

Review article

## Improving adolescent health: Focus on HPV vaccine acceptance

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### Abstract

The success of future human papillomavirus (HPV) vaccination programs will depend on individuals' willingness to accept vaccination, parents' willingness to have their preadolescent and early adolescent children vaccinated, and health care providers' willingness to recommend HPV vaccination. The purpose of this article is to provide a qualitative review of the relevant literature, including research on knowledge and attitudes about HPV infection and its clinical sequelae, the acceptability of HPV vaccination to individuals and parents, and health care providers' attitudes about recommending HPV vaccination. Additionally, strategies are suggested by which providers of adolescent health care can discuss and recommend HPV vaccines with parents and their children. The research published to date suggests that there is a good deal of misunderstanding about HPV infection, cervical cancer screening, and the sequelae of HPV infection. However, the majority of research studies to date indicate that young women, parents, and health care providers are interested in vaccines that prevent HPV and other sexually transmitted infections (STIs). Of particular note are the consistent findings that providers are less comfortable vaccinating younger versus older adolescents and that endorsement of vaccination by a professional organization is of great importance. Furthermore, research suggests that most parents are interested in having their preadolescent and adolescent children vaccinated against HPV. Parents value the information and recommendations provided by their children's health care providers. To the extent that providers are concerned about potential negative reactions of parents to a recommendation of HPV vaccination, these findings should provide reassurance. At the same time, health care providers will need to be prepared to provide patients and parents with information about HPV and HPV immunization and to respond productively to the rare parent who expresses opposition to HPV vaccine or any other vaccine. © 2005 Society for Adolescent Medicine. All rights reserved.

### Keywords:

Vaccination; HPV; Sexually transmitted infection; Parents; Adolescent; Health personnel

Vaccines that protect against infection with the most common disease-causing human papillomavirus (HPV) types are predicted to prevent thousands of cases of cervical cancer worldwide, as well as substantially reduce emotional stress associated with abnormal Papanicolaou (Pap) test results and diagnosis with a sexually transmitted infection (STI) [1]. In addition, economic modeling studies suggest that HPV vaccination can result in significant savings in health care dollars [2–4]. The extent of economic benefit,

however, may depend on age at vaccination, duration of immunity, whether males as well as females are immunized, and the potential reduction in recommended frequency of Pap smears after vaccination [2–4]. Data from 2002 indicate that 5.7% of females and 7.9% of males report having had sexual intercourse by age 14 [5], with many adolescents engaging in other forms of sexual activity before initiating sexual intercourse. Ideally, therefore, vaccination would be directed toward preadolescents and early adolescents in order to provide the greatest public health benefit offered by prophylactic HPV vaccines [6]. In addition, there have been questions as to whether health care providers, parents, and adolescents will be comfortable with administering or recommending a vaccine designed to prevent infection with an

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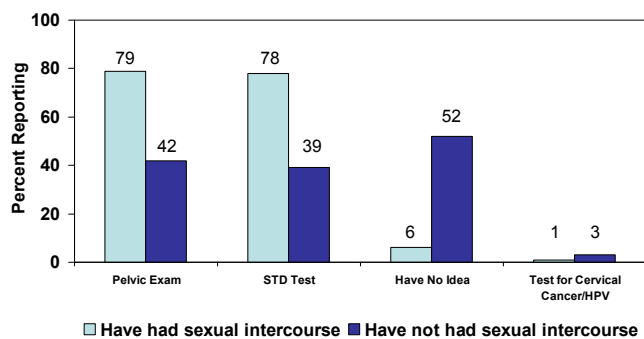


Fig. 1. Young women's understanding of the term Pap smear. Subjects were asked to check all of the choices that mean the same thing as Pap smear. Adapted from [15].

STI that is poorly understood by many women [6,7]. This article will review the research relevant to adolescents', parents', and health care providers' understanding and attitudes about HPV and HPV vaccination, and recommend strategies designed to foster vaccine acceptance among adolescents and their parents.

### Knowledge and attitudes about HPV

It is well established that adult as well as adolescent women have limited understanding of HPV [8–13]. In two United Kingdom studies, only 30% of women participants had ever heard of HPV [10,12] and in a Canadian study only 13% of adolescents had heard of HPV [9]. Similarly, among a sample of university students in the United States, 37% had ever heard of HPV [13]. Although research with patients attending health clinics in the United States found more encouraging results (67% indicated that they had heard of HPV), it is still concerning that one-third of the participants had not heard of the infection [11]. Prior experience with an abnormal Pap smear result is associated with greater knowledge about HPV [10,12], suggesting that HPV-related educational efforts may often occur after women have experienced an adverse consequence of HPV infection. Conversely, a separate study found poor knowledge about Pap smears and no association between prior experience with abnormal Pap smear results and knowledge [14]. Even among persons who have heard about HPV, misconceptions about the virus are widespread. For instance, few women know about the links between genital HPV infection, abnormal Pap smear results, and cervical cancer [8–12]. Furthermore, a recent study reported that 68% of the adolescent and young adult women incorrectly thought that Pap smears and pelvic examinations were the same procedures [15] (Figure 1), a result consistent with findings from an earlier study [16]. Adolescent and adult women also generally do not know who should get a Pap smear and have a poor understanding of the meaning of Pap smear results [8,9,14]. Overall, these sets of findings sug-

gest that more effort needs to be made to educate young women and the parents of adolescents about HPV and HPV vaccination before infection takes place.

Although women have been poorly educated about HPV, research indicates that there is a great desire for information about HPV infection [11,17]. Holcomb et al found that women are interested in learning about HPV, how the virus is transmitted, and how they can prevent becoming infected [11]. Furthermore, 86% of the participants in this study thought that information about HPV should be given to individuals before they initiate sexual activity. Two additional findings are particularly relevant for physicians and emphasize the value of physician-provided education. Women whose primary source of information about HPV was a doctor had better knowledge about HPV compared with those who identified alternative sources. Also, after pamphlets and brochures, respondents identified health care providers as the best source of information about HPV. Providers were identified as important sources of education more frequently than were health education classes, the Internet, friends, or family. Anhang et al reported similar results, noting that the women in their study wanted more information about HPV transmission, prevention, treatment, and the risks associated with HPV infection [17]. Moreover, consistent with research described above, there was a great deal of confusion about some aspects of HPV infection, including the distinction between high-risk and low-risk types. Overall, women were interested in gaining an understanding of their personal risk for HPV infection and its clinical sequelae, and were eager to learn more about HPV.

### HPV vaccination: personal acceptability

Clearly, adolescent and adult women are concerned about HPV and want to be better informed about infection, transmission, screening, and prevention. However, this desire for education about HPV does not imply that an HPV vaccine will be widely accepted by women. Given that HPV is an STI, potential barriers to vaccine acceptance may include the stigma associated with STIs and the possibility that acceptance of the vaccine may be seen as an admission of risky sexual behavior [7]. Although HPV vaccines may be presented to adolescents and their parents as a vaccine that prevents cervical cancer, thereby avoiding or minimizing the STI issue, any vaccine that protects against the HPV types responsible for both genital warts and cervical cancer would undoubtedly be categorized as an STI vaccine. In addition, consumers of health care have a right to receive complete, accurate information about HPV infection and vaccination.

Interestingly, concerns about the STI issue have so far proven to be largely unfounded. The empirical research to date has found high levels of interest in HPV vaccination among adolescents and young women [18–21]. Adult and adolescent women recruited from health care clinics were

particularly interested in vaccine efficacy and physician recommendation [18]. Although the prevention of cervical cancer was seen by participants as a compelling feature of HPV vaccination, the addition of genital warts prevention did not reduce interest in the vaccine. Some young women found that vaccines that protect against warts increased acceptability of HPV vaccines [19]. In a third study of young women recruited from community and clinical sites, approximately 85% of participants indicated an intention to receive an HPV vaccine for cervical cancer prevention once it became available [20]. These women had broadly positive attitudes about many aspects of HPV vaccination. Finally, a study of male and female university students found that 74% said that they would accept an HPV vaccine [21]. Acceptance rates differed neither by gender nor on the basis of whether the vaccine was described primarily as an STI vaccine or a reproductive health vaccine.

These research studies indicate that young women and men view HPV vaccination in a positive light. They also suggest that the STI issue does not reduce personal acceptability of HPV vaccination. Although one study showed that young men were interested in HPV vaccination, this issue is deserving of more study. If HPV vaccines are efficacious in men, vaccinating men may be an important public health strategy because men are an important vector in the transmission of the virus and can develop both genital warts and anogenital cancers as a result of infection. The fact that physician recommendation was central to acceptability further emphasizes the important role played by health care providers in affecting patients' attitudes about vaccination [18].

### **HPV vaccination: parental acceptability**

The research summarized in the previous section suggests that most women are interested in HPV vaccines; however, given the fact that HPV vaccines are prophylactic, and will provide the greatest public health benefit prior to infection with the virus, the major targets of HPV vaccination campaigns should be pre- and early adolescents. Research on hepatitis B vaccination indicates that adolescents look to their parents for guidance around vaccination issues [22]. Moreover, parental consent most likely will be required for vaccination. The acceptability of adolescent HPV vaccination to parents, therefore, is a critical issue. Questions have been raised about whether most parents would be willing to have their children vaccinated [7]. Parents may be concerned that their adolescent child would interpret parental approval of HPV vaccination as a tacit condoning of early sexual behavior. In addition, preadolescents and adolescents are more likely to ask questions about health care issues than are younger children, and parents may be concerned about how to describe an HPV vaccine to children.

Despite these potentially troubling issues, the research to date on parental attitudes about HPV/STI vaccination is

consistent with personal acceptability literature. The majority of parents surveyed across studies are very interested in protecting their children against HPV and other STIs [23–29]. In a study of mothers in Cuernavaca, Mexico, the vast majority of participants favored HPV vaccination for their daughters [23]. The women in this study were told that the vaccine would prevent HPV infection, a virus that is sexually transmitted, and that HPV is the cause of cervical cancer. Two qualitative studies used in-depth interviews to assess attitudes of parents in the United States toward HPV vaccination [24,27]. Parents were told that HPV was sexually transmissible, and in both studies the majority of parents expressed support for the HPV vaccination of their adolescent children. In the study by Mays et al, parents who rejected the vaccine at their child's current age indicated that they would favor vaccination when their child was older [24]. Furthermore, rejection of vaccination at times appeared to result from a lack of understanding the importance of conferring immunity before the initiation of sexual activity. Themes that emerged from the study by Olshen et al included the importance of pediatrician recommendations about vaccination, poor understanding of HPV, and different viewpoints on the ideal age of administration [27]. Some parents expressed concern that HPV vaccination would encourage unsafe sexual behavior, but most parents supported vaccination.

A third study evaluated HPV vaccine acceptability among parents of 10- to 15-year-old children [25]. Parents completed questionnaires before and after reading a one-page information sheet about HPV, addressing prevalence of infection, mode of transmission, and severity of sequelae. Before reading the information sheet, 55% were in favor of vaccinating their children, 23% were opposed, and 22% were undecided. After reading about HPV and HPV vaccination, acceptability of the vaccine rose to 75%. The information sheet was particularly influential with the undecided parents; 65% of these parents moved to a position in favor of vaccination after reading the information sheet. In addition, consistent with other research reports, parents identified doctors as the strongest influence in terms of decisions about vaccinating their children. In another study, 840 mailed surveys evaluating acceptability of HPV vaccination were returned by parents of 8- to 12-year-old children, with half of the parents randomized to receive a detailed information sheet on HPV infection [29]. Parents were moderately interested in HPV vaccination for preadolescent children. However, in contrast to the study described above, attitudes toward vaccination were not influenced by receipt of the information sheet. The authors did report that health beliefs, such as perceived susceptibility of the child to STI, were predictive of HPV vaccine acceptability.

Two recent articles have reported on vaccine acceptability to parents of 12- to 17-year-old children [26,28]. In one study, specific infections were not identified, but descriptions of vaccine scenarios were varied on the basis of mode

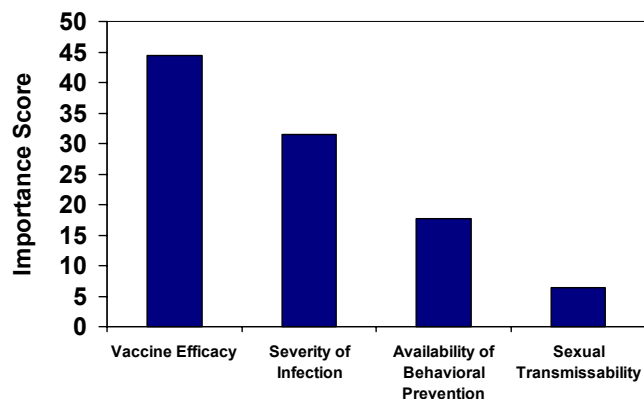


Fig. 2. Parents' most important issues regarding vaccination against sexually transmitted infections for their adolescent children. Adapted from [26].

of transmission of infection (STI, non-STI); severity of infection (curable, chronic, fatal); vaccine efficacy (50%, 70%, 90%); and availability of behavioral methods for prevention (available, not available) [26]. STI and non-STI vaccines were not rated differently and both were seen as highly acceptable, although a small percentage of parents (6%) viewed STI vaccines negatively. Parents based their ratings of vaccine scenarios primarily on severity of infection and vaccine efficacy, with the availability of behavioral prevention of infection (e.g., parents preferred vaccines that prevented infections for which no behavioral prevention was available) having a more moderate effect on parental ratings (Figure 2). These findings suggest that parents would view an efficacious HPV vaccine as beneficial for their adolescents. Furthermore, parental acceptability was the single best predictor of their adolescents' attitudes about STI vaccines, again indicating the importance to adolescents of their parents' beliefs about vaccination [28]. Concern about STI vaccination leading to unsafe sex was associated with lower acceptability, but overall acceptability was still quite high.

Taken as a whole, this series of studies suggests that the sexual transmissibility of HPV may not be a significant obstacle to parental acceptance of HPV vaccination for their children. Although parents may have some concerns that HPV/STI vaccination may lead to increases in risky sexual behavior, the majority of parents recognize that the benefits of an HPV vaccine significantly outweigh the risks. Parents are eager to protect their children from serious illnesses regardless of the source of the illness and are generally responsive to their physicians' recommendations regarding vaccination. Although one study found that a brief information-based intervention influenced parents' attitudes about HPV vaccination [25], another study found no such effect [29]. More research is needed, but it may be possible to encourage HPV vaccine acceptability among parents by providing information about the prevalence of infection, the

lack of clear prevention strategies, and the potential consequences of HPV infection.

### Health care providers

Health care providers are important sources of information and parents value physician recommendations about health-related matters, including vaccines. The success of HPV vaccination programs, therefore, will depend on physicians' willingness and ability to recommend HPV vaccines to their patients. This will undoubtedly involve developing skills to effectively communicate the advantages of vaccination to adolescents and their parents.

Three research studies have been published on health care providers' attitudes about STI vaccination. In one study, 224 nurses (predominantly pediatric nurse practitioners) rated 13 vaccine scenarios with respect to their willingness to recommend the vaccines to parents of adolescents [30]. Each scenario was uniquely defined according to patient age (11, 14, or 17 years old); infection prevented by the vaccine (mononucleosis, genital herpes, human immunodeficiency virus); gender of the patient; and whether the vaccine had been endorsed by the American Academy of Pediatrics (AAP). The mean rating across all vaccine scenarios was 72 on a 0-to-100 scale, indicating a positive disposition towards recommending vaccination. Ratings were highest for scenarios in which the adolescent patient was older and the AAP endorsed the vaccine. The type of STI and the gender of the patient did not substantially influence ratings.

In a second study using a similar methodology, 207 Fellows of the American College of Obstetricians and Gynecologists (ACOG) rated 13 HPV-specific vaccine scenarios with respect to their willingness to recommend each vaccine to patients [31]. Each scenario was uniquely defined according to patient's age (13, 17, or 22 years old); vaccine efficacy (50% or 80%); ACOG recommendation (yes or no); and disease targeted (genital warts, cervical cancer, or both). The mean rating across all vaccines was 79 on a 0-to-100 scale, indicating a fairly positive disposition towards recommending HPV vaccination. Physicians rated most highly those vaccines with ACOG approval and higher efficacy. In contrast, they were relatively reluctant to recommend vaccination for younger patients (i.e., 13-year-olds) or to recommend a vaccine that only prevented warts.

A third study examined family physicians' attitudes about adolescent HPV vaccine recommendation as a function of provider characteristics, patient characteristics, and vaccine characteristics (i.e., cervical cancer only; cervical cancer and genital warts) [32]. Participants were significantly more willing to consider vaccination of older adolescents (aged 14 or 17 compared with 11) and girls. Endorsement by professional organizations, such as the American Academy of Family Physicians (AAFP), was seen as very important. More than 90% of respondents

viewed vaccine safety and efficacy as important factors regarding recommendations.

Two common findings across these three studies were the importance of approval by professional organizations and a relative reluctance to vaccinate younger adolescents. This latter issue is one that deserves attention as HPV vaccines move toward availability, given that the ideal age for vaccination would be 13 years or younger, in order to protect the most vulnerable young adolescents and to confer immunity before initiation of sexual activity. Also, despite the clear importance of endorsements by professional organizations, these recommendations may be necessary, but not sufficient for widespread utilization of HPV vaccines by health care providers. For instance, Rupp et al [33] point to a study which found that only 21% of pediatricians in one city were immunizing infants against hepatitis B virus (HBV) despite the recommendation of the AAP for universal infant HBV immunization [34]. In addition, research over the years has documented the reluctance of health care providers to discuss sexuality with adolescent patients [35–38]. These issues will certainly need to be addressed in planning HPV vaccine campaigns.

### Other HPV issues

Genital HPV infection is the most common STI, with high incidence and prevalence rates [39–42]. HPV infections that cause warts are, from a medical standpoint, relatively benign. Furthermore, infections with high-risk, oncogenic types are usually either spontaneously cleared or regress to an undetectable level [43–45]. HPV, therefore, is a common sexually transmitted infection, but a less common sexually transmitted disease. To encourage vaccination, it is important to emphasize the risks associated with persistent infection with high-risk HPV types. Care should be taken not to increase confusion, guilt, or psychological stress [1]. In addition, HPV vaccination will not obviate the need for Pap testing because HPV vaccines offer protection against only the most common types of high-risk HPV. It will be essential to ensure that recipients of an HPV vaccine continue to get regular Pap testing [46]. This issue again serves to illustrate the importance of educating parents and adolescents about the nature of HPV infection and its relationship to women's health.

Another issue has to do with anticipating and preparing for the eventuality that a great deal of information—and misinformation—about HPV vaccination will be disseminated by media outlets, including the Internet. Much of the recent news media coverage of HPV has been incomplete and, at times, misleading [47]. In a recent commentary, for instance, Rosenthal [6] noted that a newspaper article published earlier this year suggested that parents were hesitant about the idea of HPV vaccination, despite several research studies showing great parental interest in HPV and other STI vaccines. Health care providers should be aware that

patients will come into appointments having heard about medical conditions and treatments from the media and are more likely to research medical information on the Internet [48]. A recent study found that patients who research vaccination issues on the Internet are likely to encounter sophisticated anti-vaccination Web sites [49]. In addition, press coverage of vaccination also can, at times, have an anti-immunization slant [50]. However, when media reporting on medical issues is balanced and accurate, it can be an excellent source of corrective information for patients [51]. Providers should be prepared to direct patients to accurate news and Web-based information about immunization in general and HPV infection and immunization in particular.

### Provider recommendations

The body of research described in this article should reassure physicians and other clinicians who have concerns about offering or recommending HPV vaccination to their preadolescent and adolescent patients. Women want more information on HPV for themselves and their daughters and value information provided by health care providers, suggesting that physicians will have an important role in educating adolescent patients and their parents about HPV and HPV vaccination. The research also indicates that most young women and parents feel positively about HPV vaccination for themselves and for their children. For the large majority of parents, the sexual transmissibility of HPV may be of some concern, but does not represent a significant barrier to vaccine acceptability, as their overriding concern appears to be to protect their children from harm. Parents also look to their physicians for recommendations regarding vaccination, and this is also likely to be true for any new STI vaccines.

Health care providers should anticipate that parents will have varying degrees of comfort with vaccination, including ambivalence and outright opposition [52,53]. Opposition may come from persons who are broadly anti-vaccine, as well as those who have specific concerns about an STI vaccine. Several authors discuss approaches that clinicians can use to work with parents who are against vaccination or undecided about the issue [54–57]. A common approach recommended in several articles is for the physician to initiate with parents or adolescents a discussion about what questions or concerns they might have about vaccination. Clearly, it is very important that health care providers respect parents' and adolescents' opinions about vaccination and treat their opinions seriously, even if the opinions are based on misinformation. Parents and adolescents who feel that their perspectives are taken into consideration may be more open to corrective information provided by the physician (which should include Web sites that provide accurate immunization information). This process of elicitation, listening, and respectful response enables the parent/adolescent to feel empowered by their health care provider to

make informed decisions [54]. An article published in *Pediatrics* emphasizes the importance of respectful discussion and includes excellent recommendations for how to respond to parents who oppose immunization [57].

In circumstances when HPV vaccination involves adolescent and young adult women, education about the vaccine should be included as part of comprehensive education about HPV, including the roles of Pap smears, DNA testing for HPV, and other behavioral issues (e.g., tobacco use) in maintaining women's health. Spigener and Mayeaux emphasize the importance of developing multiple strategies for delivering HPV-related information in busy office settings, including the involvement of nurse educators to elaborate on information provided by physicians as well as the provision of clear and accurate written materials [58]. Consistent with some of the patient communication methods described previously, Anhang et al discuss a "shared decision-making" approach in which the health care provider offers information and elicits reactions from the patient so that, ultimately, an informed collaborative decision can be made about HPV-related health care [59]. In a valuable study by Gilbert et al, frequently asked questions about HPV were identified, and brief, accurate answers to each question were developed [60]. These answers to common questions could readily be integrated into the shared decision-making approach described by Anhang et al or incorporated into written material.

The recent and future emergence of multiple vaccines (e.g., meningitis, pertussis, HPV) for preadolescents and adolescents provides us with a unique opportunity to provide a valuable package of preventive interventions for adolescents, which will help to keep them healthy well into their adult years. It is important, therefore, that HPV vaccination be considered within the context of a comprehensive health promotion strategy for youth. These new vaccines could be central to the establishment of a standardized well-child preadolescent health care visit and, ultimately, successful delivery of HPV vaccine will depend on widespread implementation of such a visit. Humiston and Rosenthal discuss some of the challenges associated with vaccinating adolescents and propose some potential ways to enhance vaccination rates, including system-based strategies (e.g., use of non-traditional settings for vaccine delivery), provider-based interventions (e.g., the use of standing orders), and community-directed strategies (e.g., patient reminder systems) [61].

Preventive HPV vaccines have the potential to substantially reduce HPV-associated morbidity and mortality. Ensuring widespread vaccine acceptance will require reaching out to parents and adolescents with accurate and pertinent information on both the risks of HPV-disease sequelae and the benefits of a vaccine that provides coverage for some of the most common HPV types. In addition, with the arrival of several adolescent-focused vaccines, physicians have the opportunity to offer parents a set of preventive measures

that will help to protect their children during adolescence and, importantly, will help to ensure that their children have long and healthy adult years.

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