

**Parental Attitudes Regarding HPV Vaccination of  
Pre-Adolescent and Adolescent Females in Arizona**

“A Thesis submitted to the University of Arizona College of Medicine Phoenix  
in partial fulfillment of the requirements for the Degree of Doctor of  
Medicine”

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**Dedication** – For my son – may I make this world a better place for you.

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## **Abstract**

*Background* – HPV (human papillomavirus) is considered to be the most pervasive sexually transmitted disease among sexually active young adults in the U.S. and is responsible for approximately 90% of cervical cancers worldwide. In 2006, the FDA (Federal Drug Administration) licensed the first HPV vaccine for use in girls aged 9 to 26; however, evidence shows that vaccine uptake rates among adolescent females remains to be low throughout the country.

*Objective* – To assess parental attitudes and beliefs regarding HPV and HPV vaccination of pre-adolescent and adolescent females in order to identify factors that affect intent to vaccinate.

*Methods* – A questionnaire instrument was distributed to parent members of the AZPTA (Arizona Parent-Teacher Association) and the general internet population in Arizona from March 2010 to August 2010.

*Results* – Of the eligible respondents, 61.1% expressed intent to vaccinate their daughter(s) with the HPV vaccine. Approximately 92% of parents who did not intend to vaccinate their daughter(s) had completed some or all of a post-secondary education. Parents who believed that the HPV vaccine promotes earlier sexual debut (33.3% vs. 68.8%), unsafe sexual behavior (40.0% vs. 73.5%) and sexual promiscuity (25.0% vs. 74.0%) showed significantly less intent to vaccinate with the HPV vaccine than parents who did not believe that the HPV vaccine promotes high-risk sexual activity. 75% of parents were aware that HPV causes cervical cancer and is transmitted by sexual contact; however, 75% of parents answered incorrectly to other HPV knowledge questions. Parents who believed that vaccinations, in general, are unsafe universally did not intend to vaccinate with the HPV vaccine.

*Conclusions* – Barriers to HPV vaccination included parental aversion to vaccinations, miseducation or lack of education about human papillomavirus infection, belief that vaccination will encourage risky sexual behavior among teenagers and concerns regarding efficacy and safety of the HPV vaccine. Efforts to educate parents regarding these concerns may result in increases in vaccination coverage.

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## Introduction

### *Background*

HPV is a sexually transmitted infection that affects the anogenital tract and can manifest as cervical, vulvar, vaginal, anal, penile and oropharyngeal cancers as well as genital warts in both men and women. Globally, cervical cancer continues to be one of the most common cancers in women. Transmission of HPV has been shown to occur during genital, anogenital and oral contact in both female-to-male and male-to-female directions as well as between the genital and hands occasionally resulting in self-inoculation<sup>[1][2]</sup>. There have been more than 120 strains of HPV isolated with greater than 40 demonstrating active infection of the anogenital tract and surrounding mucosal tissues<sup>[3]</sup>. The majority of newly acquired HPV infections are latent, producing no symptoms, and resolved spontaneously in less than 2 years with a median duration of infection of 8 months<sup>[4]</sup>. Because of the transient and latent nature of HPV infections, national surveillance of the disease is challenging.

Human papillomavirus is now recognized as the most pervasive sexually transmitted disease (STD) among sexually active young adults. It is currently estimated that 75% of people of reproductive age are, or have previously been, infected with genital strains of HPV<sup>[5]</sup>. However, because of inconsistent screening, lack of standard interpretation of recently developed diagnostic tests, and widespread prevalence of unidentified latent infection, there are no case-based estimates of the national prevalence of HPV infection. HPV infection is not a reportable condition at the national, state or county level; therefore, obtaining data on the prevalence of infection in different populations throughout the United States is problematic. In 2006, data from the 2003-2004 National Health and Nutrition Examination Survey (NHANES) reported that 26.8% of females aged 14-59 tested

positive for prevalent HPV infection during 2003 – 2004 using polymerase chain reaction (PCR)<sup>[6]</sup>. These numbers, however, do not include past transient or previously treated HPV infections within the population as current screening techniques are only capable of identifying active infection. Therefore, the reported numbers may prove to be a gross underestimation of the total burden of HPV infection nationally. Among the total prevalence of HPV infection, the greatest burden lies in the population of females aged 20-24 with a significant increase in risk with each additional year of age from 14 to 24<sup>[6]</sup>. Currently reported data demonstrates an HPV prevalence rate of 0-73% in the genital tract of healthy males within the United States, a large range that is likely a result of difficult screening techniques and the transient nature of HPV infections<sup>[7]</sup>.

In line with national standard, HPV infection is not a reportable condition within Arizona<sup>[8]</sup>. For this reason, there are no reliable data measuring the total prevalence of HPV infection throughout the state. However, it can be expected that the prevalence of HPV infection within Arizona does not deviate significantly from the nationally reported prevalence of HPV infection measured by NHANES.

### *Significance*

In 2006, the Food and Drug Administration (FDA) approved the first vaccine protective against HPV (HPV4; Gardasil – Merck & Co, Inc). It is directed against four types of human papillomavirus (types 6, 11, 16 & 18). The four strains of HPV included in the vaccine have been shown to cause over 90% of genital warts (types 6 and 11) and approximately 70% of cervical cancers (types 16 and 18). In 2009, a second HPV vaccine was licensed for use by the FDA (HPV2; Cervarix – GlaxoSmithKline) which is directed against the two oncogenic strains of HPV (types 16 and 18) solely. Originally, the quadrivalent vaccine, HPV4, was only licensed for use in females aged 9-26 with

recommendation from the Centers for Disease Control and Prevention (CDC) for routine vaccination of females aged 11 and 12 in attempt to vaccinate prior to an adolescent's sexual debut<sup>[9]</sup>. However, in September 2009, the FDA further approved the use of the quadrivalent vaccine in males aged 9-26 for prevention of genital warts. In the state of Arizona, the HPV vaccine is optional and requires parental consent for vaccination of males and females under the age of 18. Therefore, parental beliefs and attitudes regarding the HPV vaccine will determine whether or not a child is vaccinated. Unfortunately, in the years since the first HPV vaccine received FDA approval, there has been conjecture throughout the medical community that vaccination rates have been less than optimal among the adolescent female target population. At the 2010 National STD Conference held in March 2010, researchers from the CDC reported that HPV immunization rates are low throughout the United States with approximately 25% of girls aged 13-17 having received the first dose of the HPV vaccine and slightly greater than 1 in 10 girls aged 13-17 having received all three doses<sup>[10]</sup>.

### *Goals*

The purpose of this study is to identify factors that affect parental attitudes and intentions regarding the HPV vaccine and vaccination of pre-adolescent and adolescent females. This study will aim to assess parental attitudes regarding the HPV vaccine and intention to vaccinate, knowledge of HPV and the HPV vaccine and parental perceptions of adolescent sexual behavior. Increasing HPV awareness and understanding parental attitudes and intentions to vaccinate are two important factors towards identifying potential barriers to vaccination and ultimately, increasing HPV vaccination rates among young females in Arizona.

## **Research Materials and Methods**

A single survey study design was employed to assess parental attitudes, beliefs and knowledge of the HPV vaccine and HPV vaccination of pre-adolescent and adolescent females in Arizona. The survey design and questions were adapted from a questionnaire instrument based on “the theory of planned behavior” used to assess knowledge, attitudes and intentions to vaccinate against HPV among Canadian parents in 2007<sup>[11]</sup>. Approval for the use of the survey instrument was granted by the primary author and principal investigator, Dr. Gina Ogilvie. The final survey instrument was translated from English into Spanish by an employee of the Arizona Department of Health Services. The research study was submitted to and approved by the University of Arizona Institutional Review Board.

Study participants included men and women over the age of 19 who are parents or legal guardians of at least one female child between the ages of 5 and 18 and who could respond to written questions in English or Spanish. Participants were recruited from the Arizona Parent-Teacher Association (AZPTA) as well as from the general internet population. The survey instrument was available in electronic and paper format. The electronic questionnaire was developed using Survey Monkey™ and was available for access via the AZPTA website, AZPTA Facebook™ and Arizona Central website. Electronic survey results were collected from May 15, 2010 to August 15, 2010. Additionally, the questionnaire was distributed in paper format to AZPTA members during an AZPTA annual conference held in Phoenix, Arizona on June 4, 2010. Electronic survey results were collected and saved on Survey Monkey™ and exported to a Microsoft Office 2007 Excel spreadsheet. All results obtained via paper questionnaires were manually entered into the Excel spreadsheet and saved in electronic format.



Adapted from Dr. Gina Ogilvie's survey instrument, the following demographic characteristics were assessed for each study participant who met inclusion criteria: age and sex of the respondent; Arizona county of residence; number of children and their sex and age; respondent's highest level of education and cultural background; and family composition. Each participant was also asked about adherence to recommended routine vaccination schedules for his or her children, knowledge of cervical cancer and HPV infection, intention to have his or her daughter receive the HPV vaccine, attitudes toward vaccines in general and toward the HPV vaccine specifically, and attitudes toward the influence of HPV vaccination on adolescent sexual behavior. Each item was assessed using a 7-point Likert scale or true/false classification.

### *Analysis*

Data were analyzed using IBM® SPSS® version 17. For scale items, scores were dichotomized using a cutoff value of 4, representing a neutral response, and scores greater than 4 representing a mostly positive response and scores lesser than 4 representing a mostly negative response. For the dichotomized responses, we conducted bivariate analyses to compare the responses of parents who intended to have their daughters vaccinated against HPV and those of parents who did not intend to do so. We defined intention to vaccinate as a response of greater than 4 on the Likert scale to the statement, "I intend to have my daughter(s) receive the HPV vaccine". Respondents who answered "already vaccinated" were included in the positive response group and those who answered with a neutral response, score of 4, were excluded from analysis. A student's t-test was performed to assess statistical significance for each bivariate analysis conducted.

## Results

Between May 15, 2010 and August 15, 2010, a total of 101 surveys were completed; 37 paper and 64 electronic. 72 respondents met the required inclusion criteria and 29 respondents did not (not a parent or legal guardian and/or did not have a female child between the ages of 5 and 18) and thus, were excluded from participating. Of the 72 participants that met the required inclusion criteria, the majority represented Caucasian females who resided in Maricopa County, Arizona. Approximately half of respondents had completed some post-secondary education and an estimated 2 in 3 defined their family composition as a two-parent household (Table 1). The population of children reported was relatively balanced between males and females with the majority of each sex representing the 5 to 14 age group (Table 2).

44 (61.1%) of the 72 respondents reported that they intended to have their daughter(s) vaccinated with the HPV vaccine, 12 (16.7%) reported that they did not and 11 (15.2%) were undecided (Figure 1). A similarly equal proportion of Caucasian respondents and Non-Caucasian respondents (65.3% vs. 73.3%) reported that they intended to vaccinate with the HPV vaccine and a similarly equal proportion of female and male respondents (65.0% vs. 71.4%) reported that they intended to vaccinate with the HPV vaccine. When stratified by highest level of education completed, 11 (91.6%) of the 12 respondents who did not intend to vaccinate their daughter(s) with the HPV vaccine reported having completed some or all of a post-secondary education.

### *Cancer vs. STD Vaccine*

Of the 72 total respondents, approximately 75% of respondents reported that they would be willing to vaccinate their daughter(s) with an “anti-cancer” or an “anti-STD” vaccine regardless of their intent to

vaccinate with the HPV vaccine (Figure 2). Of the 44 respondents who reported that they intended to have their daughter(s) vaccinated with the HPV vaccine, 43 (97.7%) reported that they would be willing to vaccinate with an “anti-cancer” vaccine and 37 (84.1%) reported willingness to vaccinate with an “anti-STD” vaccine. Of the 12 respondents who reported that they did not intend to have their daughter(s) vaccinated with the HPV vaccine, 4 (33.3%) reported that they would be willing to vaccinate with an “anti-cancer” vaccine and 3 (25%) reported willingness to vaccinate with an “anti-STD” vaccine.

### *Adolescent Sexual Behavior*

Regarding the influence of the HPV vaccine on adolescent sexual behavior, a relatively small proportion of respondents believed that the HPV vaccine promotes early sexual behavior, unsafe sexual behavior and increased number of sexual partners among young females (Table 3). However, those respondents who believed that the HPV vaccine has a negative impact on adolescent sexual behavior consistently showed significantly less intent to vaccinate with the HPV vaccine than those respondents who did not believe that the HPV vaccine promotes early sexual behavior (33.3% vs. 68.6%), unsafe sexual behavior (40.0% vs. 73.5%) or increased number of sexual partners (25.0% vs. 74.0%).

### *HPV Education and Awareness*

Approximately 3 in 4 respondents are aware that HPV causes cervical cancer; however, only 15 to 20% of respondents were aware that HPV does not cause female or male infertility, newborn blindness or prostate cancer. The majority of respondents consistently answered ‘unsure’ regarding affects of HPV other than cervical cancer (Table 4).

However, 70% of respondents were able to correctly answer that HPV is transmitted during sexual contact/activity.

### *Routine Vaccinations vs. HPV Vaccination*

Respondents who believed that vaccines, in general, are safe showed greater intent to vaccinate with the HPV vaccine than those who did not believe that vaccines are safe (72.1% vs. 0.0%). However, there remained to be a proportion of respondents who did not intend to vaccinate their daughter(s) with the HPV vaccine despite believing that vaccines, in general, are safe (13.1%). Long-term side effects (51.3%) and unknown efficacy (30.5%) were the most commonly reported parental concerns regarding the HPV vaccination.

## **Discussion**

This study aimed to assess parental attitudes and beliefs regarding HPV and HPV vaccination among adolescent females in order to identify factors that affect parental intent to vaccinate and potential barriers to vaccination. The specific inclusion criteria identified parents/legal guardians of females who fall within, or near to, the licensed age limit for the HPV vaccine but who are unable to consent to vaccination independently. In Arizona, the HPV vaccine is optional and requires parental consent for vaccination of children under the age of 18. Therefore, the study participants represent a population that is confronted with the issue of HPV vaccination consent for minors. The number of participants included in our study is inadequate to provide statistically significant results; however, the trend of our data parallels the findings of previous research studies on this subject. Despite insufficient power, we identified several factors which may act as

potential barriers to vaccination and may ultimately affect a parent's decision of whether or not to vaccinate their child.

The percentage of respondents who participated in this study and reported positive intent to vaccinate with the HPV vaccine was similar, although slightly lower, than the currently reported national average of 75% among mothers within the United States<sup>[12]</sup>. There does not appear to be a difference in intent to vaccinate between male and female parents or between Caucasian and non-Caucasian parents. However, our data shows that there may be a correlation between intent to vaccinate and parental education. Parents who represented the group with the highest level of education showed lesser intent to vaccinate with the HPV vaccine than parents with lower levels of education. A similar finding was highlighted in a research study investigating parental factors associated with HPV acceptance which demonstrated that higher parental education is associated with the decision *not* to vaccinate<sup>[13]</sup>. Furthermore, according to the National State of Health Care Quality 2010 Report, vaccination rates among children who are privately insured dropped almost 4% compared to the rise in vaccination rates seen among children who are receiving Medicare<sup>[14]</sup>. Although not entirely dependent, it is likely that parents with greater education have greater household income and increased probability of being privately-insured.

These findings can potentially be explained by investigating differences between access to resources, literacy rates, and perceived susceptibility risk among parents with differing education levels. It is our suspicion that parents with higher levels of education have increased access to resources, including medical literature, popular websites on the internet, and influential peers within the medical or scientific community compared to parents with lesser education. Although access to resources and the ability to research medical information independently can be a great asset for parents, it can also prove to be a great detriment when fraudulent and/or unsubstantiated

information is disseminated throughout communities. In a study examining parental concerns regarding routine vaccination safety, it was found that all parents, regardless of whether they chose to routinely vaccinate their children, had concerns regarding the number of vaccinations given during childhood; however, there was significantly greater concern among parents who chose not to routinely vaccinate that vaccines caused autism<sup>[15]</sup>, a “link” that was first published in a notable medical journal and has since been recanted. Additionally, although it is the goal for scientific literature to have a 7<sup>th</sup> to 9<sup>th</sup> grade readability level, medical jargon and nuances may dissuade parents with lesser education from reading and interpreting the information and thus, prevent them from formulating individual opinions independent from the advice of their healthcare providers. Lastly, parents with higher education may perceive their daughters as being at lower risk for acquiring a sexually transmitted disease secondary to residing within a community regarded as low-risk and/or the perception of low-risk sexual behavior among adolescents in the community.

Respondents who believed that the HPV vaccine promoted earlier sexual debut, sexual promiscuity and unsafe sexual behaviors among adolescents showed consistently less intent to vaccinate than respondents who did not believe that adolescent sexual behaviors were influenced by HPV vaccination. Most parents do not believe that the HPV vaccine promotes risky sexual behavior among pre-adolescent and adolescent females. A recent study also found that most parents do not believe that HPV vaccine encourages sexual activity among children and those who do believe that the vaccine encourages sexual activity, generally, were older than their counterparts, had older adolescent daughters, were more likely to consider vaccinations unimportant, and had moral or religious objections to the vaccination<sup>[16]</sup>. Similarly, our study revealed that parents who believed that vaccinations, in general, are unsafe universally did not intend to vaccinate their daughters with the HPV vaccine. This group

of parents likely represents the population of parents regarded as anti-vaccination. Targeting educational efforts regarding the HPV vaccine to this group likely will not increase acceptance rates.

Currently, the quadrivalent HPV vaccine is licensed for use in females (and males) aged 9 to 26 with recommended routine vaccination of children aged 11 and 12. Based on results from Ferris et. al, prudence should be taken by healthcare providers to vaccinate patients during the recommended pre-adolescent period, not only to vaccinate prior to their sexual debut, but also in order to avoid potential parental concern regarding increased sexual activity as their daughters become older adolescents. Additionally, we believe that anticipatory guidance on the subject of safe sexual activity should be included by practitioners when discussing the HPV vaccine with both parents and adolescents. Neither of the HPV vaccines prevent acquisition of other sexually transmitted diseases, including HIV, and neither prevents pregnancy.

Perhaps not surprisingly, we discovered that the majority of parents included in our study were not well educated about human papillomavirus. Most respondents were aware that HPV causes cervical cancer and is transmitted through sexual activity; however, the majority of respondents did not know if HPV causes other medical conditions. The majority of respondents were unsure whether HPV causes newborn blindness or infertility in males and females, conditions which are commonly a result of chlamydia and gonorrhea infections. Furthermore, a similar proportion of respondents were unsure whether HPV causes prostate cancer, a disease which has been positively linked to HPV and gonorrhea infections<sup>[17]</sup>. We suspect that the knowledge of parents included in this study is reflective of the general population and that much of what parents know about HPV is a likely a result of media advertising of Gardasil® and Cervarix®, both of which are marketed as preventing ‘cervical cancer caused by HPV’. Although, we were unable to identify a study which investigates

parental knowledge regarding routine pediatric immunizations, we speculate that the majority of parents throughout the United States are not well educated about the diseases that current recommended routine vaccinations prevent, such as *H. influenza B*, diphtheria, pertussis or polio. Routine, required childhood vaccinations are a vital feature of public health and as we are better able to prevent disease, education and knowledge of diseases, which are relatively uncommon as a result of vaccination, is considered less important. Parental education, however, is an important aspect of increasing HPV vaccination acceptance rates.

### *Limitations*

Based on the previous study published by Ogilvie, from which our survey instrument was adapted, a sample size of at least 896 participants was needed in order, “to generate a national estimate of parental intention with a 95% confidence interval of  $\pm 3\%$ ”<sup>[11]</sup>. The number of participants included in our study was 72, which is insufficient and thus, limited our ability to show statistical significance for comparisons.

Additionally, the ability to generalize of our data to all parents throughout Arizona is limited due to the sample size and homogeneity of our participants by sex, race/ethnicity, county of residence and education level. The majority of participants represented married Caucasian females with some post-secondary education residing in Maricopa County, Arizona. According to the 2009 U.S. Census Bureau, 49.9% of Arizona’s population is female, 57.3% is White, Non-Hispanic, 30.8% is Hispanic or Latino and a smaller proportion is Black and American/Alaskan Native, 4.4 and 4.9%, respectively. Approximately 1 in 4 people over the age of 25 in Arizona have completed a post-secondary education and 14.7% live below the poverty line. Ideally, if



the study were to be repeated, a larger sample would be sought in order to represent the diverse population within Arizona.

Lastly, in order to increase the number of participants, we opened our survey to the general population via the internet. We did not collect any identifying information; therefore, ensuring the accuracy of collected demographic and surveyed responses is impossible.

### **Future Directions**

On October 16, 2009, the FDA approved use of the quadrivalent HPV vaccine in males aged 9 to 26 for prevention of genital warts caused by HPV types 6 and 11. Although, at this time, the quadrivalent HPV vaccine is only indicated for prevention of genital warts in males, interest is growing regarding whether vaccinating males with the quadrivalent HPV vaccine will prevent acquisition, and ultimately, transmission of oncogenic subtypes to sexual partners.

As the general U.S. population becomes increasingly aware of the vaccine's newly approved use in males, additional studies will be needed to investigate differences between vaccination acceptance rates in males and females. Additionally, if vaccination of males demonstrates two-fold protection against genital warts and transmission of HPV to female sexual partners, assessing parental attitudes and beliefs regarding vaccination of young males with the HPV vaccine will be important to determine whether parents choose to vaccinate and why. Will prevention of genital warts be important enough to override the potential fear and anxiety parents may feel by adding an additional vaccine to their child's immunization schedule? Or, will parents choose to vaccinate their son(s) in order to prevent HPV infection, and potential development of cervical cancer, in future female partners? As the research community learns more about the

pathophysiology of HPV infection in males, further studies evaluating the role of the ‘human factor’ in the pathogenesis of HPV will be needed.

## **Conclusions**

The results of this study demonstrate that the greatest barriers to HPV vaccination are parental aversion to vaccinations, in general, miseducation or lack of education regarding human papillomavirus infection, belief that vaccination will encourage risky sexual behavior and concerns regarding efficacy and safety of the HPV vaccine. Although this study lacks the power for significance, our results clearly follow trends already established in recent medical literature. Additional information not investigated in our study including religious affiliation and medical insurance status would be helpful to identify other potential obstacles to vaccination.

As stated briefly before, HPV vaccination is optional in the state of Arizona. In fact, legislation was proposed in 2007 to prohibit the Arizona Department of Health from requiring the HPV vaccine. The legislation did not pass and is currently held in the House. Currently, 19 states have enacted legislation to require, fund or educate the public about the HPV vaccine<sup>[17]</sup>. Despite possible future legislation that would require the HPV vaccine for school entrance, all public schools within Arizona grant vaccination exemption for children whose family has religious beliefs against immunizations. Although unimmunized children are at risk for suspension upon recognition of a disease outbreak within the facility/community, identifying an “HPV outbreak” would be nearly impossible. Therefore, hypothetically, if children did not receive the HPV vaccine in a state which mandated vaccination for school entry, they would be at little to no risk for school suspension as a result of being unvaccinated. Whether the non-

required nature of the HPV vaccine influences parental attitudes and intent to vaccinate remains unknown; however, we can speculate that if the state does not acknowledge and support the importance of preventing HPV infection and cervical cancer in females, then parents will be less likely to sense the significance as well.

Due to the infancy of the HPV vaccine, questions have been raised regarding the efficacy and usefulness of the vaccine against future naturally occurring infections. Without vaccination, a single host can be continuously infected with multiple strains of HPV despite previous exposures. Most naturally occurring HPV infections are transient in nature with an average duration of 8 months<sup>[4]</sup>. However, exposure to any strain of the humanpapillomavirus, regardless of duration, does not confer lasting resistance against subsequent HPV infections due to the virus' ability to limit a host's immune response<sup>[17]</sup>. This is the basis for recurrent infections within a population. Therefore, the primary goal of HPV vaccination is to produce lasting protection against future infections.

Based on reports from Phase II studies, both HPV vaccines available within the United States produce consistently higher antibody titers than natural infections and exhibited 100% efficacy in preventing persistent infection 24 months post-vaccination. However, the vaccines' efficacy in prevention of infection or disease drastically decreases when the scope is broadened to HPV strains not included in the vaccine<sup>[19]</sup>. Therefore, the utility and effectiveness of the quadrivalent vaccine is limited to prevention of infection and disease caused by HPV types 6 and 11, which cause the majority of cases of genital warts, and types 16 and 18, which are well-known oncogenic strains responsible for causing over 70% of cervical cancers. Time is a crucial factor for determining long-term safety and efficacy and until 10-year or 15-year studies are available, addressing the barriers currently identified is essential for maximizing acceptance rates of the HPV vaccine.

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Table 1. Demographics of Respondents		n = 72 (%)
Gender	Female	62 (86.1)
	Male	7 (9.7)
	No Answer	3 (4.2)
Race	Caucasian	51 (70.8)
	Hispanic	13 (18.1)
	African American	0 (0)
	Asian	1 (1.4)
	Native American	2 (2.8)
	No Answer	5 (6.9)
County	Maricopa	57 (79.2)
	Coconino	1 (1.4)
	La Paz	1 (1.4)
	Pima	5 (6.9)
	Pinal	1 (1.4)
	Yavapai	1 (1.4)
	No Answer	6 (8.3)
Education	Grade School	1 (1.4)
	High School	7 (9.7)
	Some College	22 (30.5)
	College Degree	23 (31.9)
	Post-Graduate	11 (15.3)
	Vocational/Technical	3 (4.2)
	No Answer	5 (6.9)
Family Composition	Single Parent	12 (16.7)
	Two Parents	50 (69.4)
	Parent(s) with Extended Family	5 (6.9)
	No Answer	3 (4.2)

Table 2. Demographics of Children		n = 158 (%)
Female	5-9	39 (24.7)
	10-14	30 (19.0)
	15-19	11 (7.0)
	No Answer	4 (2.5)
Male	5-9	31 (19.6)
	10-14	29 (18.3)
	15-19	8 (5.1)
	No Answer	6 (3.8)

Table 3. HPV Vaccine – Beliefs								
n = 72 (%)								
Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree	Strongly Disagree	Unsure	No Answer
<b>Vaccination Causes Girls to Engage in Earlier Sexual Activity</b>								
0 (0)	0 (0)	3 (4.2)	9 (12.5)	0 (0)	23 (31.9)	29 (40.3)	5 (6.9)	3 (4.2)
<b>Vaccination Causes Girls to Have Greater Number of Sexual Partners</b>								
0 (0)	2 (2.8)	2 (2.8)	10 (13.9)	2 (2.8)	21 (29.2)	28 (38.9)	4 (5.5)	3 (4.2)
<b>Vaccination Causes Girls to Engage in Unprotected Sexual Activity</b>								
0 (0)	2 (2.8)	3 (4.2)	11 (15.3)	3 (4.2)	19 (26.4)	29 (40.3)	3 (4.2)	3 (4.2)
<b>Protected Sexual Activity Prevents HPV Infection</b>								
7 (9.7)	19 (26.4)	11 (15.3)	8 (11.1)	5 (6.9)	4 (5.5)	5 (6.9)	7 (9.7)	6 (8.3)
<b>HPV Vaccine is a Safe Vaccine</b>								
7 (9.7)	25 (34.7)	8 (11.1)	7 (9.7)	0 (0)	4 (5.5)	2 (2.8)	14 (19.4)	5 (6.9)

Table 4. HPV Awareness				
n = 72 (%)				
	True	False	Unsure	No Answer
<b>Female Infertility</b>	8 (11.1)	11 (15.3)	17 (23.6)	10 (13.8)
<b>Newborn Blindness</b>	16 (22.2)	12 (16.7)	35 (48.6)	9 (12.5)
<b>Male Infertility</b>	20 (27.7)	14 (19.4)	29 (40.3)	9 (12.5)
<b>Cervical Cancer</b>	52 (72.2)	6 (8.3)	6 (8.3)	8 (11.1)
<b>Prostate Cancer</b>	15 (20.8)	12 (16.7)	36 (50.0)	9 (12.5)



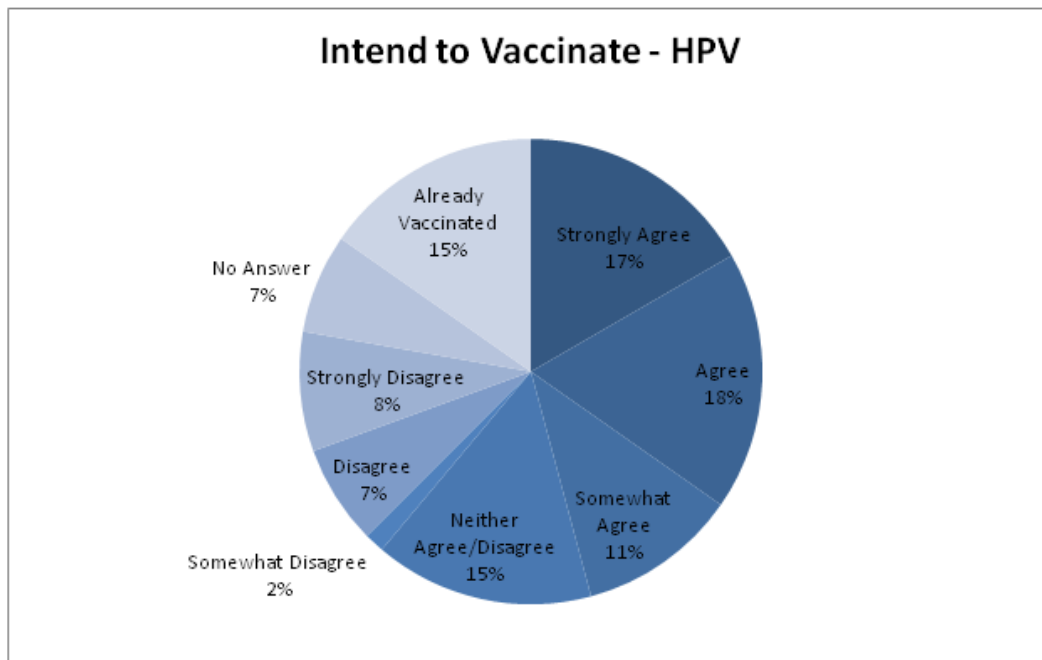


Figure 1. Intent to Vaccinate – HPV

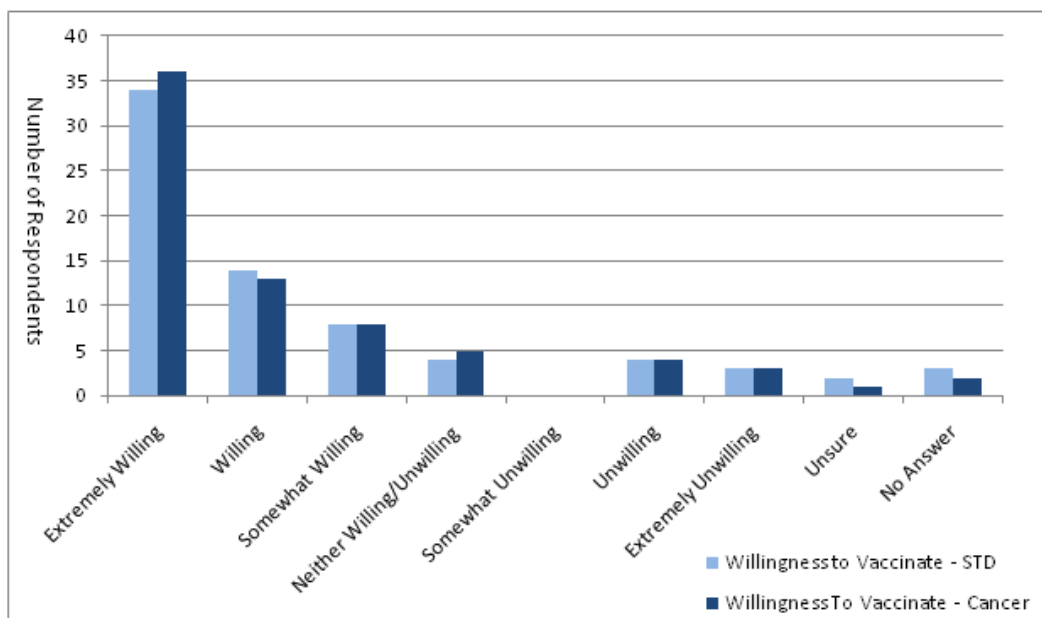


Figure 2. Willingness to Vaccinate – Cancer vs. STD