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Understanding the Reasons Why Mothers Do or Do Not Have Their Adolescent Daughters Vaccinated Against Human Papillomavirus

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Abstract

PURPOSE—The objective of this study was to compare the reasons why mothers do or do not have their adolescent daughters vaccinated against HPV.

METHODS—Mothers of vaccinated and unvaccinated 11- to 17-year-old girls seen during preventive care visits in outpatient family medicine or pediatric clinics underwent an audiotaped structured telephone interview that used open-ended questions to assess the reasons underlying maternal decisions about HPV vaccination. Qualitative methods categorized maternal responses into themes.

RESULTS—Interviews of 52 mothers (19 declining vaccination, 33 accepting) identified several distinct factors underlying their decisions about HPV vaccination. Lack of knowledge about HPV, age-related concerns, and low perceived risk of infection were commonly cited reasons for declining vaccination. Desire to prevent illness, physician recommendation, and a high perceived risk of infection were commonly identified motivating factors. Both groups of mothers had significant concerns about vaccine safety. Locus of control (e.g., mother or daughter) of health-related decisions arose as a novel factor influencing this decision that had not been previously described in the context of HPV vaccination.

CONCLUSIONS—Addressing safety concerns, educating parents about the age-specific risk of HPV infection, and promoting strong physician recommendation for vaccination may be the most useful targets for future interventions to increase HPV vaccine utilization.

Keywords

Human Papillomavirus; Adolescents; Vaccine; Parents

INTRODUCTION

In June 2006 the US Food and Drug Administration (FDA) licensed the first vaccine against human papillomavirus (HPV), called Gardasil®, for use in females 9 to 26 years of age (1). This quadrivalent vaccine has been shown in clinical trials to be highly efficacious in preventing genital warts and precancerous lesions (2–5). The Advisory Committee on Immunization Practices (ACIP) recommends that Gardasil® be routinely provided to all 11- to 12-year-old

females, with universal catch up vaccination suggested for older adolescents and young adults (6). Vaccination of minors requires parental consent, and previous studies show that parents are a critical factor in determining adolescent attitudes about vaccination (7). Thus successful HPV vaccination campaigns hinge upon parental attitudes, opinions, and motivation for vaccination. Mothers are the primary parent to make healthcare decisions about their children, including those related to vaccination (8). Understanding the reasons why mothers accept or decline HPV vaccination for their daughters is a critical first step in designing effective interventions to promote use of this vaccine.

Previous studies have explored parental attitudes about HPV vaccination (9–30) and have identified several potential factors that mothers might consider in this decision. However, many of these studies were performed prior to HPV vaccine licensure, and thus measured parental views of a “hypothetical” HPV vaccine. As with these prelicensure studies, the few post-licensure studies that have been performed on this issue have also tended to focus vaccination intention. Because most of these studies did not directly correlate influential decisional factors with actual vaccine receipt, their utility for informing interventions may be limited. For example, these studies may not have been able to capture the influence of some of the “real world” barriers to vaccination parents have been found to encounter, such as lack of insurance coverage or perceived negative social acceptability of the vaccine.

An additional potential limitation of previous studies is that many used quantitative, rather than qualitative, analytical methodological approaches—an approach that may not have captured the full spectrum of reasons underlying decisions about HPV vaccination, or their subtleties and interrelationships. Because of these limitations, we designed a post-licensure study that identified parents of adolescent girls who had been offered the HPV vaccine at a recent check-up and used open-ended interview questions and a qualitative approach (31) to more directly investigate the reasons why mothers accepted or declined HPV vaccination for their daughters.

METHODS

Study Instrument Development

A 12-item, structured, telephone survey that used open-ended questions to query mothers about their knowledge of HPV and HPV vaccines, general views on vaccines, and reasons for vaccinating/not vaccinating their daughters was developed by the research team. The survey instrument was pilot tested among a convenience sample of five parents of adolescents with refinements made to improve clarity and data collection based on pilot-test feedback. Respondents took approximately 15 minutes to complete the survey (instrument available upon request).

Study Population

Our study was comprised of mothers of 11- to 17-year-old female patients seen for a preventive care visit in the outpatient family medicine or pediatric clinics within the University of Michigan's healthcare system between January and March, 2007. During this time period, the HPV vaccine was readily accessible by clinicians in both of these medical specialties and was covered by both public health insurance and the majority of private payers in the area. To be eligible for the study, parents had to affirm that their daughter had been offered the HPV vaccine at their recent preventive care visit. Although we had initially intended to survey parents of both genders, only two fathers completed the study; thus our analysis focused specifically on mothers.

Participant Recruitment

We used the health system's electronic medical record to obtain addresses of all age-eligible female patients seen during the study period for “well child exams,” “health maintenance exams, or “sports physicals” in the family medicine and pediatric outpatient clinics ($N = 582$). The University of Michigan's Human Subjects Committee approved a waiver of consent for accessing this information. A study introduction letter addressed to the “parent or guardian of [patient's name]” was sent by mail to invite the parent who had “accompanied their daughter to her recent check up” to participate in a telephone survey. A total of 454 study introduction letters were sent over the course of the study period, of which 20 were returned as undeliverable.

Subject recruitment used a purposeful, “tiered” approach. We first contacted all parents ($n = 70$) who indicated a positive interest in the study by marking “I would like to participate” or “I might like to participate” on the return postcard enclosed with the study introduction letter. This resulted in 54 parents recruited. Recruitment then continued among parents who had not specifically “opted out” of the study (those who had not returned the postcard indicating “I do not wish to participate in this research study”) until ongoing analysis of coded transcripts demonstrated redundancy in identified themes of responses (final $n = 56$). We contacted a total of three parents in this latter category in order to recruit the additional two parents to make up the final sample of 56 parents. Four subjects were later dropped from the analysis—two because they were fathers, and two because their daughters had been seen in a clinic other than pediatrics/family medicine. One mailing to parents of pediatric patients and two mailings to parents of family medicine patients were required to achieve the final sample ($n = 52$). A \$10 gift card was provided for participation.

Data Collection

Audiotaped telephone surveys were administered by two members of the research team (A.F.D., 3 interviews; L.M.A., 49 interviews). Informed consent was obtained over the phone at the time of the interview. All study activities were approved by the University of Michigan's Human Subjects Committee.

The primary outcome assessed was maternal responses to the question: “You indicated that your daughter did/did not receive the HPV vaccine. Can you tell me a bit about the reasons behind this decision?” However, because we had hypothesized, based on previous reports (10,32,33), that the age of the child might be a critical factor in this decision, we used a pre-specified prompt (What if your daughter were a different age, either older or younger, when the HPV vaccine was offered? Do you think you would have different thoughts about having her vaccinated?) to stimulate response to this issue specifically if it had not already been provided. Knowledge about HPV was assessed with one open-ended question: “Can you tell me what you have heard or what you know about the HPV virus or about HPV vaccines?” General views on vaccination were addressed by asking all mothers whether they had ever declined a recommended vaccine for their daughter in the past.

Data Analysis

Responses were transcribed verbatim into CDC EZ Text (34), a text coding software program. As data were collected, each transcript was content analyzed independently by two members of the research team (A.F.D., L.M.A.) to generate a set of coding categories. These codes were compared and discussed between the two reviewers, and differences reconciled to generate a single coding system. This system was modified and expanded in an iterative and ongoing manner as data were collected. As responses were coded and analyzed, patterns emerged that allowed categorization of codes into themes of responses (e.g., “reasons”).

RESULTS

Respondent Characteristics

Of the 52 mothers recruited, 19 had declined HPV vaccination for their daughters, and 33 had accepted the vaccine. Patients from both medical specialties were well represented (Table 1). Vaccine-accepting and vaccine-declining mothers were similar with respect to mothers' age and education level, age of the adolescent daughter, medical specialty where the visit occurred, and “strength” of physician recommendation for HPV vaccination. It was notable that more vaccine-declining mothers did not see their daughter's “regular” medical provider at the time of the preventive care visit than vaccine-accepting mothers.

None of the mothers in our study appeared to be generally against vaccines. Two mothers accepting and two mothers declining HPV vaccination had declined another recommended vaccine in the past for their daughter, but in all cases only a single type of vaccine was refused. These included influenza vaccination, infant hepatitis B vaccination and school-aged “pertussis vaccination.”

Maternal Knowledge about HPV

When asked to describe what they knew about HPV and HPV vaccines, most mothers ($n=41$) mentioned the connection between HPV infection and cervical cancer and/or the ability of HPV vaccines to prevent this disease. Only a few of the mothers ($n=3$, all vaccine-accepting) brought up the connection between HPV infection/vaccination and genital warts—two of these erroneously indicated that genital warts could cause cervical cancer. Mothers in each vaccination group mentioned similar issues when asked about what they knew of HPV infection or HPV vaccines.

Commonly Identified Reasons Underlying Maternal Decisions About HPV Vaccines

Overall, 11 “themes” of reasons underlying maternal decisions about HPV vaccination were identified (Table 2). Response patterns differed greatly based on the daughters' vaccination status, and some reasons were more commonly mentioned than others. Among mothers declining the vaccine, the most commonly identified reasons for this decision were as follows: 1) perceiving the risk for HPV infection or HPV-related diseases to be low; 2) believing that their daughter was currently too young for the HPV vaccine, though it might be acceptable at a later age; 3) perceiving that they or the medical establishment lacked sufficient knowledge about HPV/HPV vaccines; and 4) significant concerns about the long-term safety of the vaccine. Among mothers accepting the vaccine, the most commonly identified reasons for this decision were as follows: 1) perceiving that their daughter was at high risk for acquiring HPV; 2) believing that the vaccine had a favorable safety profile; 3) wanting to protect against or prevent cervical cancer; 4) personal experience with HPV infection or HPV-related diseases; and 5) strong physician recommendation for HPV vaccination.

Safety and Risk: Reasons Common Among Both Groups, but with Opposite Viewpoints

Vaccine safety—Vaccine safety was mentioned frequently ($n=8$ vaccine-declining mothers, $n=7$ vaccine-accepting mothers), but views on this issue differed on the basis of the daughter's vaccination status. Among mothers declining the vaccine, safety concerns were often the primary reason for doing so ($n=7$). These concerns were related to a feeling that they personally lacked the knowledge needed to make an informed decision about HPV vaccination for their daughter (“I just don't know enough about it. That's reason number one and then I don't want her to fall into a category where she gets this done and then ten years down the line they find that it reacts a different way. So it's a little bit frightening for me.”), or that the medical establishment in general lacked sufficient knowledge about HPV vaccines to ensure safety (“I

don't think there's been enough study yet about what the implications are for the long term for giving this vaccine to young adolescent girls.”). Despite substantial safety concerns, vaccine-declining mothers generally recognized that HPV vaccination could have some benefit. Several ($n=8$) seemed to indicate a willingness to reconsider the vaccine for their daughters in the future when additional safety information was available: “I don't think there's enough information out there about the vaccine...I was going to take a year or possibly two as a wait-and-see approach to see what other studies come about regarding this vaccination.”

Safety concerns among mothers accepting the vaccine seemed to often be overcome by a belief that benefits from vaccination outweighed the risks: “The only reservation I had about it was that it is new... I want other people to try it out first and make sure there are no side effects and that sort of thing...[But then I thought] Why wouldn't I get extra protection if I can have it?” Two vaccine-accepting mothers also described how they believed the testing/licensure process to evaluate new vaccines was adequate to identify significant risks to vaccination: “I am nervous because it is a new vaccine and I would hate to see in...10 years down the road them come back and talk about devastating effects it has, so I'm trusting that they've done enough testing and that they've looked at this long enough.”

Perceived risk—Viewpoints on their daughters' risk for HPV also differed by vaccination status, though mothers uniformly discussed risk within the context of their daughter's sexuality. Mothers declining the vaccine perceived their daughters to be at low risk for HPV—primarily because they did not believe their daughter was likely to be sexually active currently or in the near future. These mothers lacked a sense of urgency about the need for vaccination before the onset of sexual activity: “She's still physically a little girl and going to elementary school... Unless something happens in a courtyard at school or something there's really no way that she's going to be sexually active right now.” Moreover, for several mothers in this group ($n=7$), risk perceptions were closely linked to their daughter's age. These mothers recognized that risk would increase as their daughter got older and this interrelationship appeared to influence vaccine acceptability: “If she were 16 or 17...there would be more to consider because, you know, she could be [sexually] active.”

In contrast, mothers who accepted the vaccine perceived their daughters to be at high risk of acquiring HPV infection, even if they believed their daughters had never been sexually active and/or were of a young age. These mothers acknowledged the high prevalence of HPV in the general population and that high-risk sexual behavior was not a prerequisite for infection: “Even though we try to practice...that she's only going to have sex with her husband, I'm a little more realistic than that. Even if she only does have sex with one man in her life, there's no guarantee that he hasn't had other partners and that he might not be a carrier.”

Control over health-related decisions: A novel factor identified—Control over health-related decisions (i.e., mother vs. daughter) emerged as a novel influential factor in our study that had not been described previously in the context of HPV vaccination. Of the vaccine-declining mothers mentioning this reason ($n=3$), all described how they wanted their daughter, when older, to play a role in the decision to vaccinate. This wish was related to concerns about vaccine safety and apprehension about the implications of their decision for their daughter in the future: “If she were older and there could be a competent discussion on it and she could choose...I would definitely allow it. But at 11, I'm just so bothered by my decision having an impact on her later in life.” In contrast, the vaccine-accepting mothers who cited this as a factor in their decision ($n=4$) wanted to take advantage of their current control over their daughter's health-related decisions: “I figured now is the best time because it's a time that I can make the decision for her and I wanted to make sure she was protected before there was any chance of her becoming sexually active.”

DISCUSSION

Our study, which focused on mothers whose daughters had been offered the HPV vaccine at a recent check up, identified 11 “themes” of reasons why mothers did or did not have their daughters vaccinated against HPV at this visit. Mothers who declined vaccination generally felt that their daughter was at low risk for HPV infection and “too young” to receive the vaccine. These mothers had significant concerns about vaccine safety, which were frequently linked to the perception that they personally lacked sufficient knowledge for making an informed decision about the vaccine or that medical establishment more broadly had inadequate information to ensure long-term efficacy and lack of adverse effects. Despite these misgivings, vaccine acceptability among mothers in the vaccine-declining group appeared to be modifiable, with many implying that they would reconsider vaccination when their daughter was older, more likely to be sexually active, and/or when more safety information was available. Mothers accepting the vaccine did so with the belief that their daughters were at high risk of acquiring HPV and that the consequences of such an infection could be severe. Though these mothers also mentioned safety concerns frequently, they were tempered by the perceived benefits to vaccination and trust in the vaccine testing and licensure process.

Findings from our study support those of multiple studies of parental HPV vaccination intention performed in a variety of settings in the United States and abroad demonstrating that issues such as perceived risk of infection, severity of disease, benefits to vaccination, and vaccine safety can all impact parental acceptability of HPV vaccination for adolescent girls (9–30). Our study also identified a novel factor influencing maternal decisions about HPV vaccination that had not been previously described in the context of HPV vaccination—control over health-related behaviors. This concept appeared to have both positive and negative impacts on the decision to vaccinate among a subset of mothers. For vaccine-declining mothers, the “weight of responsibility” for making this decision, particularly in light of their significant concerns about vaccine safety, meant that it was imperative to have their daughters’ input (when they were older and more mature) in the decision. In contrast, vaccine-accepting mothers found it desirable to take advantage of their current “control” over their daughter’s health-related decisions, recognizing that this decision would soon be under their daughters’ purview. Unlike early childhood vaccination, which is primarily under parental control, adolescent vaccine delivery requires assent from the adolescent being vaccinated. The role of adolescents’ views in influencing whether HPV vaccines are received is only beginning to be studied (15,35) and warrants further investigation. Linked to this concept is the issue of whether adolescents should be allowed to “self-consent” to HPV vaccination—a controversial idea that is currently under debate (36). Finding mechanisms to improve adolescents’ self efficacy for discussing the HPV vaccine with their parents may be important for increasing HPV vaccine utilization among this population. For example, having physicians provide an HPV vaccine “talking points” handout might be one way to facilitate a discussion about the vaccine between adolescents who wish to be vaccinated and their parents. Interventions such as this may be of particular use for adolescents whose parents forgo vaccination because they are embarrassed or reluctant to discuss the vaccine, but who want their daughter to have a role in the decision to be vaccinated.

Our study also demonstrated that many more mothers who declined HPV vaccination had not seen their child’s regular provider when compared to mothers accepting the vaccine. Though none of the vaccine-declining mothers in our study mentioned decreased familiarity with their child’s provider as a reason for their decision, our results may point to an important, though perhaps subconscious, aspect of HPV vaccination that should be considered when designing outreach and intervention strategies to promote use of this vaccine by adolescents. Numerous studies demonstrate that provider recommendation is a critical factor for vaccination (10,21, 37), and it is conceivable that some of the mothers declining vaccination in our study would have had a different opinion about the vaccine had they been able to discuss it with a provider

with whom they had more experience and trust. Future studies should investigate how provider familiarity impacts parental views of the HPV vaccine and adolescent HPV vaccine administration.

Mothers who declined vaccination in our study seemed to have modifiable views about the vaccine as many were open to the idea of having their daughters vaccinated in the future, either when they judged them more likely to be sexually active, or when additional safety and efficacy data were available. This suggests that these mothers were not inherently against HPV vaccination per se, but rather that the perceived balance of “risks” to benefits of HPV vaccination was unfavorable. Several studies demonstrate that HPV infection occurs soon after sexual initiation (38) and that adolescents and young adults are at highest risk of being infected (39). Because parents frequently misjudge their child's level of sexual activity (40), adopting a “later would be better” attitude about HPV vaccination could have detrimental health effects by failing to prevent HPV infection among sexually active adolescents. This lack of urgency about the need for HPV vaccination has been documented in other studies (27) and may be an important target for public educational campaigns in the future. For example, some parents may find messages that center on the high prevalence of HPV among adolescents and the high risk of HPV infection with even just one sexual partner compelling, especially when these risks are presented in direct comparison to the low risk of adverse health effects from HPV vaccination.

A limitation of our study was that the maternal sample was derived from patients seen for preventive care visits only; it did not include mothers whose daughters were offered the HPV vaccine at a problem-related outpatient visit or mothers who are unable to, or choose not to, access preventive care services. In addition, we primarily relied on spontaneous maternal responses to an open-ended question to identify reasons underlying decisions about HPV vaccination (as opposed to querying mothers directly about specific reasons). This approach was chosen so as to minimize interviewer-imposed bias in responses, but it is possible that some mothers had additional reasons underlying their decision that they did not feel comfortable discussing with the interviewer. In addition, questions were asked of mothers days or weeks after their daughter's medical visit. The reasons for mothers' decisions identified by our study may not be completely reflective of their decision-making process at the actual time of vaccine consideration. An additional potential limitation was the lack of diversity in our sample: All participants had access to health care and our sample was highly educated. Racial/ethnic information about the participants was unknown. However, the aim of qualitative studies is not to generate results generalizable to a population, but rather to achieve the intended goal of the study—in this case to develop a deeper understanding of the reasons behind maternal decisions about HPV vaccination. Finally, although we had originally intended to explore both parents' views on HPV vaccination for their daughters, only two fathers were identified through our recruitment process. Previous studies indicate that mothers are the primary parent responsible for taking their children to the doctor. It is therefore not surprising that the majority of study participants identified by our study as “the person who accompanied their daughter to her recent check up” were mothers. However, given the controversy related to the sexual transmissibility of HPV, it is conceivable that fathers may play a more active role in decisions about HPV vaccination than for other vaccines. Further exploration of the role of fathers in this process, and their potential to serve as advocates for, or opponents of, HPV vaccination is needed.

CONCLUSIONS

This study provides insight in the postlicensure era into the reasons why mothers accept or decline HPV vaccination for their daughters. Using qualitative methods, we identified a wide range of reasons that factor into this decision. One of these, control over health-related

decisions, had not been described previously in the context of HPV vaccination. The decision to decline the vaccine appeared modifiable, with many mothers seemingly agreeable to vaccination when their daughter was older, more likely to be sexually active or when additional safety information for the vaccine was available. These findings may help to inform future interventions aimed at improving adherence to HPV vaccination recommendations.

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Selected Abbreviations and Acronyms

FDA	Food and Drug Administration
HPV	human papillomavirus
ACIP	Advisory Committee on Immunization Practices
US	United States

REFERENCES

1. U.S. Food and Drug Administration. Product Approval Information-Licensing Action, Gardasil. 2006 [Accessed August 1, 2006]. Available from: <http://www.fda.gov/cber/products/hpvmer060806qa.htm>
2. 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]
3. Joura EA, Leodolter S, Hernandez-Avila M, Wheeler CM, Perez G, Koutsky LA, et al. Efficacy of a quadrivalent prophylactic human papillomavirus (types 6, 11, 16, and 18) L1 virus-like-particle vaccine against high-grade vulval and vaginal lesions: a combined analysis of three randomised clinical trials. *Lancet* 2007;369:1693–1702. [PubMed: 17512854]
4. Villa LL, Costa RL, Petta CA, Andrade RP, Ault KA, Giuliano AR, et al. Prophylactic quadrivalent human papillomavirus (types 6, 11, 16, and 18) L1 virus-like particle vaccine in young women: a randomised double-blind placebo-controlled multicentre phase II efficacy trial. *Lancet Oncol* 2005;6:271–728. [PubMed: 15863374]
5. Villa LL, Costa RL, Petta CA, Andrade RP, Paavonen J, Iversen OE, et al. High sustained efficacy of a prophylactic quadrivalent human papillomavirus types 6/11/16/18 L1 virus-like particle vaccine through 5 years of follow-up. *Br J Cancer* 2006;95:1459–951466.
6. Markowitz LE, Dunne EF, Saraiya M, Lawson HW, Chesson H, Unger ER. Quadrivalent Human Papillomavirus Vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 2007;56(RR-2):1–24. [PubMed: 17380109]
7. Rosenthal SL, Kottenhahn RK, Biro FM, Succop PA. Hepatitis B Vaccine Acceptance Among Adolescents and Their Parents. *J Adolesc Health* 1995;17:248–254. [PubMed: 8580126]
8. Henry, J.; Kaiser Foundation. Women, Work and Family Health: a balancing act. Apr2003 [Accessed May 24, 2007]. Available from: <http://www.kff.org/womenshealth/loader.cfm?urlZ/commonsspot/security/getfile.cfm&PageIDZ14293>.
9. Davis K, Dickman ED, Ferris D, Dias JK. Human papillomavirus vaccine acceptability among parents of 10- to 15-year-old adolescents. *J Low Genet Tract Dis* 2004;8(3):188–194.
10. Dempsey AF, Zimet GD, Davis RL, Koutsky L. Factors that are associated with parental acceptance of human papillomavirus vaccines: a randomized intervention study of written information about HPV. *Pediatrics* 2006;117:1486–1493. [PubMed: 16651301]
11. 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]

12. Hopenhayn C, Christian A, Christian WJ, Schoenberg NE. Human papillomavirus vaccine: knowledge and attitudes in two Appalachian Kentucky counties. *Cancer Causes Control* 2007;18:627–634. [PubMed: 17497223]
13. Mays RM, Sturm LA, Zimet GD. Parental perspectives on vaccinating children against sexually transmitted infections. *Soc Sci Med* 2004;58:1405–1413. [PubMed: 14759685]
14. Olshen E, Woods ER, Austin SB, Luskin M, Bauchner H. Parental acceptance of the human papillomavirus vaccine. *J Adolesc Health* 2005;37:248–251. [PubMed: 16109349]
15. Zimet GD, Perkins SM, Sturm LA, Bair RM, Juliar BE, Mays RM. Predictors of STI vaccine acceptability among parents and their adolescent children. *J Adolesc Health* 2005;37:179–186. [PubMed: 16109336]
16. Brabin L, Roberts SA, Farzaneh F, Kitchener HC. Future acceptance of adolescent human papillomavirus vaccination: a survey of parental attitudes. *Vaccine* 2006;24:3087–3094. [PubMed: 16500736]
17. Marlow LA, Waller J, Wardle J. Parental attitudes to pre-pubertal HPV vaccination. *Vaccine* 2007;25:1945–1952. [PubMed: 17284337]
18. Ogilvie GS, Remple VP, Marra F, McNeil SA, Naus M, Pielak KL, et al. Parental intention to have daughters receive the human papillomavirus vaccine. *CMAJ* 2007;177:1506–1512. [PubMed: 18056599]
19. 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]
20. Zimet GD, Mays RM, Sturm LA, Ravert AA, Perkins SM, Juliar BE. Parental attitudes about sexually transmitted infection vaccination for their adolescent children. *Arch Pediatr Adolesc Med* 2005;159:132–137. [PubMed: 15699306]
21. Brewer NT, Fazekas KI. Predictors of HPV vaccine acceptability: a theory-informed, systematic review. *Prev Med* 2007;45:107. [PubMed: 17628649]
22. Chan SS, Cheung TH, Lo WK, Chung TK. Women's attitudes on human papillomavirus vaccination to their daughters. *J Adolesc Health* 2007;41:204–207. [PubMed: 17659226]
23. Dinh TA, Rosenthal SL, Doan ED, Trang T, Pham VH, Tran BD, et al. Attitudes of mothers in Da Nang, Vietnam toward a human papillomavirus vaccine. *J Adolesc Health* 2007;40:559–563. [PubMed: 17531763]
24. Lazcano-Ponce E, Rivera L, Arillo-Santillan E, Salmeron J, Hernandez-Avila M, Munoz N. Acceptability of a human papillomavirus (HPV) trial vaccine among mothers of adolescents in Cuernavaca, Mexico. *Arch Med Res* 2001;32:243–247. [PubMed: 11395192]
25. Woodhall SC, Lehtinen M, Verho T, Huhtala H, Hokkanen M, Kosunen E. Anticipated acceptance of HPV vaccination at the baseline of implementation: a survey of parental and adolescent knowledge and attitudes in Finland. *J Adolesc Health* 2007;40:466–469. [PubMed: 17448408]
26. Stretch R, Roberts SA, McCann R, Baxter D, Chambers G, Kitchener H, et al. Parental attitudes and information needs in an adolescent HPV vaccination programme. *Br J Cancer* 2008;99:1908–1911. [PubMed: 18985038]
27. Rosenthal SL, Rupp R, Zimet GD, Meza HM, Loza ML, Short MB, 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]
28. Watts LA, Joseph N, Wallace M, Rauh-Hain JA, Muzikansky A, Growdon WB, et al. HPV vaccine: a comparison of attitudes and behavioral perspectives between Latino and non-Latino women. *Gynecol Oncol* 2009;112:577–582. Epub 2009 Jan 15. [PubMed: 19150120]
29. Bair RM, Mays RM, Sturm LA, Perkins SM, Juliar BE, Zimet GD. Acceptability to Latino parents of sexually transmitted infection vaccination. *Ambul Pediatr* 2008;9:98–103. [PubMed: 18355738]
30. de Visser R, McDonnell E. Correlates of parents' reports of acceptability of human papillomavirus vaccination for their school-aged children. *Sex Health* 2008;5:331–338. [PubMed: 19061552]
31. Ritchie, J.; Spencer, L. *Qualitative data analysis for applied policy research*. Routledge; London (UK): 1994.
32. Dombkowski KJ, Lantz PM, Freed GL. Risk factors for delay in age-appropriate vaccination. *Public Health Rep* 2004;119:144–155. [PubMed: 15192901]

33. Allred NJ, Wooten KG, Kong Y. The association of health insurance and continuous primary care in the medical home on vaccination coverage for 19- to 35-month-old children. *Pediatrics* 2007;119 (Suppl. 1):S4–S11. [PubMed: 17272584]
34. Carey, J.; Wenzel, PH.; Reilly, C.; Sheridan, J.; Steinberg, J.; Harbison, K. CDC EZ-Text: Software for Collection, Management and Analysis of Semi-structured Qualitative Databases. 3.06 ed.. Conwal Incorporated for the Centers for Disease Control and Prevention; Atlanta: 1998.
35. 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;111:1103–1110. [PubMed: 18448742]
36. Farrell RM, Rome ES. Adolescents' access and consent to the human papillomavirus vaccine: a critical aspect for immunization success. *Pediatrics* 2007;120:434–437. [PubMed: 17671069]
37. Zimet GD, Mays RM, Winston Y, Kee R, Dickes J, Su L. Acceptability of human papillomavirus immunization. *J Womens Health Gend Based Med* 2000;9:47–50. [PubMed: 10718505]
38. 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;197:279–282. [PubMed: 18179386]
39. Dunne EF, Unger ER, Sternberg M, McQuillan G, Swan DC, Patel SS, et al. Prevalence of HPV infection among females in the United States. *JAMA* 2007;297:813–819. [PubMed: 17327523]
40. Jaccard J, Dittus PJ, Gordon VV. Parent-adolescent congruency in reports of adolescent sexual behavior and in communications about sexual behavior. *Child Dev* 1998;69:247–261. [PubMed: 9499570]

TABLE 1

Sample characteristics, stratified by daughter's HPV vaccination status

Characteristic	Vaccine declined <i>n</i> = 19	Vaccine received <i>n</i> = 33
<i>Participating mothers' characteristics</i>		
Mean age, yr	40.5	44.5
Highest education level		
Graduate degree	26%	30%
Some college/4-year degree	58%	67%
High school/GED	16%	3%
Percentage with other adolescent daughters (> 12 yr)	42%	33%
<i>Characteristics of daughter eligible for HPV vaccine</i>		
Mean age, yr (range)	14.1 (11–17)	13.7 (11–17)
No. of daughters who did not receive at least one other recommended childhood/adolescent vaccine [*]	2	2
<i>Characteristics of physician seen at HPV-related visit</i>		
Medical specialty of qualifying visit (% total)		
Pediatrics	63%	61%
Family medicine	37%	39%
Strength of physician recommendation for HPV vaccination at qualifying visit (% total)		
Likert Scale score category [†]		
1–2	0%	6%
3	26%	3%
4–5	68%	91%
Missing	6%	-
Mean score, entire group	4.0	4.1
Provider seen at qualifying visit (% total)		
Regular provider	58%	82%
Other provider, previously encountered	0%	16%
Other provider, not previously encountered	42%	3%

* Maternal report.

[†] Five-point Likert scale: 1, not recommended; 5, strongly recommended.

TABLE 2

Reasons, and their subcomponents, underlying maternal decisions about vaccinating their daughters against HPV

Vaccine declined (N = 19)		Vaccine received (N = 33)	
1	<i>Perceived risk of infection</i>		
	<i>n</i> = 7		<i>n</i> = 9
	Not likely to become/not already sexually active		Likely to become/is already sexually active
	No family history of cancer		HPV highly prevalent in society
	Cervical cancer is not deadly.		Cannot tell which partners harbor HPV
	HPV is not very contagious.		Never know when adolescents will start having sex
	Daughter taught the “right thing to do,” so risk is low.		Family history of cancer (general)
2	<i>Age-related</i>		
	<i>n</i> = 7		<i>n</i> = 0
	Too young for a vaccine against an STD		
	Want to wait till daughter is older		
	Vaccination in general can be harmful to a preadolescent.		
3	<i>Knowledge</i>		
	<i>n</i> = 6		<i>n</i> = 1
	Need more personal information about HPV/vaccine		Wish there were a lot of “data” about the vaccine's long-term effectiveness
	Medical establishment needs to know more about HPV/vaccine.		
4	<i>Vaccine safety</i>		
	<i>n</i> = 8		<i>n</i> = 7
	Not enough data on long-term safety of vaccine		Vaccine is “too new” to feel completely comfortable with it.
	Vaccines (in general) linked to autism		Generally benefits to vaccination outweigh safety concerns.
	Many vaccines initially declared safe later found to be unsafe		
5	<i>Protection/prevention of illness and disease</i>		
	<i>n</i> = 2		<i>n</i> = 26
	HPV vaccine will prevent illness. (general)		HPV vaccines are a general safeguard against illness/disease.
	Providing HPV vaccines before sexual activity would afford best protection.		HPV vaccines protect against HPV/cervical cancer.
6	<i>Personal experience with HPV</i>		
	<i>n</i> = 1		<i>n</i> = 12
	Mother had personal experience with abnormal exams.		Mother or family member had experience with cervical cancer/abnormal exams/HPV infection.
7	<i>Physician recommendation</i>		
	<i>n</i> = 2		<i>n</i> = 11
	Physician gave a reason to wait on vaccine.		Doctor recommended it, so daughter got it.
			Always follow doctor recommendations.
8	<i>General beliefs about vaccination</i>		
	<i>n</i> = 2		<i>n</i> = 5
	Problematic to get multiple vaccines at one time		Believe strongly that vaccines are beneficial
	Don't generally “like” vaccines		No big deal—just one more vaccine
9	<i>Control over health-related decisions</i>		

Vaccine declined (<i>N</i> = 19)		Vaccine received (<i>N</i> = 33)	
<i>n</i> = 2		<i>n</i> = 4	
Want to wait until daughter can make her own decision about the vaccine		Want to get daughter vaccinated while mother can control medical decisions	
Daughter expressed opinion that she doesn't want the vaccine.		Daughter voiced a desire to get the vaccine.	
10	<i>Financial issues</i>		
<i>n</i> = 3		<i>n</i> = 2	
Wanted vaccine but could not get because of lack of/unsure of insurance coverage		Daughter was going to “age out” of insurance coverage for vaccine soon so wanted to get now.	
		Would not have been able to get the vaccine if there had not been coverage	
11	<i>Religious values</i>		
<i>n</i> = 1		<i>n</i> = 0	
Religious values “played a role” in the decision.			

STD = sexually transmitted disease.