Southern California CSU DNP Consortium

California State University, Fullerton
California State University, Long Beach
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ASSESSING WOMEN’S KNOWLEDGE REGARDING HUMAN PAPILLOMAVIRUS AND ITS PREVENTIVE OPTIONS

A DOCTORAL PROJECT

Submitted in Partial Fulfillment of the Requirements

For the degree of

DOCTOR OF NURSING PRACTICE

By

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ABSTRACT

Human Papillomavirus (HPV) is the most common sexually transmitted infection afflicting over 20 million men and women in the United States alone. Despite the availability of FDA approved HPV vaccine series, HPV continues to be a problem for almost half of the sexually active individuals in the United States. The continued high incidence of HPV could at least partially be due to the documented low vaccination rates in females across the nation. Nationally, only 54% of females who qualified for the vaccine series received at least one vaccine and, only one third of these females actually completed the full vaccine series (CDC, 2012). Low vaccination rates could be related to lack of knowledge among young women about HPV vaccines or due to failure of healthcare providers in promoting the vaccines among these women.

The purpose of this study was to assess the current knowledge and/or knowledge deficit of HPV and the awareness of the availability of HPV preventive options in women ages 18-26 in two clinical sites in Southern California. The specific aims of this study were to; (a) explore participants current HPV knowledge, (b) explore barriers that prevent women from receiving HPV vaccine(s), and (c) compare the vaccination rate in the study population against the national average.

This descriptive correlational study was conducted at two clinical sites. Women (n=309) at these sites completed a survey regarding their knowledge and belief of HPV. Data was analyzed using generalized linear models. We implemented multiple data manipulation steps that included various ways of recoding categorical variables, ensuring
unidirectional effects on the covariates and obtained an average among multiple closely
related questions.

Results from separate univariate logistic regression models showed that age and
education were the only significant predictors of HPV vaccination uptake (p < 0.02).
Having a pap smear was also a significant predictor of vaccine uptake (p < 0.03). Results
also revealed HPV awareness, knowledge of HPV being a STI, HPV vaccine awareness,
and having been told about HPV vaccine by a nurse or a doctor all attained statistical
significance (p < 0.001). Belief that HPV vaccine would be helpful and belief that HPV
could be a problem showed statistical significance (p < 0.001) and were also predictors of
vaccine uptake in this sample. Taken together results revealed women lack knowledge
about HPV and the potential sequelae that could follow.

Low vaccine uptake and lack of HPV knowledge were apparent in this study
population. Better screening procedures and need for healthcare providers to advocate
for women and vaccine programs that offer HPV vaccine series to all women who
qualify.
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ACKNOWLEDGMENTS

I would like to take this opportunity to thank my family and friends for all their support and encouragement throughout the years in helping me to achieve my goals. I want to take this opportunity to also thank my good friend Lisa Wheadon for encouraging me when the times got tough. I would also like to thank the clinical staff, mainly Ana and Jasmine for all their hard work in recruiting participants for this study. Without the clinical staff, this study would not have been possible. I would also like to take a moment and thank my committee and chair for all their hard work, guidance, and patience with me while this study was being conducted. Your knowledge, mentorship, and experience are greatly appreciated and will not be forgotten. Lastly, I would like to thank God, without Him and His plan for me, I would not be where I am today.
INTRODUCTION

It is estimated that almost half of all individuals in the United States who are sexually active will acquire Human Papillomavirus (HPV) (Garcini, Galvan, & Barnack-Tavlaris, 2012). HPV is the most common sexually transmitted infection afflicting over 20 million men and women in the United States alone. HPV is the second leading cause of cancer deaths in women worldwide (CDC, 2011; McCave, 2010). In the United States, HPV is responsible for 70% of all cervical cancers diagnosed (CDC, 2011; Kontos, Emmons, Puelo, & Viswanath, 2012). The Centers for Disease Control (CDC) and the American Cancer Society estimate an annual HPV-related mortality rate of 4000 women. Although every woman is at risk of contracting HPV, Hispanic and Non-Hispanic Black women have a disproportionately higher incidence of cervical cancer than any other racial groups (Ford, 2011).

There are over 100 strains of HPV, 40 of which directly affect the genital region to include not only the cervix but also the penis and anus. HPV strains 6, 11, 16 and 18 are all Sexually Transmitted Infections (STI’s). HPV Strains 16 and 18 are considered high risk strains and are known to cause cervical cancer. HPV strains 6 and 11 cause genital and anal warts. These particular strains manifest themselves on the genital region as cauliflower like lesions. Because HPV 16 and 18 do not have any symptomatology associated with them, most women are not aware of their STI until they have a positive finding on their Papanicolaou smear (Pap smear). With time, HPV in most women will clear on its own without any medical intervention. Women who do not clear the virus are at increased risk of developing cervical cancer in the future.

Prevention is the key to reducing the incidence of long term HPV sequelae. Two vaccines are available in the United States to help combat HPV: Gardasil® and
Cervarix®. Gardasil is a quadrivalent vaccine, approved by the Food and Drug Administration (FDA) in 2007. Gardasil targets HPV types 6, 11, 16 and 18. Cervarix, a bivalent vaccine, approved by the FDA in 2009 targets HPV types 16 and 18 (UpToDate, 2012). Both vaccines are administered in a series of three injections over a six month period.

Gardasil is found to be 97 to 100% effective in preventing cervical cancer related to HPV in an “HPV-naïve population.” Its efficacy in all participants, with or without prior HPV infection, was approximately 44% (UpToDate, 2012). Cervarix is 93% effective in preventing cervical cancer in the “HPV-naïve population” and 30% in all participants, with or without prior HPV infection. (UpToDate, 2012).

The Advisory Committee on Immunizations Practices (ACIP), a subcommittee of the CDC, recommends either Gardasil or Cervarix be routinely offered to females between the ages of 11 and 12 years but can be offered to woman up to the age of 26. The series may be administered as early as nine years of age. The vaccine series schedule is as follows; the first vaccine, followed by the second vaccine one-two months after the first, the third and the final vaccine should be administered six months after the initial vaccine was administered. ACIP recommends girls/women who fail to receive their vaccine during recommended intervals may utilize the “catch-up” vaccination schedule.

**Problem Statement**

Despite the availability of FDA approved HPV vaccine series, HPV continues to be a problem for almost half of the sexually active individuals in the United States. The continued high incidence of HPV could at least partially be due to the documented low
vaccination rates in females across the nation. Nationally, only 54% of females who qualified for the vaccine series received at least one vaccine and, only one third of these females actually completed the full vaccine series (CDC, 2012). Low vaccination rates could be related to lack of knowledge among young women about HPV vaccines or due to failure of healthcare providers in promoting the vaccines among these women. Evidence suggests perceived vaccine effectiveness and low levels of HPV knowledge appear to contribute to low HPV vaccine uptake across the this country.

**Purpose Statement**

The purpose of this study was to assess knowledge and/or knowledge deficit of HPV and the awareness of the availability of HPV vaccine preventive options in women ages 18-26 at two clinical sites in Southern California who provide care to predominately insured or underinsured women. The specific aims of this study were to; (a) explore participants’ current HPV knowledge, (b) explore barriers that prevent women from receiving HPV vaccine(s), and (c) compare the vaccination rate in the study population against the national average.

**Theoretical Framework**

The theoretical framework that guided this study was the Health Belief Model (HBM). This is an appropriate model to assess participants’ reasons for engaging in or rejecting health promotion and preventive practices such as vaccinations (Gerend & Shepherd, 2012). The HBM was initially developed in the 1950’s by social psychologists, Hochbaum and Rosenstock. In the 1950’s, programs sponsored by the U.S. Public Health Service for detection and screening, particularly tuberculosis detection program had limited success (Baum, Newman, Weinman, West, & McManus, 1997).
The paradox that affected these public health programs needed to be understood before services could be implemented to assist in controlling diseases (Hochbaum, 1958). The HBM has since evolved to explain, predict and explore what influences individuals’ behavior and their belief of personal benefits to early disease detection and prevention (Glanz, Kimer, & Vismanath, 2008; Rosenstock, Strecher, & Becker, 1988).

Throughout the evolution of the HBM, six health behaviors that predict an individuals’ willingness to engage in programs that prevent disease have been identified (Figure 1). These health behaviors include: perceived susceptibility, perceived severity, perceived benefits, perceived barriers cues; or the belief of the need to take action, and likeliness to pursue a behavior (Gerend et al., 2012; Pirzaheh & Mazaheri, 2012; Sharma, 2011).

According to Sharma (2011), perceived susceptibility refers to the idea and belief that the individual is at risk for acquiring HPV or cervical cancer. Individuals vary in their level of perceived susceptibility. The more susceptible an individual feels, the more likely they are to engage in preventive measures. Perceived severity refers to an individual’s belief in the harm a disease can inflict or debilitate. A perceived benefit is the belief that the advantage of the HPV vaccination reduces the risk of HPV and its sequelae. Perceived barriers refer to the belief of actual or imagined cost related to this behavior. Cues in action or motivation refers to individuals need to take action based on both internal and external cues. Likeliness to pursue a behavior is the self-efficacy and confidence that the individual has the ability to pursue a behavior (Sharma, 2011).
Figure 1. Health Belief Model.
REVIEW OF LITERATURE

Articles relevant to this research were retrieved from PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsycINFO, and Cochran Central Register for Controlled Trial electronic databases. Data was also retrieved from open-access websites such as the United States Centers of Disease Control and Prevention (CDC). Key search terms included; “HPV knowledge,” “HPV vaccine acceptance,” “women/girls,” “perceptions of HPV vaccine effectiveness,” and “HPV awareness.” The literature search was limited to articles published in the English language in peer-reviewed journals published between the years of 2005 and 2013. Fifty articles that met the search criteria were retrieved. Of these, only 25 articles met all the inclusion criteria and were included. Four reoccurring themes merged during the data search. These themes were placed into four categories: HPV knowledge, HPV awareness, HPV vaccine effectiveness, and HPV vaccine acceptance.

**Human Papillomavirus Knowledge**

Despite the prevalence of HPV in the United States and despite attempts by healthcare providers to educate patients on preventive options, many women still lack knowledge of HPV, modes of transmission, availability of HPV vaccine series and the importance of routine cervical cancer screening (Gerend & Magloire, 2007; Sanford & Pleasant, 2009). Women also lacked knowledge regarding the association between HPV and genital warts (Daley et al., 2008) and availability of preventive vaccines (Kennedy, Osgood, Rosenbloom, Feinglass, & Simon, 2008).

Taken together, studies regarding HPV knowledge revealed most women lack the knowledge of HPV. This suggested the need to further educate women on; what HPV
consists of, the identification of multiple strains that effect the genital regions, modes of transmission, prevention option, and progression of HPV disease. Although some studies showed knowledge of HPV had increased slightly, findings still suggested women continued to have many misconceptions about HPV.

**Human Papillomavirus Awareness**

Regardless of socio-economic status, race, and ethnicity, some studies revealed the lack of awareness among women regarding HPV types, modes of transmission and preventive options were alarming. Many women were unaware of the link between HPV and its association with oral and anal cancers. HPV associated oral cancers have been on the rise over the past decade (Stock, Peterson, Haulihan, & Walsh, 2013). Certain studies involving college students revealed the more information students received about types/strains of HPV, modes and transmission and disease sequelae, the more likely they were to accept vaccination against HPV (Stock et al., 2013).

A synthesis of HPV awareness studies, revealed the need to inform women about the availability of HPV vaccine series. Making women aware of HPV was suggested to be the key the aids women to make informed decisions about HPV vaccine uptake (McCree et al., 2010). Exploration of barriers to vaccine uptake was suggested and should be studied further (Ford, 2011). The connection among oral sex and oral cancers needed to be explained to women along with effective interventions to decrease risk of HPV infection and potential sequelae (Stock et al., 2013).

These studies on HPV awareness suggested the need to develop clear and specific messages for HPV positive women about testing, diagnosing, results, treatment options, counseling, and what constitutes high risk sexual behaviors. Eliminating confusion
among women and making them aware of HPV screening practices was suggested as being paramount in getting patients to comply with treatment regimens and preventing further sequelae (McCree et al., 2010).

**Human Papillomavirus Vaccine Effectiveness**

Belief of vaccine effectiveness by study participants was thought to be another barrier to vaccine uptake. Parents of minor children voiced concerns of vaccine effectiveness when it came to making the decision to vaccinate their daughters and the reasons women over the age of 18 do not pursue the vaccine series. An interesting conclusion by a research team found, information sharing through socialization about HPV vaccine effectiveness yielded higher perceptions of vaccine efficacy than any other means of information sharing methods (Casillas et al., 2011; Reiter et al., 2011). Similar studies revealed if healthcare professionals, a parent(s)/family members or teachers were the source of information regarding HPV and preventive options, there appeared to be a higher association of perceived vaccine effectiveness, vaccine acceptance and willingness to become vaccinated. Conclusions by most studies indicated the need for larger educational campaigns regarding HPV vaccine effectiveness and the prevention of HPV.

**Human Papillomavirus Acceptance**

The perception of HPV vaccine effectiveness is directly related to vaccine uptake or acceptance of HPV vaccine (Sanderson et al., 2009). Since the vaccine series can be initiated as young as nine years of age, which requires parental consent, some studies focused efforts on studying parents of minors who qualified for the vaccine series. Researchers explored reasons mothers do or do not accept the HPV vaccine series for their adolescent daughters. Findings in studies conducted by Dempsey, Abraham, Dalton
and Ruffin (2009); Gerend, Weibley and Bland (2009); Katz et al. (2009); and Sanderson et al. (2009), were similar. The similarities were: perceived risk of their daughters acquiring HPV infection at a young age, vaccine safety, vaccine effectiveness, vaccine side effects, and religious values or objections. In these studies, parents, who were not opposed to vaccinating their daughters, had higher knowledge levels regarding HPV compared to mothers who opposed the vaccine series. Parents with a lower income reported stronger interest in vaccinating their daughter’s compared to parents who had higher incomes (Gerend et al., 2009).

Lack of education regarding HPV and preventive option was a cause for concern by health professionals. More emphasis needed to be placed on educating parents of females who qualify for the vaccine series in order for these parents to make educated decisions to accept or decline the vaccine for their child (Dempsey et al., 2009). If parents are concerned about accepting a vaccine that prevents an STI, they need to realize their children already receive a vaccine that protects them against an STI which could potentially cause cancer. This vaccine is given to newborns at birth and is given to prevent Hepatitis B (Sanderson et al., 2009).
METHODS

Design, Sample and Setting

This descriptive correlational study was approved by the Institutional Review Board (IRB) at California State University, Fullerton in Fullerton California. Study participants were recruited from two clinical sites in San Bernardino County, California. These two clinical sites were private practices that deliver Obstetrical and Gynecological (Ob/Gyn) care to insured or underinsured women of all ages and races. These women were predominately Medi-Cal insured or qualify for Family Pact services, a state funded sexual health program for low-income California residents.

The sample consisted of 309 women between the ages of 18-26 who received care at the two clinical sites. Women under the age of 18 were considered minors and were excluded from this study to avoid parental consent. Women over the 26 were also excluded from this study because they are not eligible to receive the HPV vaccine series.

A 23-question survey was developed for this study (Appendix A). Survey questions were modeled after the Health Information National Trends Survey (HINTS) and other questions were developed based on the six health behaviors from the HBM. The survey contained questions regarding demographic information, HPV knowledge, health screening practices, HPV risk factors, perceived risk of contracting HPV, HPV vaccine knowledge, and HPV vaccine status. The survey concluded with two open-ended questions on perceived factors that prevent and those that encourage women to become vaccinated against HPV.
**Procedures**

Clinical staffs at both sites were trained to screen and recruit potential participants for this study. Trained clinical staff discussed with potential participants the purpose of the study, risks and benefits of being involved in the study as well as measures implemented to ensure confidentiality. Women between the ages of 18-26 were approached by clinical staff and invited to participate in this study once they arrived for their appointments. Women who agreed to participate in this study, were handed a black pen, a survey, and clip board. In order to preserve confidentiality, along with the survey, participants were given a white self-sealing envelope so their completed surveys could be placed in and returned to a locked collection box located in the reception area. No incentives were given to study participants.

Regardless of participation status in the study, all women were given a “Genital HPV Infection-Fact Sheet” produced by the CDC (Appendix B). The fact sheet was handed to every patient by clinical staff after they had their vital signs recorded.

**Data Analysis**

Data was analyzed using generalized linear models. All computations were performed using the R statistical software platform version 3.0.1 (http://www.r-project.org).

We implemented multiple data manipulation steps that included various ways of recoding categorical variables, ensuring unidirectional effects of the covariates and got an average among multiple closely related questions. We averaged similarly directed items in an effort to reduce collinearity and multidimensionality. Very low response rate (<10) and non-informative categories such as: “Refused to Answer” and “Don’t Know” were
removed from the dataset and their corresponding statistical weights were uniformly
distributed among the remaining participants in the data collected. Missing and
incomplete data problems were handled via classical hot deck imputation. Hot deck
imputation is the practice of replacing missing data by substituting data from other
complete cases and is generally regarded to a superior alternative to the removal of
incomplete data or mean value imputation. Since we strived for low “non-response
rates,” an adjustment for variance inflation was not necessary (Rao & Shao, 1992).

We implemented an exhaustive search through all potential predictors of the HPV
vaccine uptake prior to the adoption and future plans of adoption. This was combined
with model building based on forward selection and backward elimination of covariates
to derive the best predictive model. This model based and data driven approach allowed
the detection and assessed the effects sizes of significant predictors of the aforesaid
outcome variable of interest. The best predictive model and the corresponding desired
unbiased effects of the predictors are never unquestionably determined unless the model
building encompasses all possible potential confounders and risk factors. At the very
least, this would imply the need to consider and test all survey items for association with
the outcome variable.

Descriptive analysis was conducted on participant’s demographic information
along with characteristics and items that reflected participant’s current HPV knowledge
and behavior. These analyses are presented in separate frequency tables. The
subsequent statistical analyses were aimed at determining the best set of predictors of the
outcome variables of interest: presence or absence of HPV vaccine uptake. We obtained
this data by dichotomizing the survey item denoting the number of vaccines these women
have had with; zero being no vaccine and one, signifying receiving at least one of the three vaccines from the series.

Preliminary analyses focused on assessing the statistical significance and effect sizes of the individual survey items. These items were carried out via separate univariate logistic regression models and nested models were compared through likelihood ratio tests (LRT). In order to ensure proper asymptotic behavior of the LRT statistic, empty or rare response categories were deleted, which in turn yielded a minor decrease in sample size. Lastly, multivariate logistic model building was implemented through stepwise variable selection/deletion and model comparison that identified and estimated the effect sizes of the best set of predictors for the HPV vaccine acceptance.
RESULTS

Demographic Information

Three hundred and nine surveys were completed at two Obstetrical/Gynecological outpatient clinics in San Bernardino County, California. The demographic summary of the sample is shown in Table 1. All participants were females between the ages of 18 and 26. Approximately 65% of the sample completed high school, 78% were single, and approximately 66% of the study sample had an annual income of less than $24,999. The vast majority of the participants were Hispanic (75.1%) followed by African American (18%). Approximately 46% of the sample rated their understanding of medical statistics as “easy” and 47% rated themselves as being in “good” health.

Knowledge, Beliefs and Behavior

The vast majority (84.8%) of the women in the study have had a pap smear but only 60.8% have heard of HPV, less than half (45.8%) knew that the virus could cause cervical cancer and just over half (50.3%) knew that HPV was a STI. Approximately 47% of the participants were aware of the existence of an HPV vaccine series, and approximately 49% had not had the HPV vaccine(s). One third of the sample had never received information about the HPV vaccine series from a nurse or doctor. With respect to HPV status, only 9.3% of the participants had been told they have had or have HPV, and 3.3% had been treated for genital warts.

When asked about their beliefs regarding HPV and its effect on overall well-being; only 4% of the women declared they believed they were at risk of contracting HPV, 51.6% believed the HPV vaccine would be beneficial to them, and 50.7% believed HPV could be a potential problem for them. Analysis of the items addressing vaccine
related costs revealed; 30.5 and 77% of women would be willing to receive the vaccine if it cost between $100 and $300, or if it were offered to them for free. A detailed HPV item data summary is shown in Table 2.

**Univariate Logistic Regression Analyses**

Questions of interest in this study were background characteristics of study participants, knowledge regarding HPV, and identify which behaviors were associated with decisions to receive the HPV vaccine series. The outcome variable of interest was dichotomized to denote the number of injections women have had with zero being none and one representing at least one vaccine received. Results from separate univariate logistic regression models showed that among the background characteristics only age and education were the only significant predictors of HPV vaccination uptake ($p < 0.02$). Having had a pap smear was also a significant predictor of vaccine uptake ($p < 0.03$).

Results revealed HPV awareness, knowledge of HPV being an STI, HPV vaccine awareness, and having been told about HPV vaccine by a nurse or a doctor all attained statistical significance ($p < 0.001$). Knowledge that HPV could cause cervical cancer was statistically significant ($p < 0.01$). Along the HPV beliefs facet of the survey, belief that HPV vaccine would help the individual from contracting HPV and belief that HPV is or could be a problem were the two significant covariates ($p < 0.001$). Lastly, willingness to pay for the vaccine or desire to get it if offered for free was statistically significant ($p < 0.01$). Somewhat surprisingly, marital status, income, ethnicity, general health, HPV status/genital warts, and belief of being at risk of contracting HPV, failed to reach significance with p-values ranging from 0.07 to 0.94. A detailed univariate logistic regression summary is shown in Table 3.
Table 1

Demographic Information of the Survey Participants (n = 309)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Age in years (n = 309)</td>
<td></td>
</tr>
<tr>
<td>18-19</td>
<td>73 (23.6)</td>
</tr>
<tr>
<td>20-21</td>
<td>83 (26.9)</td>
</tr>
<tr>
<td>22-23</td>
<td>68 (22.0)</td>
</tr>
<tr>
<td>24-26</td>
<td>85 (27.5)</td>
</tr>
<tr>
<td>2) Highest education (n = 309)</td>
<td></td>
</tr>
<tr>
<td>8th grade or less</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>9th grade</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>10th grade</td>
<td>15 (4.9)</td>
</tr>
<tr>
<td>11th grade</td>
<td>28 (9.1)</td>
</tr>
<tr>
<td>12th grade</td>
<td>200 (64.7)</td>
</tr>
<tr>
<td>Technical training</td>
<td>24 (7.8)</td>
</tr>
<tr>
<td>Associate degree</td>
<td>29 (9.4)</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>4 (1.3)</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>4 (1.3)</td>
</tr>
<tr>
<td>3) Current marital status (n = 309)</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>241 (78.0)</td>
</tr>
<tr>
<td>Married</td>
<td>54 (17.5)</td>
</tr>
<tr>
<td>Divorced</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Widowed</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Separated</td>
<td>5 (1.3)</td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>9 (2.9)</td>
</tr>
<tr>
<td>4) Household income (n = 307)</td>
<td></td>
</tr>
<tr>
<td>Less than 15,000</td>
<td>148 (48.2)</td>
</tr>
<tr>
<td>15,000-24,999</td>
<td>54 (17.6)</td>
</tr>
<tr>
<td>25,000-34,999</td>
<td>14 (4.6)</td>
</tr>
<tr>
<td>35,000-47,999</td>
<td>10 (3.3)</td>
</tr>
<tr>
<td>More than 48,000</td>
<td>2 (0.7)</td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>79 (25.7)</td>
</tr>
<tr>
<td>5) Ethnicity (n = 309)</td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latina</td>
<td>232 (75.1)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>13 (4.2)</td>
</tr>
<tr>
<td>African American</td>
<td>55 (17.8)</td>
</tr>
<tr>
<td>Asian/Filipina</td>
<td>3 (1.0)</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Native American</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>6) Numeracy/Understanding medical statistics (n = 305)</td>
<td></td>
</tr>
<tr>
<td>Very easy</td>
<td>67 (22.0)</td>
</tr>
<tr>
<td>Easy</td>
<td>140 (45.9)</td>
</tr>
<tr>
<td>Hard</td>
<td>51 (16.7)</td>
</tr>
<tr>
<td>Very hard</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Do not know</td>
<td>46 (15.1)</td>
</tr>
<tr>
<td>7) General Health (n = 305)</td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>31 (10.2)</td>
</tr>
<tr>
<td>Very good</td>
<td>61 (20.0)</td>
</tr>
<tr>
<td>Good</td>
<td>143 (46.8)</td>
</tr>
<tr>
<td>Fair</td>
<td>60 (19.7)</td>
</tr>
<tr>
<td>Poor</td>
<td>6 (2.0)</td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Do not know</td>
<td>4 (1.3)</td>
</tr>
</tbody>
</table>
Table 2

**HPV Knowledge, Beliefs and Behavior of the Survey Participants (n = 309)**

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Ever had a pap smear or a pap test (n = 309)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>262 (84.8)</td>
</tr>
<tr>
<td>No</td>
<td>44 (14.2)</td>
</tr>
<tr>
<td>Do not know</td>
<td>3 (1.0)</td>
</tr>
<tr>
<td>2) HPV awareness (n = 301)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>183 (60.8)</td>
</tr>
<tr>
<td>No</td>
<td>93 (30.9)</td>
</tr>
<tr>
<td>Do not know</td>
<td>25 (8.3)</td>
</tr>
<tr>
<td>3) HPV can cause cervical cancer (n = 301)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>138 (45.8)</td>
</tr>
<tr>
<td>No</td>
<td>15 (5.0)</td>
</tr>
<tr>
<td>Do not know</td>
<td>148 (49.2)</td>
</tr>
<tr>
<td>4) HPV is a STD/STI (n = 302)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>152 (50.3)</td>
</tr>
<tr>
<td>No</td>
<td>92 (30.5)</td>
</tr>
<tr>
<td>Do not know</td>
<td>58 (19.2)</td>
</tr>
<tr>
<td>5) HPV vaccine awareness (n = 301)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>141 (46.8)</td>
</tr>
<tr>
<td>No</td>
<td>110 (36.6)</td>
</tr>
<tr>
<td>Do not know</td>
<td>50 (16.6)</td>
</tr>
<tr>
<td>6) Number of HPV shots (n = 300)</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>146 (48.7)</td>
</tr>
<tr>
<td>1</td>
<td>21 (7.0)</td>
</tr>
<tr>
<td>2</td>
<td>15 (5.0)</td>
</tr>
<tr>
<td>3</td>
<td>27 (9.0)</td>
</tr>
<tr>
<td>Do not know</td>
<td>91 (30.3)</td>
</tr>
<tr>
<td>7) A nurse or a doctor talked to you about HPV shots (n = 300)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>98 (32.7)</td>
</tr>
<tr>
<td>No</td>
<td>155 (51.7)</td>
</tr>
<tr>
<td>Do not know</td>
<td>47 (15.6)</td>
</tr>
<tr>
<td>8) Ever been told that you have HPV (n = 303)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28 (9.3)</td>
</tr>
<tr>
<td>No</td>
<td>268 (88.4)</td>
</tr>
<tr>
<td>Do not know</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>9) Ever been treated for genital warts (n = 302)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10 (3.3)</td>
</tr>
<tr>
<td>No</td>
<td>283 (93.7)</td>
</tr>
<tr>
<td>Do not know</td>
<td>9 (3.0)</td>
</tr>
<tr>
<td>10) Believe you are at risk of getting HPV (n = 303)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12 (4.0)</td>
</tr>
<tr>
<td>No</td>
<td>192 (63.3)</td>
</tr>
<tr>
<td>Do not know</td>
<td>82 (27.1)</td>
</tr>
<tr>
<td>I already have HPV</td>
<td>17 (5.6)</td>
</tr>
<tr>
<td>11) Believe that HPV vaccine would help you (n = 306)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>158 (51.6)</td>
</tr>
<tr>
<td>No</td>
<td>33 (10.8)</td>
</tr>
<tr>
<td>Do not know</td>
<td>115 (37.6)</td>
</tr>
<tr>
<td>12) Believe that HPV is or can be a problem for you (n = 306)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>155 (50.7)</td>
</tr>
<tr>
<td>No</td>
<td>35 (11.4)</td>
</tr>
<tr>
<td>Do not know</td>
<td>116 (37.9)</td>
</tr>
<tr>
<td>13) Would you pay 100-300$ for HPV vaccine (n = 302)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>93 (30.5)</td>
</tr>
<tr>
<td>No</td>
<td>112 (36.7)</td>
</tr>
<tr>
<td>Do not know</td>
<td>100 (32.8)</td>
</tr>
<tr>
<td>14) Would you get a free HPV vaccine (n = 302)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>235 (77.0)</td>
</tr>
<tr>
<td>No</td>
<td>17 (5.6)</td>
</tr>
<tr>
<td>Do not know</td>
<td>53 (17.4)</td>
</tr>
</tbody>
</table>
Table 3

Univariate Logistic Regression Analyses (n = 209)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Chi-square LRT statistic</th>
<th>DF(1)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>9.68</td>
<td>3</td>
<td>0.02</td>
</tr>
<tr>
<td>Education</td>
<td>11.57</td>
<td>4</td>
<td>0.02</td>
</tr>
<tr>
<td>Marital status</td>
<td>1.35</td>
<td>2</td>
<td>0.51</td>
</tr>
<tr>
<td>Income</td>
<td>2.30</td>
<td>4</td>
<td>0.68</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>3.40</td>
<td>1</td>
<td>0.07</td>
</tr>
<tr>
<td>Numeracy</td>
<td>7.13</td>
<td>3</td>
<td>0.07</td>
</tr>
<tr>
<td>General health</td>
<td>2.60</td>
<td>3</td>
<td>0.46</td>
</tr>
<tr>
<td>Ever had pap smear</td>
<td>6.74</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>HPV awareness</td>
<td>22.16</td>
<td>2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HPV can cause cervical cancer</td>
<td>8.61</td>
<td>2</td>
<td>0.01</td>
</tr>
<tr>
<td>HPV is a STD/STI</td>
<td>13.46</td>
<td>2</td>
<td>0.001</td>
</tr>
<tr>
<td>HPV vaccine awareness</td>
<td>37.96</td>
<td>2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>A nurse or a doctor talked to you</td>
<td>71.11</td>
<td>2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>about HPV vaccine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever been told you have HPV</td>
<td>0.12</td>
<td>2</td>
<td>0.94</td>
</tr>
<tr>
<td>Ever been treated for genital</td>
<td>2.93</td>
<td>2</td>
<td>0.23</td>
</tr>
<tr>
<td>warts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Believe you are at risk of getting</td>
<td>1.23</td>
<td>3</td>
<td>0.75</td>
</tr>
<tr>
<td>HPV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Believe that HPV vaccine would</td>
<td>19.40</td>
<td>2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>help you</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Believe that HPV is or can be a</td>
<td>17.61</td>
<td>2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>problem for you</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would you pay $100-300 for HPV</td>
<td>8.50</td>
<td>2</td>
<td>0.01</td>
</tr>
<tr>
<td>vaccine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would you get a free HPV vaccine</td>
<td>24.84</td>
<td>2</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

(1) Rare and empty categories have been removed from the original data summarized in Table 1.

Multivariate Logistic Regression Analysis

We implemented rigorous multivariate logistic regression model building to identify and assess the effect sizes of the best set of predictors for the HPV vaccination status. Our results revealed that the only significant predictors of vaccine non-uptake were not having been told about HPV vaccine by a nurse or a doctor (p < 0.001), not believing the HPV vaccine would be helpful (p < 0.05), and uncertainty of HPV vaccine helpfulness (p < 0.003). In particular, the odds of having had the HPV vaccine for women that have not been told about HPV vaccine by a nurse or a doctor were 95% smaller compared to the odds for women who were told about the vaccine by a nurse or doctor. Further, the odds of having had the HPV vaccine for women that lacked belief in
its helpfulness were 82 and 81% smaller than the odds for women who believed in its helpfulness. A detailed multivariate logistic regression summary is shown in Table 4.

Table 4

*Multivariate Logistic Regression Analysis (n = 207)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>SE</th>
<th>exp(β)</th>
<th>Z-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.12</td>
<td>0.35</td>
<td>3.06</td>
<td>3.20</td>
<td>0.001</td>
</tr>
<tr>
<td>A nurse or a doctor has not talked to you about HPV vaccine</td>
<td>-2.94</td>
<td>0.51</td>
<td>0.05</td>
<td>-5.81</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Not believing the HPV vaccine would be helpful</td>
<td>-1.72</td>
<td>0.91</td>
<td>0.18</td>
<td>-1.89</td>
<td>0.05</td>
</tr>
<tr>
<td>Uncertain of HPV vaccine helpfulness</td>
<td>-1.69</td>
<td>0.58</td>
<td>0.19</td>
<td>-2.93</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Open Ended Survey Questions

Two open-ended questions were asked to study participants regarding their opinion on, “What prevents women your age from receiving the HPV vaccine,” and “What would encourage women your age to get the HPV vaccine?” An overwhelming majority of study participants (n = 130) who responded to this question stated that more education regarding HPV was the most important factor in promoting women to receive the vaccine followed by cost, and having the vaccine optional instead of mandating vaccination for girls/women who qualify. In response to the second question, participants stated, that vaccine education was the most important factor that would encourage women to receive HPV vaccine followed by the need to care for oneself and reduced vaccine cost.
DISCUSSION

A limitation of this study was the high number of participants involved who received medical services under the “Family Pact” program or limited services under the “Medi-Cal” programs. In most instances, these particular programs do not pay for HPV vaccine series. This factor alone could account for the low vaccine uptake at these two clinical sites. Seventy seven percent of our participants indicated they would accept the vaccine if it were offered to them for “free.” This would suggest the need for free vaccination program to women in this age group.

Issues among providers as to when is the appropriate age sexual health topics should be discussed remains controversial especially among pediatric providers. Since the vaccine can be initiated as young as nine years of age, a possibility of low HPV knowledge and low vaccine uptake could be the assumption by other providers that pediatric providers are discussing HPV and administering the vaccine to these patients prior to patients’ participating in their first sexual debut. Assumptions such as these could also be a contributing factor to low vaccine uptake and low HPV knowledge. Providers should not assume the HPV vaccine was administered while the patient was being seen by their pediatric providers; rather providers need to specifically document HPV vaccine status on all their patients, regardless of age.

The Health Information National Trends Survey (HINTS), a national survey that collects data from Americans 18 years of age and older regarding public’s use of cancer related information and what different communication channels are utilized to obtain this information was used as the comparison group.

According to HINT(S) survey (2008), participants were asked, “Have you ever heard of HPV,” of the nearly 5,000 respondents, 66.6% had heard of HPV and 33% had
not. In this study, participants were asked the same question with 60.8% of participants having heard of HPV and 30.9% had not. This finding supports women; both locally and nationally, continue to lack knowledge regarding HPV.

**Implication for Practice**

In this study, we explored participant’s knowledge of HPV, their barriers to receiving HPV vaccine(s), their HPV knowledge deficit and compared study participants HPV vaccination rates against the national average.

Women in this study lacked knowledge regarding HPV. This lack of knowledge appeared to be a barrier to receiving HPV vaccine as well as lack of understanding of HPV vaccine effectiveness. Women in this area were below the national average of vaccine uptake with only 7% of participants reporting, having received at least one vaccine compared to the national average of 54% (CDC, 2012). An alarming 9.0% of study participants reported having completed the vaccine series compared to the national average of 33.4% (CDC, 2012). Interestingly, many women surveyed would be willing to receive the vaccine series if the vaccine series were offered to them for free. Findings also suggested “nurses or doctors” play a significant role in educating women regarding HPV and HPV vaccine availability.

Efforts regarding HPV education with an emphasis on prevention need to be increased in order to drive down the rising cases of HPV and increase vaccine uptake. The general population need to be informed and made aware of the benefits of HPV vaccination and vaccine efficacy to include how the vaccine protects girls and women against cervical and anal cancers as well as genital warts. Encouraging enrollment in
low-cost health plans that cover preventive services, including vaccines, is another strategy to promote improved vaccine rates.
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APPENDIX A

HPV QUESTIONNAIRE

INSTRUCTIONS:

My name is Alicia Skibar a Women's Health Nurse Practitioner. I am a graduate student under the direction of Dr. Sadeeka Al-Majid, an Associate Professor in the School of Nursing at California State University, Fullerton. We are conducting a study research at Metropolitan Clinics on knowledge of Human Papilloma Virus.

1. If you are between the ages of 18-26, you are invited to participate in a research study that aims at assessing women's knowledge of human papillomavirus or HPV. Results from this survey may help better understand where medical professionals need to focus on in order to decrease the incidence of HPV. Findings may help improve sexual health education given to women by their medical providers.

2. Your participation in this study is completely voluntary. If you choose to participate in this study, please fill out the attached survey and place in the designated area by the receptionist's desk. **PLEASE DO NOT WRITE YOUR NAME OR ANY IDENTIFYING INFORMATION ON THE SURVEY.** Returning the completed survey will signify your consent to participate in this study.

3. The information obtained through this survey will be anonymous. Confidentiality will be provided to the extent allowed by law. Only the researchers will have access to the raw data. It will be impossible to connect the data to the person who completed it. If you feel uncomfortable about answering a question, you do not need to answer it. The data collected will be stored up to one year after the study is completed; the surveys will then be shredded.

4. If you decide not to participate in the study, your decision will not affect the treatment you are otherwise eligible for.

5. If you have any questions about this study, please contact myself at (909) 546-1052 or Dr. Al-Majid at (657) 278-2368. If you have questions about the rights of human research participants contact the CSUF IRB Office at (657) 278-7640 or irb@fullerton.edu.

1. How old are you? Please write your age in years
   _______ years old

2. What is the highest grade you completed?
   A. 8th grade or less
   B. 9th
   C. 10th
   D. 11th
   E. 12th
   F. Technical training
   G. Associates degree
   H. Bachelor's Degree
   I. Graduate degree
   J. Do not want to answer

3. Marital Status:
   A. Single
   B. Married
   C. Divorced
   D. Widowed
   E. Separated
   F. Do not want to answer
4. Household yearly Income:
   a. Less than $15,000
   b. $15,000-$25,000
   c. $26,000-$35,000
   d. $36,000-$47,000
   e. More than $48,000
   f. Do not want to answer

5. What is the ethnic background you identify with most?
   a. Hispanic/Latina
   b. Caucasian
   c. Black/African American
   d. Asian/Filipina
   e. Pacific Islander
   f. Middle Eastern
   g. Native American
   h. Other
   i. Do not want to answer

6. Have you ever had a Pap smear or Pap test?
   a. Yes
   b. No
   c. Don’t know

7. Have you ever heard of Human Papillomavirus or HPV?
   a. Yes
   b. No
   c. Don’t know

8. Do you think that HPV can cause cervical cancer?
   a. Yes
   b. No
   c. Don’t know

9. Did you know that HPV is a sexually transmitted infection or STD/STI?
   a. Yes
   b. No
   c. Don’t know

10. Did you know there are a series of 3 shots (vaccines) you can get to prevent against getting HPV?
    a. Yes
    b. No
    c. Don’t know

11. Have you ever had any of the HPV vaccine/shot series?
    a. Yes-if so how many have you had (circle one): 1 2 3
    b. No
    c. Don’t know

12. Has a health care provider such as a nurse or doctor ever talked to you about a HPV vaccine or shot?
    a. Yes
    b. No
    c. Don’t know

13. Has anyone ever told you, you had HPV?
    a. Yes
    b. No
    c. Don’t know
14. HAVE YOU EVER BEEN TREATED FOR GENITAL WARTS?
   A. YES
   B. NO
   C. DON’T KNOW

15. DO YOU BELIEVE YOU ARE AT RISK OF GETTING HPV?
   A. YES
   B. NO
   C. DON’T KNOW
   D. I ALREADY HAVE OR HAVE HAD HPV

16. DO YOU THINK THE HPV SHOT/VACCINE WOULD HELP PREVENT *YOU* FROM GETTING HPV OR ANOTHER STRAIN OF HPV?
   A. YES
   B. NO
   C. DON’T KNOW

17. DO YOU BELIEVE THAT HPV IS OR CAN BE A PROBLEM FOR YOU AND OTHER WOMEN LIKE YOU?
   A. YES
   B. NO
   C. DON’T KNOW

18. IF YOU HAD TO PAY $100-$300 FOR THE HPV SHOT/VACCINE SERIES, WOULD YOU PAY FOR IT?
   A. YES
   B. NO
   C. DON’T KNOW

19. IF THE HPV SHOT/VACCINE WAS OFFERED TO YOU FOR FREE, WOULD YOU CHOOSE TO GET IT?
   A. YES
   B. NO
   C. DON’T KNOW

20. IN GENERAL, HOW EASY OR HARD DO YOU FIND IT TO UNDERSTAND MEDICAL STATISTICS?
    WOULD YOU SAY ...
   A. VERY EASY
   B. EASY
   C. HARD
   D. VERY HARD
   E. REFUSED
   F. DON’T Know

21. IN GENERAL, WOULD YOU SAY YOUR HEALTH IS ...
   A. EXCELLENT
   B. VERY GOOD
   C. GOOD
   D. FAIR
   E. POOR
   F. REFUSED
   G. DON’T KNOW

22. IN YOUR OPINION, WHAT PREVENTS WOMEN YOUR AGE FROM RECEIVING HPV VACCINE?

____________________________________________________________________________________________________________

23. IN YOUR OPINION, WHAT WOULD ENCOURAGE WOMEN YOUR AGE TO GET THE HPV VACCINE?

____________________________________________________________________________________________________________

*******Thank you for participating*****
What is genital HPV infection?
Genital human papillomavirus (also called HPV) is the most common sexually transmitted infection (STI). There are more than 40 types of HPV that can infect the genital areas of males and females. These HPV types can also infect the mouth and throat.
HPV can cause serious health problems, including genital warts and certain cancers. There is no certain way to tell who will develop health problems from HPV and who will not. In most cases HPV goes away by itself before it causes any health problems, and most people who become infected with HPV do not even know they have it.
HPV is not the same as herpes or HIV (the virus that causes AIDS). Both viruses can be passed on during sex, but they have different symptoms and cause different health problems.

Who is at risk for HPV?
Anyone who is having (or has ever had) sex can get HPV. HPV is so common that nearly all sexually-active men and women get it at some point in their lives. This is true even for people who only have sex with one person in their lifetime.

How do people get HPV?
HPV is passed on through genital contact, most often during vaginal and anal sex. HPV may also be passed on during oral sex and genital-to-genital contact. HPV can be passed on between straight and same-sex partners—even when the infected person has no signs or symptoms.
Most infected persons do not realize they are infected, or that they are passing HPV on to a sex partner. A person can still have HPV, even if years have passed since he or she has had sexual contact with an infected person. It is also possible to get more than one type of HPV.
In rare circumstances, a pregnant woman with genital HPV can pass the HPV on to her baby during delivery.

What are the potential health problems caused by HPV?
Most people with HPV never develop symptoms or health problems. Most HPV infections (90%) go away by themselves within two years. But, sometimes, HPV infections will persist and can cause a variety of serious health problems. Health problems that can be caused by HPV include

- **Genital warts** (warts on the genital areas);
- **Recurrent respiratory papillomatosis** (RRP), a rare condition in which warts grow in the throat;
- **Cervical cancer**, cancer on a woman’s cervix; and
- **Other, less common, but serious cancers**, including genital cancers (cancer of the vulva, vagina, penis, or anus), and a type of head and neck cancer called oropharyngeal cancer (cancer in the back of throat, including the base of the tongue and tonsils).

All cases of genital warts and RRP, and nearly all cases of cervical cancer, are caused by HPV. A subset of cancers of the vagina, vulva, anus, penis, and oropharynx, are caused by HPV.
The types of HPV that can cause genital warts are not the same as the types of HPV that can cause cancers.

Signs and symptoms of health problems caused by HPV:
**Genital warts** usually appear as a small bump or group of bumps in the genital area. They can be small or large, raised or flat, or shaped like a cauliflower. Healthcare providers can usually diagnose warts by looking at the genital area. Warts can appear within weeks or months after sexual contact with an infected partner—even if the infected partner has no signs of genital warts. If left untreated, genital warts might go away, remain unchanged, or increase in size or number. The types of HPV that can cause genital warts are not the same as the types of HPV that can cause cancers.

**Cervical cancer** usually does not cause symptoms until it is quite advanced. For this reason, it is important for women to get regular screening for cervical cancer. Screening tests can find early signs of disease so that problems can be treated early, before they ever turn into cancer.

**Other cancers caused by HPV** might not have signs or symptoms until they are advanced and hard to treat. Other HPV-associated cancers include some cancers of the vulva, vagina, penis, anus, and oropharynx.

**RRP** is a condition in which warts grow in the throat. RRP can occur in children (juvenile-onset) and adults (adult-onset). These growths can sometimes block the airway, causing a hoarse voice or trouble breathing.

How does HPV lead to health problems?
In most cases the virus goes away and it does not lead to any health problems. However, when the virus persists, or does not go away, HPV can cause normal cells to become abnormal and, most of the time you cannot see or feel these cell changes.

- Warts can appear within months after getting HPV.
- Cancer often takes years—even decades—to develop after a person gets HPV.
There is no certain way to know which people infected with HPV will go on to develop cancer or other health problems. However, persons with weak immune systems (including persons with HIV) may be less able to fight off HPV and more likely to develop health problems from it.

**How common are HPV and health problems caused by HPV?**

**HPV (the virus):** Approximately 79 million Americans are currently infected with HPV. About 14 million people become newly infected each year. HPV is so common that nearly all sexually-active men and women will get at least one type of HPV at some point in their lives.

**Genital warts:** About 360,000 persons in the U.S. get genital warts each year.

**Cervical cancer:** About 12,000 women in the U.S. get cervical cancer each year.

**Other cancers that can be caused by HPV,** including some vaginal, vulvar, penile, anal, and oropharyngeal cancers: Each year in the U.S., HPV is thought to cause an estimated – 2,100 vulvar cancers, – 500 vaginal cancers, – 600 penile cancers, – 2,800 anal cancers in women,

*Note:* Other factors, notably tobacco and alcohol use, may also play a role with HPV to cause these cancers.

About 21,000 of these cancers are potentially preventable by HPV vaccines.

– 1,500 anal cancers in men,
– 1,700 oropharyngeal cancers in women,* and
– 6,700 oropharyngeal cancers in men

**Recurrent respiratory papillomatosis (RRP)** is very rare. It is estimated that about 820 children get juvenile-onset RRP every year in the U.S.

**What is the difference between HPV and HIV?**

HPV is a different virus than HIV, and causes different health problems. HPV does not live in the blood cells, but rather lives on the skin. Also, whereas HIV can lead to AIDS, genital HPV can lead to genital warts and certain types of cancer. However, persons with HIV are more likely to get HPV and to develop health problems from HPV. This is especially true for anal cancer.

**Does HPV affect a pregnant woman and her baby?**

Women who are pregnant can get infected with HPV. Usually these infections do not cause any problems. But sometimes

HPV leads to genital warts, which can grow during pregnancy. Women with genital warts during the late stages of pregnancy are more likely to have children with warts in the throat, a condition called recurrent respiratory papillomatosis; however, this is a very rare condition.

Pregnant women can develop cervical cell changes due to HPV. These changes can be detected through routine cervical cancer screening. Women should get routine cervical cancer screening, even during pregnancy.

**Is there a test for HPV?**

HPV tests are available to help screen women aged 30 years and older for cervical cancer. These HPV tests are not recommended to screen men, adolescents, or women under the age of 30 years. There is no general HPV test for men or women to check one’s overall “HPV status.” Also, there is not an approved HPV test to find HPV in the mouth or throat.

**How can HPV be prevented?**

**There are several ways that people can lower their chances of getting HPV:**

HPV vaccines are recommended for 11- or 12-year-old boys and girls. HPV vaccines are safe and effective, and can protect males and females against some of the most common types of HPV that can lead to disease and cancer. HPV vaccines are given in three shots over six months; it is important to get all three doses to get the best protection. Boys and girls at ages 11 or 12 are most likely to have the best protection provided by HPV vaccines, and their immune response to vaccine is better than older women and men.

**Girls and women:** Two vaccines (Cervarix and Gardasil) are available to protect females against the types of HPV that cause most cervical cancers. One of these vaccines (Gardasil) also protects against most genital warts, and has been shown to protect against anal, vaginal, and vulvar cancers. Either vaccine is recommended for 11- and 12-year-old girls, and for females 13 through 26 years of age who did not get any or all of the shots when they were younger. These vaccines can also be given to girls beginning at 9 years of age.

**Boys and men:** One vaccine (Gardasil) is available to protect males against most genital warts and anal cancers. Gardasil is recommended for 11- and 12-year-old boys, and for males 13 through 21 years of age who did not get any or all of the shots when they were younger. Gay, bisexual, and other men who have sex with men should receive the vaccine through age 26 years. Males 22–26 years of age may also get the vaccine.

For those who choose to be sexually active, condoms may lower the risk of HPV. Condoms may also lower the risk of developing HPV-related diseases, such as genital warts and cervical cancer. To be most effective, condoms should be used with every sex act, from start to finish. HPV can infect areas that are not covered by a condom – so condoms may not fully protect against HPV.

People can also lower their chances of getting HPV by being in a faithful relationship with one partner; limiting their number of sex partners; and choosing a partner who has had no or few prior sex partners. But even people with only one lifetime sex partner can get HPV, and it may not be possible to determine if a person who has been sexually active in the past is currently infected. Because HPV is so common, and almost every sexually-active person will get HPV at some time in their lives, it is important to protect against the possible health effects of HPV.
Can people prevent health problems caused by HPV?
Yes, there are different prevention strategies for different health problems caused by HPV. HPV vaccines can prevent many diseases and cancers caused by HPV. In addition to vaccination, there are other ways to lower the risk of health problems caused by HPV.

A person can lower their risk of
- Cervical cancer by getting routine screening if they are a woman aged 21–65 years (and following up on any abnormal results);
- Oropharyngeal cancers by avoiding tobacco and limiting alcohol intake; and
- Genital warts by using condoms all the time and the right way.

Is there a treatment for HPV or health problems caused by HPV?
There is no treatment for the virus itself, but there are treatments for the health problems that HPV can cause:

- **Genital warts** can be removed with treatments applied by the provider or the person himself/herself. No one treatment is better than another. Some people choose not to treat warts, but to see if they disappear on their own. If left untreated, genital warts may go away, stay the same, or grow in size or number.
- **Cervical cancer** is most treatable when it is diagnosed and treated early. Women who get routine Pap tests and follow up as needed can identify problems before cancer develops. Prevention is always better than treatment. For more information visit [www.cancer.org](http://www.cancer.org).
- **Other HPV-related cancers** are also more treatable when diagnosed and treated early. For more information visit [www.cancer.org](http://www.cancer.org).
- **Recurrent respiratory papillomatosis (RRP)** can be treated with surgery or medicines. Curing RRP can sometimes require many treatments or surgeries over a period of years.

Where can I get more information?

HPV Information [http://www.cdc.gov/hpv/](http://www.cdc.gov/hpv/)
Cervical Cancer Screening [http://www.cdc.gov/cancer/cervical/basic_info/screening.htm](http://www.cdc.gov/cancer/cervical/basic_info/screening.htm)
CDC-INFO Contact Center 1-800-CDC-INFO (1-800-232-4636) TTY: (888) 232-6348
CDC National Prevention Information Network (NPIN) [http://www.cdcnpin.org/scripts/index.asp](http://www.cdcnpin.org/scripts/index.asp) P.O. Box 6003 Rockville, MD 20849-6003 1-800-458-5231 1-888-282-7681 Fax 1-800-243-7012 TTY E-mail: info@cdcnpin.org
National HPV and Cervical Cancer Prevention Resource Center American Sexual Health Association (ASHA)
[http://www.ashastd.org/std-sti/hpv.html](http://www.ashastd.org/std-sti/hpv.html) P. O. Box 13827 Research Triangle Park, NC 27709-3827 1-800-783-9877
## APPENDIX C

### TABLE OF EVIDENCE FOR PROPOSAL

<table>
<thead>
<tr>
<th>Authors/Title</th>
<th>Purpose</th>
<th>Design</th>
<th>Sample/Setting</th>
<th>Measurements</th>
<th>Results/Findings</th>
<th>Conclusions</th>
</tr>
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</table>
| **Gerend, 2007**  
Awareness, knowledge and beliefs about human papillomavirus in a racially diverse sample or young adults | Assess current levels and correlations of awareness, knowledge and beliefs about HPV in a racially diverse sample of young adults | Survey assessing  
1)Sexual history  
2)Awareness and knowledge of HPV  
3)HPV related beliefs  
4)Interest in learning more about HPV  
5)Interest in HPV vaccine | 124 colleges students 18-26 year olds from two southeastern universities (historically black universities)  
Participants were recruited by members of the research team-participants were invited to complete a brief anonymous survey for a study called “20 questions: A Health Study” | Awareness/Knowledge  
78% heard of HPV – majority heard of HPV from:  
60%-public media  
39%-medical provider  
32%-friends  
28%-internet  
27%-parents  
HPV related beliefs  
Perceived risk of HPV infection was relatively low  
56%-disagree strongly or moderately, with the statement that they are at risk for HPV infection  
Interest in HPV education  
64% were interested in learning more about HPV  
Interest in obtaining HPV vaccine  
65% of women were interested in receiving the HPV vaccine | Findings suggest that continued health education in needed to promote better knowledge of HPV |
| **Stock, 2013**  
Influences of oral sex and oral cancer information on young adults oral sexual-risk cognitions and likelihood of HPV vaccination | Questionnaire about past sexual behaviors participants randomly assigned to oral sex and HPV informational readings (n = 125) or control group (n = 113)  
Students were randomly assigned to a control | 258 undergraduates who participated for this study were from a psychology course. Individuals who participated received extra credit from their course instructor | ANCOVA using general liner models, Bonferroni adjusted pair wise comparisons were used to further examine differences between the two conditions within each gender | 85% reported engaging in oral sex.  
Participants averaged 8 oral sex partners in their life.  
Less than 5% reported wearing condoms.  
44% of the women received HPV vaccine | Students exposed to the oral sex-related HPV information reported greater knowledge, higher likelihood of HPV vaccination, and increased perceived risk of infection and HPV infection concern, compared to student who |
<table>
<thead>
<tr>
<th>Study</th>
<th>Research Questions</th>
<th>Study Design</th>
<th>Findings</th>
<th>Implications</th>
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<tbody>
<tr>
<td>McCree, 2010</td>
<td>Awareness of diagnosis and knowledge of HPV in women patients</td>
<td>Report results of awareness of an HPV diagnosis and HPV knowledge from a multisite study of HPV knowledge, attitudes and behavior and the impact of an HPV diagnosis in women and their partners</td>
<td>Study was conducted at four clinical sites. Studies conduct with either face to face interview, telephone interviews, paper-pencil survey, computer based survey or combination of all</td>
<td>Women who were already vaccinated reported higher willingness to engage in oral sex, reported a lower level of perceived risk and greater levels of condom use (p &lt; .05)</td>
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<tr>
<td>Ford, 2011</td>
<td>Examine racial and ethnic disparities in HPV</td>
<td>Descriptive correlational study</td>
<td>1019 women aged 18-24 Self-identified as</td>
<td>Descriptive multi-variant logistical regression</td>
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<tr>
<td>Research Question</td>
<td>Methodology</td>
<td>Results</td>
<td>Recommendations</td>
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<td>Racial and ethnic disparity in human papillomavirus awareness and vaccination among young adult women</td>
<td>Hispanic, non-Hispanic black or non-Hispanic white, were recruited for this study. Analysis using data from 2007-2008 National Survey of Family Growth</td>
<td>Women, 56-60% Hispanic women reported an awareness of HPV infection and vaccination, yet 23% white, 8% black and 6% Hispanic women have received the HPV vaccine. Continued surveillance is important to monitor vaccine uptake. Future research is needed to explore knowledge and vaccination barriers across racial/ethnic groups and develop more effective public health interventions.</td>
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<td>Merchand, 2012 Low HPV vaccine coverage among female community college students</td>
<td>178 students were recruited ages 18-26 from a community college in Los Angeles. Multi-variant logistical regression-test the relationship of statistically significant bivariate predictions to vaccine initiation. Data gathered were from the following measurement 1) HPV awareness/knowledge 2) Perceived vulnerability and severity of HPV 3) HPV vaccine awareness and beliefs 4) HPV vaccine uptake 5) Perceived social norms 6) Provider recommendations 7) Health care satisfaction and trust 8) Cervical cancer history 9) Mother/daughter communication about sex. 45 respondents had initiated the vaccine series. Most common reasons for vaccine 1) MD recommendation 2) Wanting to prevent cervical cancer 3) Having a mother who recommended the vaccine. Among those who heard of the vaccine, 73% reported they had “never thought about” or were “undecided about getting the HPV vaccine” Chi square-bivariate comparison between vaccinated and un-vaccinated groups on all predictors. Vaccinated women were younger, perceived the vaccine to be safer, perceive HPV severity to be lower, (p &lt; .10) reported more social approval, more often had a doctor’s recommendation for the vaccine, and more often had a PMD compared to those who did not. Having providers recommendation was most strongly associated with vaccination. Simple interventions could prompt health providers to make vaccine recommendation when appropriate. Future research should identify individuals and groups who may have negative beliefs about the safety and efficacy of HPV vaccine and provide accurate information to support vaccine decision making.</td>
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<tr>
<td>Authors</td>
<td>Study Title</td>
<td>Study Design</td>
<td>Participants</td>
<td>Key Findings</td>
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<td>Nguyen, 2012</td>
<td>Pap testing, awareness, and acceptability of a human papillomavirus vaccine among Chinese American women</td>
<td>Cross-sectional survey</td>
<td>162 Chinese-American women participated in this study in a community setting in an urban area in Northeastern-United States on women 18 years of age and older. Participants were recruited from a community event focusing on Asian-American women and Breast cancer.</td>
<td>HPV knowledge and awareness of an HPV vaccine was assessed, in addition to randomly assigned questions-participants were given one of two versions of information regarding HPV to included “Almost all cases of HPV are transmitted through sex with and infected partner and the other version did not mention HPV being an STI. Average mean age of participants was 67 years. Results of survey were coded into Stata version 10-continuous variables were placed in to categorical variables. 19.3% of participants had heard of HPV. 18.9% had heard of a vaccine to prevent cervical cancer. Being insured was significantly associated with awareness of a vaccine against cervical cancer.</td>
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<td>Dempsey, 2009</td>
<td>Understanding the reasons why mothers do or do not have their adolescent daughters vaccinated against human papillomavirus.</td>
<td>Qualitative design-grounded theory 12-Item telephone survey-used open ended questions Study participants were mothers to 11-17 year old female patients seen for preventative services in a family practice clinic or pediatric clinic within the University of Michigan’s Healthcare system between January-March 2007. Using electronic medical records, age-eligible females were identified and letters were sent to their parents/guardian inviting them to participate in a telephone survey.454 letters were sent out-52 invitations accepted. Sample size: (n = 52). 12- Item telephone survey was conducted to query mothers about their knowledge of HPV and the HPV vaccine, general views of the vaccine and reasons for vaccinating their daughters or not vaccinating them. Study participants were mothers to 11-17 year old female patients seen for preventative services in a family practice clinic or pediatric clinic within the University of Michigan’s Healthcare system between January-March 2007. Using electronic medical records, age-eligible females were identified and letters were sent to their parents/guardian inviting them to participate in a telephone survey.454 letters were sent out-52 invitations accepted. Sample size: (n = 52).</td>
<td>Mothers who declined the vaccine for their daughter (n = 19) Mother who accepted the vaccine for their daughter (n = 33) Most mothers were aware of the connection between HPV and cervical cancer (n = 41) 11 themes were identified as underlying reason of vaccine decision 1) Perceived risk of infection 2) Age-related 3) Knowledge 4) Vaccine safety 5) Protection/prevent 6) Experience with HPV 7) Physicians recommendation 8) General belief of vaccination 9) Control over health-educating parents regarding the safety of the HPV vaccine, age specific risk of HPV infection and strong physician recommendation may be the most influential factors in increasing HPV vaccine acceptance and compliance.</td>
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<td>Sample size: (n = 52)</td>
<td>Gerend, 2008 Parental response to human papillomavirus vaccine availability: Uptake and intentions.</td>
<td>Correlational Design</td>
<td>surveys were placed in pediatric exam rooms with a sign inviting parents to participate Between January-June 2008</td>
<td>Surveys questions were used from previous research. The survey assessed Human Papillomavirus knowledge, beliefs, and attitudes, personal experience with cervical cancer/genital warts, physician recommendation, vaccine uptake and intentions to vaccinate a daughter/son in the near future (82 surveys were returned)</td>
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<td>Katz, 2009 Acceptance of the HPV vaccine among women, parents, community leaders, and healthcare providers in Ohio Appalachia</td>
<td>Assess HPV vaccine acceptability and barriers of women in rural residents and specifically among residents of Appalachia (Ohio) Qualitative study-grounded theory Focus groups of Appalachia, Ohio were conducted, concentrating on knowledge, barriers, beliefs and attitudes about the HPV vaccine at the individual and community level</td>
<td>Participants were recruited from different counties in Ohio Participants were recruited from local health clinics-fliers were also placed in libraries to recruit more participants. The four focus groups consisted of; healthcare providers (n = 37), community leaders (n =31), parents of young girls (n = 19)and women age 18-26 (n = 27). A coding tree was developed to assist in classifying, sorting and categorizing the data (n = 114)</td>
<td>Themes: Barriers Knowledge Attitudes and belief Suggestions for educational materials and programs The groups quiz results were analyzed and comparisons were conducted using ANOVA Barriers: The barriers identified were lack of healthcare access, lack of health insurance, poor patient/provider communication, not having time Knowledge: Most participants knew the high incidence of cervical cancer in their area however, they felt lung, breast, and colon cancer were more of a problem in their community Attitudes and belief: Participants believed that individuals living in</td>
<td>Findings suggest there are significant barriers, lack of knowledge, and cultural attitudes and beliefs must be considered when developing educational materials in order to increase HPV vaccination rates and compliance</td>
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</table>
Appalachia are proud, religious and come from conservative families which teach abstinence. Suggestion for education:
1) Provide factual info about HPV and the vaccine including transmission.
2) Logistical info about the vaccine and who should get it and where to get the vaccine.

Reiter, 2011
HPV and HPV vaccine education intervention: Effects on parents, healthcare staff, and school staff

To assess the effectiveness of education intervention on Human Papillomavirus (HPV) and Human Papillomavirus vaccine among parents, healthcare staff and school staff.

Paired t-test was used to compare pre education and post education knowledge of HPV.

The study was conducted in Guilford County-North Carolina between the years of 2008-2009. North Carolina has one of the highest incidence of cervical cancer deaths in the nation (6.1 deaths per 100,000 women annually).

Convenience sample- Participants were invited to educational session.

Sample: Three groups were targeted for this intervention
Parents (n = 376)
Healthcare staff (n = 118)
School staff (n = 456)

Participants attended an education session lasting 30-40 minutes. Prior to this educational session, participants were asked to fill out a survey regarding their current knowledge of HPV-the same was asked of them following the intervention (education session) each target group had a different survey tailored for their group.

Participants had relatively low levels of objectivity to the HPV vaccine prior to the intervention. Education sessions increased self-rated knowledge in all three groups (p = <0.001).

Surveys objectively assessed knowledge of many aspects of HPV and HPV vaccine among healthcare providers and school staff (p = <0.05).

Post Intervention:
90% of staff reported HPV vaccine education is beneficial to staff and middle school is an appropriate venue for education.
97% of parents and 85% of school staff would be supportive of school-based vaccine clinics.

Study concluded that education on HPV and HPV vaccine increase the knowledge to all three of the targeted groups that are influential in vaccine behaviors of adolescent females.

Recommendation:
Education intervention represents a potentially effective vaccine acceptance and compliance.
Education intervention increased knowledge which in turn provided strong support for school-based vaccine clinics.

Schnatz, 2010
Assessment of the perceptions and administration of the human papillomavirus

To investigate pediatrician’s acceptability of the recommendation to offer their adolescent female patients the Human Papillomavirus (HPV) vaccine.

Descriptive correlational design

16-question multiple choice survey with numeric estimates that was mailed to all practicing Connecticut pediatricians.

Survey:
1) Demographics
2) Knowledge of HPV
3) How pediatricians obtain knowledge regarding HPV

53.5% providers reported “moderately knowledgeable” of HPV. 37.4% of providers reported “very knowledgeable”.

Journals provide a solid framework by which providers gain information regarding HPV. However, journals do not provide open.
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Papillomavirus (HPV) vaccine</th>
<th>1336 surveys were mailed</th>
<th>32.5% return rate Connecticut-licensed Pediatricians</th>
<th>Sample size (n=434)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4) What age and what manner they discuss STI’s with their patient</td>
<td>5) Admin of HPV vaccine</td>
<td>6) What age they recommend vaccine</td>
<td>70% of providers report obtaining HPV information from peer-reviewed journals</td>
<td>91% of providers reported discussing STI with patients and parents starting age 10-16</td>
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<tr>
<td>94% of providers report they “always” or “sometimes” discuss the vaccine</td>
<td>33% of providers report reasons parents choose not to vaccinate are, unknown long term effects, and belief their child is not sexually active</td>
<td>Significant correlation of provider knowledge of HPV and willingness to discuss STI’s with patients (p &lt; .001)</td>
<td>Larger educational campaigns that highlight the role of social contact and social recommendation for HPV vaccination is key for vaccine uptake.</td>
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**Casillas, 2011**

The impact of social communication of perceived HPV vaccine effectiveness in a low-income, minority population

To determine if hearing about the HPV vaccine form family/friends or discussing the vaccine with family/friends is associated with perceived HPV vaccine effectiveness among female ethnic-minority, medical-decision-makers of vaccine-eligible girls

Data from a cross-sectional HPV vaccine telephone survey administered by the Los Angeles County Office of Women’s Health (OWH)

Los Angeles County women age 18-65 who called in to the OWH hotline. The majority of phone calls come from low income, minority women calling this hotline for health information and medical service referrals (n =490)

1) Perceived HPV vaccine effectiveness
2) Sources of information regarding HPV vaccine
3) Discussion regarding HPV vaccine
4) Social source of information and discussion were associated with higher perceived vaccine effectiveness

**McCave, 2010**

Influential factors in HPV vaccine uptake among providers in four states.

to examine perceived barriers, provider support and vaccination actions in delivering the HPV vaccine for girls ages 9-17 in four US states

Cross-sectional survey with randomly selected primary care providers who were likely to administer the HPV vaccine to girls between the ages of 9-17

Theory of Planned Behavior (TPB) served

Random, purposive sample of 1,500 pediatricians, family physicians, gynecologist, nurse practitioners, and physicans assistance in four states-

survey-providers were recruited through state medical and nursing

Random, purposive sample of 1,500 pediatricians, family physicians, gynecologist, nurse practitioners, and physicans assistance in four states-

survey-providers were recruited through state medical and nursing boards (New

Results of this study concluded that providers in the four states had higher vaccination rates in girls 13-17 compared to the 9-12 year olds. Comments made in the open-ended questions reflect discomfort from the providers and from
<table>
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<th><strong>as a foundation for the development of the survey - individual behavioral intentions included:</strong> personal attitudes, subjective norms, and perceived behavioral control</th>
<th>boards (New Mexico, North Carolina, Texas and Louisiana) 375 providers from each state were mailed a survey-sample sized was based on power analysis using the following estimates: (1)95% power, (2) .01 alpha level, (3) .15 effect size, (4) four predictors - Min 15% response rate -1500 sample size -15% to achieve 95% power Sample size (n=227)</th>
<th>boards (New Mexico, North Carolina, Texas and Louisiana) 375 providers from each state were mailed a survey-sample sized was based on power analysis using the following estimates: (1)95% power, (2) .01 alpha level, (3) .15 effect size, (4) four predictors - Min 15% response rate -1500 sample size -15% to achieve 95% power</th>
<th>Mexico, North Carolina, Texas and Louisiana) 375 providers from each state were mailed a survey-sample sized was based on power analysis using the following estimates: (1)95% power, (2) .01 alpha level, (3) .15 effect size, (4) four predictors - Min 15% response rate -1500 sample size -15% to achieve 95% power</th>
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<tr>
<td><strong>Findings from TPB:</strong> Providers who vaccinate at a higher rate in the 13-17 age groups also have a higher vaccination rate in the 9-12 age group - suggesting providers personal belief have a positive influence on vaccination.</td>
<td><strong>Knowledge, attitudes, and informational behaviors of college students in regard to the Human Papillomavirus</strong></td>
<td><strong>Multiple choice survey (Likert-scale) targeting 1,500 college student enrolled in a public university in Northeast United States</strong></td>
<td><strong>Topics to be measured/descriptive analysis 1)HPV prevalence 2)Modes of transmission 3)Cervical cancer 4)STI risk factors 5)Stigma</strong></td>
</tr>
<tr>
<td><strong>To assess students’ HPV knowledge, attitudes and behaviors</strong></td>
<td><strong>Participants generally understood HPV is an STI (74.8%)</strong> Participants were unclear of the prevalence (13.6%) HPV transmission via skin-to-skin contact (51.8%) and oral sex (49.6%) Participants were misinformed about the fact that most women with HPV infections will not develop cervical cancer</td>
<td><strong>Participants were still ill informed regarding mode of transmission, methods of prevention/transmission, commonality of HPV infection and virus role in cervical cancer</strong></td>
<td><strong>Most college students in this study have heard of HPV</strong></td>
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</table>