

## RESEARCH ARTICLE

# Parental Decision Making Regarding Vaccination of their Children Against HPV

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## KEYWORDS:

Adolescent Medicine

Cervical Cancer

Genital Warts

Human Papilloma Virus

Vaccination

**Objective:** To determine which factors contribute to parental decision making in order to increase childhood vaccination rates against HPV.

**Methods:** An IRB-approved survey was placed in the four Rowan University School of Osteopathic Medicine Family Medicine offices asking parents of children age 18 or younger to complete it. Questions focused on the age and gender of their children, their knowledge of the HPV vaccine, whether they have or will vaccinate their children if they do not intend to vaccinate their children why not, and the best way for them to obtain information about the vaccine. Results were analyzed using Fisher's exact test.

**Results:** 40 surveys were completed and returned. Subjects included 32 female and 8 male parents with a variety of ethnicities, levels of education, religions and current ages. Overall, 72.5% of parents with at least one daughter and 65% of parents with at least one son either had or intended to vaccinate them against HPV. Physician discussion of the vaccine did not significantly impact vaccination decisions in parents with daughters, but it did impact vaccination decisions for parents with sons. Eighty percent of parents that received physician education vaccinated or intended to vaccinate their sons. In comparison, only fifty percent of parents who did not receive education from their physician vaccinated or intended to vaccinate their sons.

**Conclusion:** Data collected suggested that physician education may increase parental decision to vaccinate their sons against HPV, but does not have impact on whether parents will vaccinate their daughters.

## INTRODUCTION

Human Papilloma Virus (HPV) is a DNA virus, which affects the skin and mucosa of humans. There have been 170 different strains of this virus identified and good portions of these strains are transmitted through sexual contact including vaginal, anal and oral intercourse.<sup>1</sup> HPV can often be subclinical and show no symptoms, however it can also cause genital warts, cervical cancer, vulvar cancer, vaginal cancer, penile cancer, anal cancer and oropharyngeal cancer.<sup>1,2</sup> Specifically HPV 6 and 11 cause genital warts and HPV 16 and 18 cause cervical cancer.<sup>2</sup>

Human papilloma virus is the most common sexually transmitted disease, which affects 79 million Americans. Every year 14 million people become newly infected and most men and women have had at least one strain in their lifetime. Genital warts affect 360,000 people each year and 11,000 women are diagnosed with cervical cancer annually.<sup>2</sup>

The Human Papillomavirus Quadrivalent Vaccine (HPQV) is a vaccine that prevents against HPV strains 6,11, 16 and 18 and is commercially available as *Gardasil*<sup>®</sup>.<sup>3</sup> The US FDA approved the use of HPQV for females ages 9-26 years old in 2006 and then approved its use for males age 9-26 years old in 2009. The CDC recommends that the vaccine be administered in ages 11-12 for both males and females.<sup>2</sup> The vaccine is recommended up to age 26 in females who have not been previously vaccinated and age 21 in males who have not been previously vaccinated. Males age 22-26 may be vaccinated as well.<sup>4</sup>

Recently, a nine valent HPV vaccine has been released and the age recommendations are the same as for HPQV, however it covers five more strains than the HPV.<sup>2</sup> The nine valent HPV vaccine prevents against HPV strains 6, 11, 16, 18, 31, 33, 45, 52 and 58<sup>5,6</sup> and is commercially available as *Gardasil*<sup>®</sup>9.<sup>6</sup> Before the nine valent vaccine release, vaccination against HPV was preventing 70% of cervical cancers, likely due to the immunities to HPV strain 16 and HPV strain 18, which have been identified as major causes of cervical dysplasia. By increasing the amount of HPV strains protected against in the nine valent vaccine, it is estimated to prevent against 90% of cervical cancers as opposed to the previous 70%. In a direct comparison between the quadrivalent

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HPV vaccine and nine valent HPV vaccine, the efficacy of the nine valent vaccine was 96.7% for preventing cervical diseases caused by HPV 31, 33, 45, 52 and 58 and the nine valent vaccine was noninferior to the quadrivalent vaccine in producing an antibody response to HPV 6, 11, 16 and 18.<sup>5</sup>

Previously the HPV vaccine required three doses, but in 2016, the Advisory Committee on Immunization Practices updated the guidelines to include a two-dose option. For patients who receive their first dose of the HPV vaccine before the age of 15, only two doses of the vaccine are required and the second dose can be administered 6-12 months after the first dose. Once the patient turns 15 years old, three doses of the HPV vaccine should be administered with the second dose administered 1-2 months after the first dose and the third dose administered 6 months after the first dose.<sup>7</sup>

Despite the release of these vaccines, in 2016, only 65.1% of teenage girls were vaccinated with at least one dose of the HPV vaccine and only 49.5% had completed the HPV vaccination series. Vaccination rates are even lower in males. Only 56.9% of teenage males were vaccinated with at least one dose of the HPV vaccine and only 37.5% had completed the HPV vaccine series.<sup>8</sup> Due to these low vaccination rates, many studies have looked at reasons why the vaccination rates are so low and ways to improve vaccination rates.

A recent study debunked many misconceptions about the HPV vaccine, by showing that although many parents have fears of increased sexual activity or risky sexual behavior post vaccination, there is no evidence that this occurs. Another misconception discussed in the article was that the vaccine was new and safety was questionable, but the evidence does not support this claim either. They also discuss the major factor contributing to low vaccination rates is the failure of physicians to recommend the HPV vaccine. They concluded that in order to achieve higher rates of vaccination, they will need to focus on education of parents about the safety and efficacy of the vaccine, as well as educating health care providers on the indications for the vaccine and how to best communicate with parents the benefits of the vaccine and the possible risks related to not vaccinating their child.<sup>9</sup>

Another study about parental awareness of HPV vaccines compiled data from the National Health Interview Survey and looked at parents who had children age 8-17. The study found that 62.6% of US parents had heard of the vaccine. They also found that the factors of the parents that increased awareness were female gender, white race, English speaking, higher education, higher income, married and more educated. They also showed that children who had better access to preventive pediatric care were more likely to be vaccinated. The study concluded that the key to greater vaccination rates would be increased parental awareness through improving access to preventative health care for children.<sup>10</sup>

Similarly, a recent study used a survey questionnaire to evaluate parental acceptability of the HPV vaccine in Mysore, India where annually a large amount of women are being newly diagnosed with cervical cancer and dying from cervical cancer that the HPV vaccine could help decrease significantly. The survey showed 71% of parents were willing to vaccinate their daughters and was

highest in people who felt the vaccine was safe, a good way to protect against cervical cancer and who believed cervical cancer to be a serious disease. Based on these results, they concluded that the safety of the vaccine and proven benefits in regards to cervical cancer should be emphasized to promote increased vaccination rates.<sup>11</sup>

It has been shown that educating parents with easy to understand materials, which highlight the benefits of HPV vaccination, as well as building trust with the parents will increase parental consent for their adolescents to participate in clinical HPV trials.<sup>12</sup> This data could lead to inferences that if parents are willing to let their children participate in a clinical trial on the HPV vaccine, they may be more willing to allow them to actually receive the vaccine. Also, by increasing the amount of research on the vaccine performed on adolescents, the intended recipient of the vaccines, we have more evidenced based education for parents to discuss with physicians, which help them decide whether or not to vaccinate their children.

Lastly, it has been shown that with an increase of parental HPV vaccine awareness from 72% to 77% over a four-year period, HPV vaccination rates of daughters increased from 25% to 48% in Los Angeles County.<sup>13</sup> Based on this data, it would support a hypothesis that improved parental education would increase vaccination rates and that current vaccination rates are lower than they should be due to lack of awareness of the vaccine and its benefits.

## METHODS

An IRB-approved anonymous survey was distributed in all Rowan University School of Osteopathic Medicine Family Medicine offices at the front desk asking parents of children age 18 or younger to complete it. Family Medicine has four office locations that have patients from a variety of ethnic backgrounds, socio-economic statuses and insurance types. Inclusion criteria were adults who were able to read English with children under 18 years old. Exclusion criteria were adults who did not have children or could not read English, as the survey was only available in the English language. The consent was explained on the survey and was implied by the participant completing the survey. Results were analyzed using Fisher's exact test. Demographic information was elicited from study participants including gender, age, religion, education status, and marital status. Additional questions focused on the age/gender of their children, if the children were vaccinated in general, parental knowledge of the HPV vaccine, whether parents have or intend to vaccinate their children for HPV, reason parent will not vaccinate their children and the parent's preferred way to obtain information about the HPV vaccine. [www.acofp.org/acofpimis/acofporg/PDFs/OFP/HPVsurvey.pdf](http://www.acofp.org/acofpimis/acofporg/PDFs/OFP/HPVsurvey.pdf).

## RESULTS

Forty surveys were completed and returned. Subjects included 32 females and 18 males with a variety of ethnicities, levels of education, marital status, religion and current age. (Table 1, see page 18)

Overall, 72.5% of parents with at least one daughter and 65% of parents with at least one son either had or intended to vaccinate

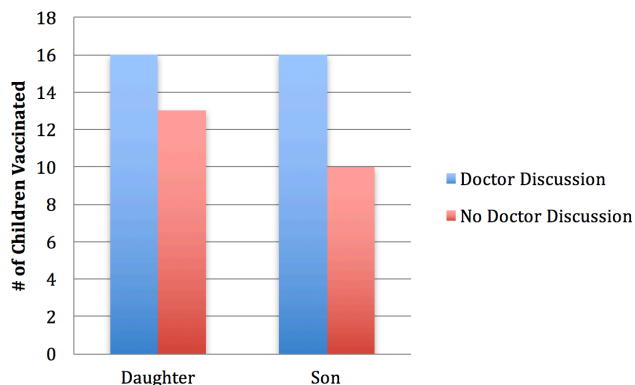
**TABLE 1:**  
Demographic Information of Parents

Characteristic	No. (%)
Gender	n=50
Male	18 (36%)
Female	32 (64%)
Age	n=40
21-25 y.o.	3 (6%)
26-30 y.o.	2 (4%)
31-35 y.o.	4 (8%)
36-40 y.o.	17 (34%)
41-45 y.o.	7 (14%)
46-50 y.o.	4 (8%)
No response	10 (20%)
Race	n=40
Caucasian	28 (56%)
Black	5 (10%)
Asian	1 (2%)
Hispanic	5 (10%)
Other	1 (2%)
No response	10 (20%)
Religion	n=40
Christian	15 (30%)
Catholic	15 (30%)
Muslim	2 (4%)
Other	5 (10%)
None	3 (6%)
No response	10 (20%)

them against HPV. Parents who indicated they had a discussion with a physician about the vaccine did not correlate with an increase in vaccination rates in parents with at least one daughter; however, it did correlate with an increase in vaccination rates for parents with at least one son. Eighty percent of parents that received physician education vaccinated or intended to vaccinate their sons (16 parents vaccinated their sons out of the 20 parents who received education by a physician). In comparison, only fifty percent of parents who did not receive education from their physician vaccinated or intended to vaccinate their sons (10 parents vaccinated their sons out of the 20 parents who did not receive education from their physician). ( $p=0.048$ ). (Figure 1)

Vaccination preference was not significantly impacted by other factors such as parental age, education status, race/ethnicity or

**FIGURE 1:**  
Vaccination Rates With and Without Physical Education



religion. Most participants were knowledgeable about the HPV vaccine and the majority felt that a doctor was the appropriate place to get information about the HPV vaccine; however, this knowledge did not correlate with an increase in vaccination rates within this sample size. Other reasons for not vaccinating your child besides lack of education or not having enough information on the vaccine were evaluated such as feeling the vaccine is not safe, feeling the vaccine is not needed for their child, concern that vaccination will change their child’s sexual activities and in general not believing in vaccines. These other beliefs, while evaluated in the survey, did not significantly correlate with a reason for decreased vaccination rates.

**CONCLUSION/DISCUSSION**

Survey data collected suggested that physician education may increase parental decision to vaccinate their sons against HPV, but has no significant impact on whether parents will vaccinate daughters. Other factors such as religion, concerns about safety of the vaccine, and worries that the vaccination will increase earlier and risky sexual behavior had no statistically significant impact on parental decision making regarding the HPV vaccine. Participants were knowledgeable about the HPV vaccine and the majority felt that a doctor was the appropriate place to get information about the HPV vaccine, however this knowledge did not show a significant increase in vaccination rates in our sample size. Lack of parental education may be decreasing vaccination rates in parents with sons.

In regards to parents with daughters, more investigation is necessary. In the US, females are vaccinated at higher rate likely due to multiple factors such as the vaccine was approved and marketed to females first and marketing is focused on a female disease of cervical cancer, but our study demonstrated an increase in vaccination among male children after parental education about the vaccine from their physician. These results bring up various questions such as if parents are truly well educated and informed about the HPV vaccine and that it can prevent cervical cancer, why are they not vaccinating their daughters at a 100% rate? Are there other barriers to vaccination that need further investigation?

While this study did not have a large sample size, it does provide ideas and groundwork for future studies. This study did not look at HPV vaccine series completion, just vaccination rates, which is an important area to evaluate in the future. Physician education and parental awareness may lead to increase in vaccine rates, but studies are lacking about whether it will increase the rates of vaccine series completion. Another area for future evaluation would be to examine how physicians are educating parents and which strategies may be more effective to increase vaccination rates. Physician educational efforts were not evaluated in this study, but the parents simply indicated whether their physician had discussed the vaccine with them or not. Finally, in our study we just had parents list how many sons and daughters they had and did not differentiate between families with only sons, only daughters or a combination of the two, but in the future it would

be interesting to study if there is any significant difference of vaccination rates among the groups.

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## AUTHOR DISCLOSURES:

No relevant financial affiliations

## REFERENCES:

1. Harper DM, Demars LR. Primary Strategies for HPV Infection and Cervical Cancer Prevention. *Clinical Obstetrics and Gynecology*. 2014;57(2):256-278.
2. Genital HPV Infection- Fact Sheet. <http://www.cdc.gov/std/hpv/stdfact-hpv.htm>. Published July 17, 2017. Accessed September 17, 2017.
3. U.S. Food and Drug Administration-Gardasil. <http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/UCM094042.htm>. Published June 15, 2017. Accessed September 17, 2017.
4. Kao CM, Schneyer RJ, Bocchini JA. Child and adolescent immunizations: selected review of recent US recommendations and literature. *Current Opinion in Pediatrics*. 2014;26(3):383-395.
5. Joura EA, Giuliano AR, Iversen O-E, et al. A 9-Valent HPV Vaccine against Infection and Intraepithelial Neoplasia in Women. *New England Journal of Medicine*. 2015;372(8):711-723.
6. U.S. Food and Drug Administration-Gardasil 9. <https://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm426445.htm>. Published February 15, 2018. Accessed February 18, 2018.
7. Meites E, Kempe A, Markowitz LE. Use of a 2-Dose Schedule for Human Papillomavirus Vaccination — Updated Recommendations of the Advisory Committee on Immunization Practices. *MMWR Morb Mortal Wkly Rep* 2016;65:1405–1408. DOI: <http://dx.doi.org/10.15585/mmwr.mm6549a5>
8. Walker TY, Elam-Evans LD, Singleton JA, et al. National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years — United States, 2016. *MMWR Morb Mortal Wkly Rep* 2017;66:874–882. DOI: <http://dx.doi.org/10.15585/mmwr.mm6633a2>.
9. Zimet GD, Rosberger Z, Fisher WA, Perez S, & Stupiansky NW. Beliefs, behaviors, and HPV vaccine: Correcting the myths and misinformation. *Preventative Medicine*. 2013;57(5):414-418.
10. Wisk LE, Allchin A, Witt WP. Disparities in Human Papillomavirus Vaccine Awareness Among US Parents of Preadolescents and Adolescents. *Sexually Transmitted Diseases*. 2014;41(2):117-122.
11. Madhivanan P, Li T, Srinivas V, Marlow L, Mukherjee S, Krupp K. Human papillomavirus vaccine acceptability among parents of adolescent girls: Obstacles and challenges in Mysore, India. *Preventative Medicine*. 2014;64:69-74.
12. Erves JC, Mayo-Gamble TL, Hull PC, Duke L, Miller ST. Adolescent Participation in HPV Vaccine Clinical Trials: Are Parents Willing. *Journal of Community Health*. 2017;42(5):894-901.
13. Nonzee NJ, Baldwin SB, Cui Y, Singhal R. Disparities in parental human papillomavirus (HPV) vaccine awareness and uptake among adolescents. *Vaccine*. 2018;36(10):1243-1247.