



# IJSRM

INTERNATIONAL JOURNAL OF SCIENCE AND RESEARCH METHODOLOGY

An Official Publication of Human Journals



Human Journals

**Review Article**

March 2020 Vol.:15, Issue:1

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## Influencing Factors for Adolescents Receiving the Human Papillomavirus (HPV) Vaccine



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**Submission:** 22 February 2020

**Accepted:** 29 February 2020

**Published:** 30 March 2020



HUMAN JOURNALS

[www.ijsrm.humanjournals.com](http://www.ijsrm.humanjournals.com)

**Keywords:** HPV, vaccine, immunization, health, infection, adolescents, parents

### ABSTRACT

**Background:** Eighty percent of sexually active people have been exposed to the human papillomavirus (HPV) sometime within their lifetime. Although most infections resolve from the immune system's ability to fight infection, HPV infections that persist beyond 12 months increase the likelihood of precancerous and cancerous lesions. Many health care organizations and medical professionals advocate for this vaccine to prevent the spread of HPV infections that could potentially cause various types of cancers. The purpose of this systematic review was to determine: What are the influencing factors for adolescents receiving the HPV vaccine compared to those who do not receive the vaccine for reducing the overall risk of HPV? **Method:** This is a systematic review regarding the influencing factors for adolescents receiving the HPV vaccine for reducing the overall risk of HPV. This review examines current evidence-based research regarding the HPV vaccine. **Findings and Conclusion:** This review revealed common themes throughout the literature, which are the influencing factors for the uptake of the HPV vaccine. The identified themes were related to health care workers, parents and guardians, cancer and infection prevention, and socio-demographics.

## 1. INTRODUCTION

Vaccination is a type of immunotherapy that has been effective against many diseases. An antigen is introduced and injected into an individual's body to stimulate an immune response. One of the most dramatic advances in pediatrics has been the decline of infectious diseases during the twentieth and twenty-first century because of the widespread use of immunizations [1]. Before the development of the human papillomavirus (HPV) vaccine, there were minimal preventative measures to avoid contracting HPV. In 2006, the pharmaceutical manufacturer, Merck, released the Gardasil vaccine with claims that receiving the three-dose series will prevent HPV infections [2]. Many health care organizations and medical professionals advocate for this vaccine to prevent the spread of HPV infections that could potentially cause various types of cancers. The purpose of this systematic review was to determine: What are the influencing factors for adolescents receiving the HPV vaccine compared to those who do not receive the vaccine for reducing the overall risk of HPV?

### Background

HPV is the most common sexually transmitted disease in America [3]. The virus is transmitted by direct contact with infection or mucous membranes during oral, anal, or vaginal sex with someone who has the virus and may even be passed through open mouth kissing [3]. A speaker at a conference, the HPV Vaccine: A road to an HPV cancer-free generation stated, 80% of sexually active people have been exposed to HPV sometime within their lifetime [4]. Although most infections resolve from the immune system's ability to fight infection, HPV infections that persist beyond 12 months increase the likeliness of precancerous and cancerous lesions [4]. Since HPV can lead to cervical, throat, vulvar, vaginal, penile, and anal cancer, it is important to educate parents about protecting their child with the HPV vaccine for prevention.

Gardasil 9 is the recommended HPV vaccine approved in the United States. This vaccine protects against HPV for up to 10 years, which ensures lasting and meaningful effects [4]. Children can get the HPV vaccine when they receive other required sixth-grade vaccinations such as tetanus, diphtheria, and pertussis (Tdap) and meningococcal conjugate vaccine (MCV4). This makes it convenient for children to obtain all their vaccinations in one visit. The HPV vaccine can be given as early as nine years of age, but the first dose is scheduled between ages 11 and 12 [4]. For those who did not receive the vaccine at these ages, it can be

administered up to the age of 26 [5]. If the child starts the first dose before their 15th birthday, he or she will only need two doses. If the first dose is after the child's 15th birthday, three doses are needed [3]. The reason why children receive this vaccine at such a young age is that it is during a time when the immune system is robust. Additionally, the vaccine is given between 11 and 12 years old because it is necessary before sexual activity and exposure to HPV.

The HPV vaccine is subject to controversy nationwide. Since the HPV vaccine is not among the required immunizations for school-age children, the necessity of it is heavily debated among many parents. In 2017, 65% of adolescents aged 13 to 17 received the HPV vaccine [6] whereas in 2016 vaccination coverage was 43.4% (Shay et al., 2018, p. 2). These numbers fall short of the Healthy People 2020 goal of 80% series completion [7,8]. Parents are held responsible for whether their child receives the vaccine because adolescents are not of legal age to decide to receive the HPV vaccine on their own. A significant number of parents and guardians base their decision to vaccinate their child on negative mass and social media coverage [8]. Health care workers play a role in educating parents and adolescents on the HPV vaccine and disproving false preconceptions. As a result, health care workers can increase the HPV vaccination uptake for adolescents nationwide.

## 2. METHODS

This is a systematic review on the topic of the various influential factors regarding the uptake of the HPV vaccine by adolescents to reduce the overall risk of HPV. This review was conducted by searching PubMed, Ovid, and Cumulative Index of Nursing and Allied Health Literature (CINAHL) databases. Key terms used for research included the HPV vaccine, efficiency of the HPV vaccine, the safety of the HPV vaccine, cancer prevention with the HPV vaccine, health care workers and the HPV vaccine, parents and the HPV vaccine, and missed opportunities and the HPV vaccine. This search, using the keywords, resulted in 2,790 peer-reviewed articles (see Table 1). From the 2,790 peer-reviewed articles, an analysis was conducted and 2,750 were excluded preliminarily because they did not meet the criteria for years of publication, evidence hierarchy, and objective of research. An additional 26 peer-reviewed articles were excluded due to lack of hierarchical evidence - leaving a total of 14 articles included in this review.

**Table No. 1: Search Strategy and Limiters**

1	2	3	4	5	6
Database Searched	Date of Search	Search Strategy and Limiters	Number of Articles Found	Estimate of Relevant Articles	Articles Used
Cumulative Index of Nursing and Allied Health Literature (CINAHL)	10/01/2019	Key terms: the HPV vaccine, efficiency of the HPV vaccine, safety of the HPV vaccine, cancer prevention with the HPV vaccine, health care workers and the HPV vaccine, parents and the HPV vaccine, and missed opportunities and the HPV vaccine Limitations: Last 5 years; English; Linked full text; Peer-reviewed journals	839	20	10
PubMed	10/10/2019	Key terms: the HPV vaccine, effect of the HPV vaccine Limitations: Last 5 years; English; Linked full text; Only humans; Peer-reviewed	1,937	5	3
Ovid	10/12/2019	Key terms: Missed opportunities and the HPV vaccine Limitations: Last 5 years; English; Linked full text; Peer-reviewed journals	14	2	1

**Relevant Articles Chosen**

The levels of evidence hierarchy used for nursing literature, with 1 as the highest and 7 as the lowest, were utilized to rank the quality and strength of evidence (see Figure 1). Level one of

the hierarchies contain the strongest evidence whereas level seven contains the weakest evidence [9]. Although the majority (12 out of 14) of the articles were included from the top four tiers, two articles were included from the sixth tier because the articles discussed accurate, current, and evidence-based research to support the main topic of this review.

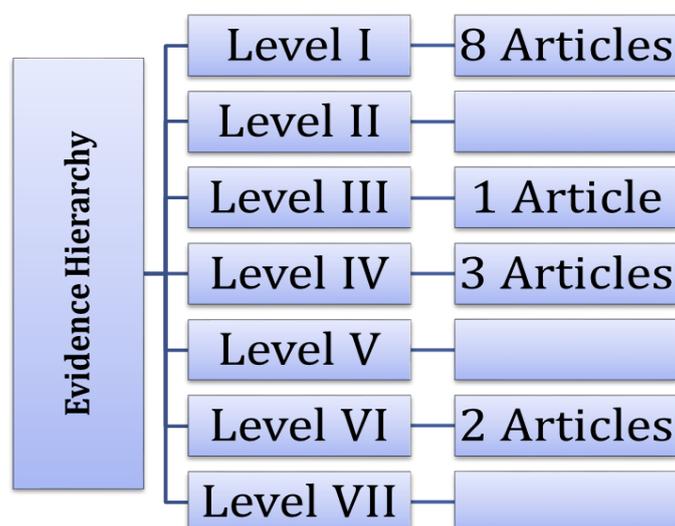


Figure No. 1: Level of evidence for articles used in the study

Note. For the level of evidence, 1 is the highest and 7 is the lowest

### 3. RESULTS

Through completing this systematic review, the literature gathered indicated similar themes. The themes were related to different factors and influences on whether adolescents will receive the HPV vaccine or not. The identified themes that relate to the uptake of the HPV vaccine are health care workers, parents and guardians, cancer and infection prevention, and socio-demographics. The themes are shown in Figure 2.

#### Influence of Health Care Workers on the HPV Vaccine

Health care workers influence parents and legal guardians' decisions to consent for adolescents to receive the HPV vaccine [6-8, 10]. Many health care providers encourage adolescents to receive the HPV vaccine, while others do not. Roncancio et al. [7] interviewed mothers of adolescent boys between the ages of 11 and 17 years and the responses indicated that doctors were viewed as supporters by recommending the HPV vaccine. Ng et al. [10] gathered similar findings during a comparison of HPV-vaccinated adolescents with private insurance versus those with Medicaid. While gathering data, Ng et al. [10] discovered

clinician recommendation greatly influences parental acceptance. Health care workers can utilize their knowledge of the HPV vaccine to influence the decisions of parents.

Talking to parents about the HPV vaccine can sometimes be challenging for health care workers, especially when parents are hesitant to vaccinate their children. Shay et al. [8] audio-recorded visits to examine how parents verbally expressed hesitancy toward the HPV vaccine, providers' responses to parental hesitancy, and same-day vaccination. The study indicated that when providers responded with persistence and emphasized the importance of the vaccine, 17 out of the 18 were vaccinated that day [8]. On the other hand, when providers responded with reluctance, none of the adolescents were vaccinated. Thus, parental expressions of hesitancy may present a critical opening for providers to respectfully engage parents, endorse the HPV vaccine, and address questions and concerns [8]. Provider support in the clinical setting has a major impact on adolescent HPV vaccination uptake.

To further explore the impact of health care provider interactions, Stout and Martins [6] examined a clinical case report that resulted in a missed opportunity to immunize an individual. A 31-year-old homosexual male presented to the doctor with complaints of a painful lump on his neck and nasal congestion. The patient was later diagnosed with oropharyngeal squamous cell carcinoma confirmed with the HPV genotype 16 involvement. Since the doctor did not explore the patients' health history and sexual orientation, the patient was not identified as someone who is at high risk for developing HPV. This scenario illustrates how all visits to the primary care provider are opportunities to engage in education and make recommendations for the HPV vaccine [6]. Despite the purpose of doctor appointments, health care workers should prioritize immunization status and needs at every visit. The disease outcome of this individual could have been prevented if the HPV vaccine was recommended before the patient encountered the virus.

### **Influence of Parents/Guardians Regarding the HPV Vaccine**

Adolescents are not of legal age to make various health care decisions, which includes receiving the HPV vaccine. As a result, parents and legal guardians influence decisions regarding the HPV vaccine [7, 11, 12]. Parents and legal guardians are held responsible for deciding whether their child receives the HPV vaccine. The decision to vaccinate against HPV is based on multiple factors, such as personal beliefs and opinions.

In a qualitative analysis, Roncancio et al. [7] identified the mother's positive attitudes toward their son receiving the HPV vaccine, which were good, happy, at ease, secure, protection, prevention, vaccine good for his health. These positive attitudes influenced their decision to accept the vaccine for their child. Similar to these findings, Erves et al. [11] concluded that perceived benefits of adolescent clinical trial participation, ease of understanding clinical trials, and trust in medical researchers were positively associated with greater parental willingness of adolescent participation. This information suggests that parents and guardians are more likely to get their children vaccinated when they take an action based on factual information.

On the other hand, in a systematic review, Loke et al. [12] revealed that parental influence can also be a barrier to the HPV vaccination. The following statement is a direct representation of concerns expressed by parents and guardians: Many parents believed that their children were at low risk of contracting an HPV infection. Others felt that their children were too young to be sexually active or believed they were sexually inactive and regarded the HPV vaccination as unnecessary [12].

While this may be the case for some children, not every parent knows their child's sexual encounters. Another concern among parents is that if their child receives the HPV vaccine, the child would feel that it is appropriate to engage in sexual activity, believing that they were protected from contracting STIs. However, there is no association between vaccination and children becoming sexually active.

A common misconception among parents is that male adolescents do not need the vaccine; however, the vaccine prevents penile, anal, and throat cancer in males [4]. Roncancio et al. [7] claimed, vaccinating all eligible males is especially important given the rise in the incidence of HPV-caused oropharyngeal cancer in the United States and the fact that the incidence of this type of cancer is higher among males. The advocacy of male adolescents receiving the vaccine is less known compared to females, but males are advised to receive the vaccine as well.

Individuals who are considering the HPV vaccine might opt-out of receiving it due to the parental belief of it being unsafe. In a study on the safety, tolerability, and side effects of the HPV vaccine, the administration of the HPV vaccine has been well-tolerated in different groups [13]. Most subjects reported a low rate of adverse effects. This research supports that

the occurrence of adverse effects from the HPV vaccine is less common and includes mild reactions such as headache, fatigue, and injection site pain and swelling [13].

Several parents are reluctant to vaccinate their children because they believe the vaccine is linked to infertility. However, getting vaccinated helps protect against cervical cancer and can help ensure a woman's ability to get pregnant and have healthy babies [14]. Overall, parent concerns about the HPV vaccine greatly influence their decision to vaccinate.

### **Effects of the HPV Vaccine on Cancer/Infection Prevention**

The intended effect of the HPV vaccine, to protect against HPV infections and different forms of cancer, is the main reason individuals want to receive the HPV vaccine [15-17]. Machalek et al. [17] discovered the impact of herd immunity. In this study, females received the HPV vaccine to prevent the spread of HPV infections. There was an overall decrease in HPV infections in both males and females because the females were protected from the virus. This decreased the spread of HPV infections to unvaccinated men. The claim regarding infection prevention benefits of the HPV vaccine is evident in this study.

In addition to infection prevention, the HPV vaccine is effective in preventing the development of different types of cancer. Arbyn et al. [15] conducted 26 randomized controlled trials with 73,428 subjects. In this study, the benefits outweigh the risks of vaccination regarding the reduction of precancerous lesions caused by the HPV. The effectiveness of the HPV vaccine in reducing the occurrence of cancer is highlighted in this study.

Harder et al. [16] examined the effect of cancer prevention in men after receiving the HPV vaccine. The HPV vaccine provided moderate protection against anogenital cancers in men involved in the study. Harder et al. stressed the importance of early vaccination of boys to establish ideal vaccine-induced protection before the onset of sexual activity. Vaccinating adolescents is recommended at a younger age before the child becomes sexually active. If the individual postpones getting the HPV vaccine and they are sexually active, there is a risk that the individual has already come in contact with the virus. As a result, the HPV vaccine will not be as effective. The body can fight off the infection better if the individual receives the HPV vaccine before sexual activity.

In another study, Chaturvedi et al. [18] discussed the wide range of medical benefits that come from receiving the HPV vaccine. The intended effect of the HPV vaccine is the prevention of genital warts (caused by HPV types 6 and 11) and cervical, anal, vulvar, and vaginal precancers and cancers in females and genital warts and anal precancer and cancer in males [18]. These are the most common types of cancer the HPV vaccine is designed to prevent.

### **Sociodemographics Related to the HPV Vaccine**

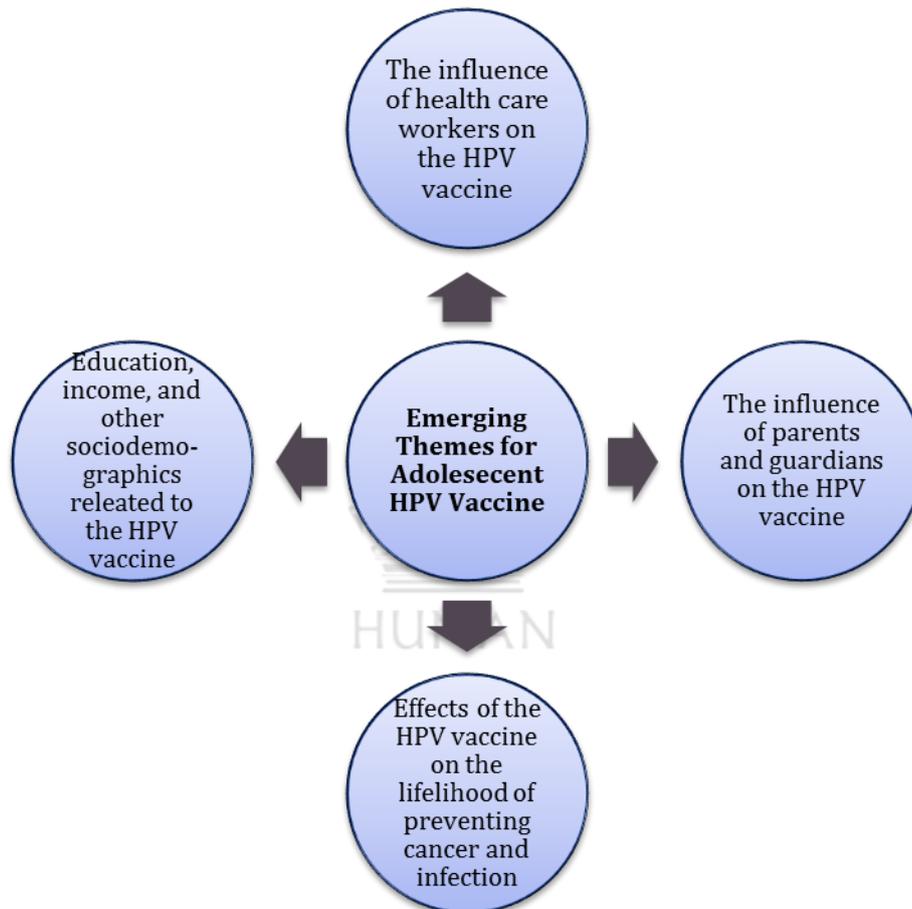
An adolescent's sociodemographic background has an impact on receiving the HPV vaccine [7,12,19-21]. Comparisons can be seen between categories of ethnicity, marital status, education level, and income. Guo et al. discovered that a higher trend of individuals who received the HPV vaccine are Caucasian, unmarried, and received additional schooling past high school. Adolescents within one of these categories have a greater likelihood of receiving the HPV vaccine.

Along with ethnicity, marital status, and education level, the income also has an impact on the decision for adolescents to receive the HPV vaccine. For some, the income and other helpful influences had a positive correlation to vaccine completion which includes health insurance, transportation, scheduling vaccine appointments, and vaccine reminders [7]. On the other hand, barriers Roncancio et al. [7] discovered that were related to the income were those who did not have health insurance or could not afford the vaccine. Loke et al. [12] explained that the cost and affordability of the vaccine can be a great hindrance to many families, stating that the HPV vaccine is expensive for low-income families, costing US \$130 per dose and \$390 for the full series. These facilitators and barriers are sociodemographic factors that impede whether adolescents receive the HPV vaccine or not.

Walling et al. [21] conducted a study to identify strategies to improve HPV vaccine coverage. One of the interventions was providing HPV vaccine education to low-income families. This strategy resulted in higher rates of series completion compared with preintervention (58% vs 42%) [21]. Additionally, Franco et al. [19] explained that states with sex education policies and HPV vaccine mandates were shown to have higher rates of completion. Overall, a greater strive to educate about the vaccine has been shown to increase vaccine uptake and compliance.

## Summary of Findings

Multiple research findings were utilized to examine influencing factors on adolescent HPV immunization. The purpose of this systematic review was to compare the impact health care workers, parents and guardians, cancer and infection prevention, and socio-demographics have on adolescents receiving the HPV vaccine (see Figure 2). After analyzing these themes, it is evident that each topic has an impact on HPV vaccine acceptance.



**Figure No. 2: Emerging Themes: Influencing factors for adolescents receiving the HPV vaccine**

Using the level of the hierarchy [9], the evidence used in the development of research regarding the HPV vaccine primarily came from level one. Additionally, levels three, four, and six were utilized in conducting research. The evidences used were meta-analysis, systematic reviews, current practice guidelines, controlled trials without randomization, cohort studies, case-controlled studies, and single qualitative studies. Adolescents and young adults, appropriate candidates for the HPV vaccine, were included in these studies.

Overall, the research findings examine factors influencing adolescents receiving the HPV vaccine. Health care providers are often the initial informants to discuss the HPV vaccine with adolescents and parents. By reviewing multiple studies, it is evident that health care providers have an impact on the HPV vaccine acceptance among adolescents. Additionally, parents and guardians have a role in adolescents receiving the HPV vaccine because they must give consent for it. Another factor that impacts the HPV vaccine acceptance is the intended effect of the vaccine, which is infection and cancer prevention. There is a relationship between sociodemographic information and adolescents receiving the HPV vaccine. These overarching themes all have an impact on the administration of the HPV vaccine.

#### **4. DISCUSSION**

By considering the study question, there is a decision for practice based on the research findings through the compilation of this paper. There are strengths, weaknesses, gaps, and recommendations to change practice regarding the topic. These concepts are discussed in detail below.

##### **Strengths**

This systematic review included strengths and weaknesses while computing the research. Some strengths include the vast amount of research available for the HPV topic. With the significant amount of current and updated research available, more accurate decisions about a change in practice can be formed. Another strength includes the variety of research found, such as meta-analysis, systematic reviews, current practice guidelines, controlled trials without randomization, cohort studies, case-controlled studies, and single qualitative studies. This wide range of research offers different perspectives, input about the HPV vaccine topic, and evidence-based practice.

##### **Weaknesses**

Although there were strengths in this study, weaknesses were discovered through the development of the literature review. The minimum support for the opposing side of receiving the HPV vaccine is a weakness of this study. For instance, opinions regarding those who are against the HPV vaccine were not heavily debated. Other weaknesses include studies that did not include the perspectives of adolescents when regarding the decision to vaccinate.

The autonomy of the adolescent receiving the vaccine was not considered a factor in this review. If further research were to be conducted, these weaknesses would aid in creating a more conclusive study.

### **Recommendations**

To bridge the gap, further studies could be conducted to gather additional data to make more accurate conclusions regarding the influencing factors of the administration of the HPV vaccine among adolescents. Pilot studies in the health care system could also be beneficial. By considering the various themes discussed in this review and the many factors that consist of following through with the HPV vaccine administration, a change in the fundamental constructs would make an impact. The ideas that would influence a change in practice include health care workers providing accurate information regarding the vaccine and considering sociodemographic factors. One of the most common sociodemographic factors that impede receiving the HPV vaccine includes the cost. By reducing the cost and allowing greater financial coverage for the vaccine, this would likely increase the opportunity for more individuals to receive the vaccine.

Several strategies can be used to help a hesitant parent decide to vaccinate their children. Health care workers should give a high-quality recommendation. The recommendation should also be strong and persuasive while still honoring the parent's right to choose. The HPV vaccine could be given on the same day as the visit rather than delayed. When an undecided parent presents in the office, the doctor may recommend that the family go home and think about their decision. As a result, the delay tactic can be a missed opportunity.

The action that nurses should take regarding enhancing their profession is making parents feel empowered to make informed decisions about vaccination. In many cases, the reason why parents avoid vaccinating their children is due to the lack of communication in the clinical setting. Health care workers are in a position to help parents decide to vaccinate their children. When the recommendation is influential, families are more likely to vaccinate their children, and as a result, prevent many diseases. Chaturvedi et al. [18] support the requirement for vaccination use. Vaccination may be necessary, and nurses can be central to the reduction of several cancers by encouraging extensive use of the HPV vaccine for both males and females [5].

## 5. CONCLUSION

In conclusion, studies show there are varying influencing factors regarding adolescents receiving the HPV vaccine. The influencing factors that were identified as major themes are health care workers, parents and guardians, cancer and infection prevention, and socio-demographics. Based on the benefits of receiving the HPV vaccine, individuals who do not receive the vaccine are not gaining protection from HPV-related cancers and infection compared to those who receive the vaccine. Health care workers are influential by educating, recommending, persuading, or discouraging the administration of the vaccine. Parents and guardians base their decision on various ideas, beliefs, and preconceptions about the vaccine. Cancer and infection prevention efforts are the main purpose of the HPV vaccine and impact the decision to vaccinate adolescents. Socio-demographics such as ethnicity, marital status, education level, and income can alter the willingness to vaccinate. All these factors have an impact on whether adolescents received the HPV vaccine or not.

Recommendations for practice to promote the administration of the HPV vaccine include education of factual information to parents and guardians in the health care setting. Another recommendation to change practice is considering the cost of the HPV vaccine by making it more affordable to lower-income families. Not only do health care providers offer accurate education about the HPV vaccine, but nurses can play an important role in advocating its use.

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