers by educating mothers so that they can effectively communicate information about vaccination to their daughters, and by encouraging mothers to discuss vaccination with their daughters and involve daughters in the decision-making process.³³

Most daughters in our study reported the vaccination decision was mutual, as has been shown in a previous study of 12- to 13-year-old girls in Manchester,³⁴ and these girls frequently stated that the decision-making process involved mother–daughter discussions about HPV vaccination. Our findings suggest that girls who have discussions with their mothers about HPV vaccination tend to view the vaccination decision as a mutual one, regardless of the mother's opinion. Our findings contrast with those of Hughes et al,³⁵ who found that in a sample of 11- to 18-year-old girls and their mothers, many girls considered themselves passive participants in the decision-making process. The difference in findings

may be due to the fact that more than half of the girls in the study by Hughes et al had not received the HPV vaccine, and if mothers made the decision not to vaccinate their daughters, this may result in little discussion about vaccination, leading to a sense among daughters that they were not involved in the decision-making process.

Mother–daughter discussions about vaccination and health-promoting behaviors not only provide girls with essential health-related information but also may help them feel empowered to begin to take responsibility for future health-related decisions, including decisions about sexual health. In the Manchester study, the great majority of girls reported that vaccination made them aware of the risks of having sex and reported that they felt better informed to make decisions about future sexual behavior.³⁴ In a study involving mothers of 11- to 12-year-old girls, 81% of mothers reported discussing HPV vaccination with their daughters, and 47% of those mothers reported that the discussion led to a conversation about sexual health, primarily among those daughters whom the mothers perceived to be sexually active.³⁶ These findings suggest that in contrast to the frequent media reports focusing on parental concern about HPV vaccination leading to riskier sexual behaviors, and evidence that clinicians believe that parents are concerned about this issue,¹⁰ many mothers are in fact using the HPV vaccination visit as an opportunity to discuss STI prevention and sexual health. As some parents may not feel comfortable discussing issues of sexuality with their daughters, clinicians may be able to help encourage parents to recognize this “teachable moment” as a valuable opportunity to promote healthy behaviors in their children.^{18,37}

The findings of this study must be interpreted in the context of several limitations. First, we only enrolled daughters who had received the HPV vaccine in a clinical setting and therefore were only able to characterize factors influencing a decision to vaccinate in this specific study sample. In addition, the study was conducted in clinical settings, and thus the findings may not be as relevant for vaccines delivered in other settings, such as school-based health centers. We only enrolled mothers who agreed to HPV vaccination, limiting the relevance of these findings to mothers who have not agreed to vaccination. Finally, we conducted the study in a relatively small number of mothers and daughters, and in a limited geographic area. However, as a qualitative study, the intent was not to generate findings that could be readily generalized to a larger population, but rather to characterize, in detail, the decision-making processes involved in HPV vaccination in a specified group of mother–daughter pairs.

Conclusions

This study provides novel insights into a number of factors that may drive a mother’s decision to vaccinate an 11- to 12-year-old daughter and may be used in interventions to improve vaccination rates. These include key characteristics of the clinician–mother interaction that influence decision making, the mechanisms by which exposure to HPV vaccine–related media and marketing influences decisions, and the important role of mother–daughter discussion about vaccination in educating daughters and helping them feel that they are involved in the decision-making process.

Acknowledgments

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article:

This study was supported through a grant (R01 073713) from the National Institutes of Health (NIAID), Principal Investigator Jessica Kahn MD MPH.

References

1. Bosch FX, de Sanjose S. Chapter 1: Human papillomavirus and cervical cancer—burden and assessment of causality. *J Natl Cancer Inst Monogr*. 2003; 31:3–13. [PubMed: 12807939]
2. Centers for Disease Control and Prevention. FDA licensure of bivalent human papillomavirus vaccine (HPV2, Cervarix) for use in females and updated HPV vaccination recommendations from the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep*. 2010; 59:626–629. [PubMed: 20508593]
3. Centers for Disease Control and Prevention. FDA licensure of quadrivalent human papillomavirus vaccine (HPV4, Gardasil) for use in males and guidance from the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep*. 2010; 59:630–632. [PubMed: 20508594]
4. Garland SM, Hernandez-Avila M, Wheeler CM, et al. Quadrivalent vaccine against human papillomavirus to prevent anogenital diseases. *N Engl J Med*. 2007; 356:1928–1943. [PubMed: 17494926]
5. Harper DM, Franco EL, Wheeler CM, et al. Sustained efficacy up to 4.5 years of a bivalent L1 virus-like particle vaccine against human papillomavirus types 16 and 18: follow-up from a randomised control trial. *Lancet*. 2006; 367:1247–1255. [PubMed: 16631880]
6. FUTURE II Study Group. Quadrivalent vaccine against human papillomavirus to prevent high-grade cervical lesions. *N Engl J Med*. 2007; 356:1915–1927. [PubMed: 17494925]
7. Waller J, Marlow LA, Wardle J. Mothers' attitudes towards preventing cervical cancer through human papillomavirus vaccination: a qualitative study. *Cancer Epidemiol Biomarkers Prev*. 2006; 15:1257–1261. [PubMed: 16835320]
8. Constantine NA, Jerman P. Acceptance of human papillomavirus vaccination among Californian parents of daughters: a representative statewide analysis. *J Adolesc Health*. 2007; 40:108–115. [PubMed: 17259050]
9. 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; 123:1439–1445. [PubMed: 19482752]
10. Kahn JA, Cooper HP, Vadaparampil ST, 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; 18:2325–2332. [PubMed: 19661092]
11. Daley MF, Crane LA, Markowitz LE, et al. Human papillomavirus vaccination practices: a survey of US physicians 18 months after licensure. *Pediatrics*. 2010; 126:425–433. [PubMed: 20679306]
12. Gottlieb SL, Brewer NT, Sternberg MR, et al. Human papillomavirus vaccine initiation in an area with elevated rates of cervical cancer. *J Adolesc Health*. 2009; 45:430–437. [PubMed: 19837348]
13. Wong CA, Berkowitz Z, Dorell CG, Price RA, Lee J, Saraiya M. Human papillomavirus vaccine uptake among 9- to 17-year-old girls: National Health Interview Survey, 2008. *Cancer*. 2011; 117:5612–5620. [PubMed: 21692069]
14. Marlow LA, Waller J, Wardle J. Parental attitudes to pre-pubertal HPV vaccination. *Vaccine*. 2007; 25:1945–1952. [PubMed: 17284337]
15. Rosenthal SL, Rupp R, Zimet GD, et al. Uptake of HPV vaccine: demographics, sexual history and values, parenting style, and vaccine attitudes. *J Adolesc Health*. 2008; 43:239–245. [PubMed: 18710678]
16. 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; 19:531–538. [PubMed: 19394865]
17. Allen JD, Othus MK, Shelton RC, et al. Parental decision making about the HPV vaccine. *Cancer Epidemiol Biomarkers Prev*. 2010; 19:2187–2198. [PubMed: 20826829]
18. Gamble HL, Klosky JL, Parra GR, Randolph ME. Factors influencing familial decision-making regarding human papillomavirus vaccination. *J Pediatr Psychol*. 2010; 35:704–715. [PubMed: 19966315]

19. Ritchie, J.; Spencer, L. Qualitative data analysis for applied policy research. In: Bryman, A.; Burgess, RG., editors. *Analyzing Qualitative Data*. London, England: Routledge; 1994. p. 173-194.
20. Kahn JA, Slap GB, Bernstein DI, et al. Psychological, behavioral, and interpersonal impact of human papillomavirus and pap test results. *J Womens Health (Larchmt)*. 2005; 14:650-659. [PubMed: 16181021]
21. Tissot AM, Zimet GD, Rosenthal SL, Bernstein DI, Wetzel C, Kahn JA. Effective strategies for HPV vaccine delivery: the views of pediatricians. *J Adolesc Health*. 2007; 41:119-125. [PubMed: 17659214]
22. Kahn JA, Rosenthal SL, Tissot AM, Bernstein DI, Wetzel C, Zimet GD. Factors influencing pediatricians' intention to recommend human papillomavirus vaccines. *Ambul Pediatr*. 2007; 7:367-373. [PubMed: 17870645]
23. Kahn JA, Slap GB, Bernstein DI, et al. Personal meaning of human papillomavirus and Pap test results in adolescent and young adult women. *Health Psychol*. 2007; 26:192-200. [PubMed: 17385971]
24. Gerend MA, Weibley E, Bland H. Parental response to human papillomavirus vaccine availability: uptake and intentions. *J Adolesc Health*. 2009; 45:528-531. [PubMed: 19837361]
25. Ziarnowski KL, Brewer NT, Weber B. Present choices, future outcomes: anticipated regret and HPV vaccination. *Prev Med*. 2009; 48:411-414. [PubMed: 18996144]
26. Reiter PL, Brewer NT, Gottlieb SL, McRee AL, Smith JS. Parents' health beliefs and HPV vaccination of their adolescent daughters. *Soc Sci Med*. 2009; 69:475-480. [PubMed: 19540642]
27. Cates JR, Shafer A, Carpentier FD, et al. How parents hear about human papillomavirus vaccine: implications for uptake. *J Adolesc Health*. 2010; 47:305-308. [PubMed: 20708571]
28. Habel MA, Liddon N, Stryker JE. The HPV vaccine: a content analysis of online news stories. *J Womens Health (Larchmt)*. 2009; 18:401-407. [PubMed: 19281323]
29. Cooper LZ, Larson HJ, Katz SL. Protecting public trust in immunization. *Pediatrics*. 2008; 122:149-153. [PubMed: 18595998]
30. Mathur MB, Mathur VS, Reichling DB. Participation in the decision to become vaccinated against human papillomavirus by California high school girls and the predictors of vaccine status. *J Pediatr Health Care*. 2010; 24:14-24. [PubMed: 20122474]
31. Cooper Robbins SC, Bernard D, McCaffery K, Brotherton J, Garland S, Skinner SR. "Is cancer contagious?": Australian adolescent girls and their parents: making the most of limited information about HPV and HPV vaccination. *Vaccine*. 2010; 28:3398-3408. [PubMed: 20199758]
32. Roberts ME, Gerrard M, Reimer R, Gibbons FX. Mother-daughter communication and human papillomavirus vaccine uptake by college students. *Pediatrics*. 2010; 125:982-989. [PubMed: 20385645]
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; 5:298-304. [PubMed: 17664495]
34. Brabin L, Roberts SA, Stretch R, et al. A survey of adolescent experiences of human papillomavirus vaccination in the Manchester study. *Br J Cancer*. 2009; 101:1502-1504. [PubMed: 19809431]
35. Hughes CC, Jones AL, Feemster KA, Fiks AG. HPV vaccine decision making in pediatric primary care: a semi-structured interview study. *BMC Pediatr*. 2011; 11:74. [PubMed: 21878128]
36. McRee AL, Reiter PL, Gottlieb SL, Brewer NT. Mother-daughter communication about HPV vaccine. *J Adolesc Health*. 2011; 48:314-317. [PubMed: 21338906]
37. Askelson NM, Campo S, Smith S, Lowe JB, Dennis LK, Andsager J. The birds, the bees, and the HPVs: what drives mothers' intentions to use the HPV vaccination as a chance to talk about sex? *J Pediatr Health Care*. 2011; 25:162-170. [PubMed: 21514491]

Table 1

Factors Influencing Mothers' Decisions to Vaccinate Their 11- to 12-Year-Old Daughters Against HPV

Mother's health-related beliefs and experiences (N)**Favorable beliefs about vaccines**

Belief that vaccines are important for health/protect health (7)

Favorable beliefs about HPV/HPV vaccines

Vaccination has health benefits

Prevents cancer (12)

Prevents STI/other diseases (6)

Vaccine is safe, effective, long-lasting (6)

Vaccinating at this age (11–12 years) is important

Recommended for that age group (8)

Best to administer prior to sexual maturity and sexual initiation (11)

Acceptance of vaccination easier at younger ages (2)

Antibody level higher at a younger age (2)

Mother's experiences increase perceived susceptibility or comfort with vaccination

Personal experience with HPV/other STI increases sense of vulnerability (4)

Family/friend experience with HPV or cancer increases sense of vulnerability (7)

Sibling's experience with HPV vaccine increases comfort (5)

Interactions with clinicians (N)**Discussions often occurred during a routine physical and/or prior to visit**

Clinicians were primarily physicians, and many had spoken to mothers about HPV vaccine prior to visit (15)

Conversations took place during a routine physical for daughter (6)

Conversations took place in context of routine physical for older sister or when older sister was vaccinated (5)

Approach to vaccination (planting the seed, providing practical information)

Planting the seed—that is, broaching subject of HPV vaccination (9)

Providing information needed for mom to make informed decision (4)

Mother trusts clinician and respects clinician's opinion (would recommend to one's own child) (7)**Interactions with friends and family (N)****Family contributed to decision making (21)**

Daughter's father

Contributed to decision to vaccinate (3)

Confirmed decision to vaccinate (6)

Mother's mother (grandmother) (6)

Older daughter (2)

Mother-in-law (1)

Sister (2)

Other family members (1)

Friends contributed to decision making (7)**Media/marketing exposure (N)****Raised mother's awareness of HPV vaccines (4)****Provided factual information to mothers/educated mothers about HPV and HPV vaccines**

Facts about HPV

Infection, transmission, sequelae (2)

Facts about vaccine

Prevents cervical cancer (but not all cervical cancer) (12)

Prevents STIs and genital warts (3)

Targeted to girls in certain age groups (4)

Safety profile is reassuring (2)

Encouraged discussion about HPV vaccination between daughter and mother (3)**Convinced them of the benefits of vaccination**

Importance of vaccination as a prevention strategy (12)

Promotion of empowerment for girls (1)

Influence of the tag line “one less” (11)

Promoted seeking out information from other sources (8)

Abbreviations: HPV, human papillomavirus; STI, sexually transmitted infection.

Table 2

Mothers' and Daughters' Perspectives on the Decision-Making Process About HPV Vaccination

Mothers' Perspective (N)**Primarily mother's decision (18)**

- Mother generally makes decisions about vaccination
- Daughter doesn't have a choice
- Daughter doesn't question
- Daughter looks to mom and trusts mom to make decisions about vaccination

Mutual decision between mother and daughter (11)

- Health-related decision making generally characterized by discussion between mother and daughter
- Decision making regarding: HPV vaccination characterized by specific discussion about:
 - Importance of vaccination
 - Vaccination to prevent cervical cancer and genital warts
 - STI prevention
 - Others' support of vaccination (clinicians, father, grandmother)

Primarily daughter's decision (1)**Daughters' perspective (N)****Primarily mother's decision (9)**

- Daughter resisted vaccination; concerned about pain
- Daughter not sure what the vaccine was for

Mutual decision between mother and daughter (also nurse, doctor, grandmother) (23)

- Decision making often (though not always) characterized by push-back from daughter
- Decision making often involved discussions about:
 - Importance of vaccination to prevent disease in the future
 - Benefits of vaccination: prevents cervical cancer and genital warts
 - Barriers to vaccination: concerns about vaccine safety, pain
 - Influential others' support of vaccination (mother, grandmother, doctor)

Primarily daughter's decision (1)

Abbreviations: HPV, human papillomavirus; STI, sexually transmitted infection.