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# Relationship Between Stages of Change and HPV Vaccine Attitudes and Beliefs in Baccalaureate Nursing Students

Megan M. Stein

*The University Of Akron*, [mms126@zips.uakron.edu](mailto:mms126@zips.uakron.edu)

Michael Sabo

*The University Of Akron*, [mrs109@zips.uakron.edu](mailto:mrs109@zips.uakron.edu)

Julia Caverly

*The University Of Akron*, [jgc26@zips.uakron.edu](mailto:jgc26@zips.uakron.edu)

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Running Head: STAGES OF CHANGE AND HPV VACCINE ATTITUDES AND BELIEFS

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Michael Sabo, Megan Stein, & Julia Caverly

The University of Akron

Author Note

Michael Sabo, School of Nursing, The University of Akron; Megan Stein, School of Nursing, The University of Akron; Julia Caverly, School of Nursing, The University of Akron. This research was sponsored by Christine Heifner-Graor, PhD, PMHCNS-BC and reviewed by Michele Enlow, DNP, RNC-OB and Jennifer Magee, MSN, RN, ACNS-BC, faculty of the School of Nursing at The University of Akron. Correspondence concerning this article should be addressed to Michael Sabo, Megan Stein, Julia Caverly, or Christine Heifner-Graor, School of Nursing, The University of Akron, Akron, OH 44325. Email: mrs109@zips.uakron.edu, mms126@zips.uakron.edu, jgc26@zips.uakron.edu, or graor@uakron.edu, respectively.

**Relationship Between Stages of Change and HPV Vaccine Attitudes and Beliefs in  
Baccalaureate Nursing Students**

The genital human papillomavirus (HPV) is a sexually transmitted infection (STI) with potentially serious health consequences. Approximately 79 million people in the United States are infected with HPV, and another 14 million people become newly infected with this virus each year (“Genital HPV infection,” 2013). According to the Center for Disease Control (CDC), about 33,300 HPV associated cancers occur each year (“HPV-associated cancer risks,” 2013). HPV is responsible for more than 90% of anal and cervical cancers and more than 50% of vaginal, vulvar, and penile cancers (“HPV-associated cancer risks,” 2013). Recent studies show that 60%–70% of cancers of the oropharynx may also be linked to HPV. Cervical cancer is the most common HPV-associated cancer among women, and oropharyngeal cancers are the most common among men (“HPV-associated cancer risks,” 2013).

Gardasil, a vaccination for HPV, is used to prevent cervical cancer, cancer of the vagina and vulva, and genital warts. Gardasil is the only HPV vaccine that protects against four different types of HPV: types 6, 11, 16, 18. In girls and young women, ages 9 to 26, Gardasil protects against two types of HPV that cause about 75% of cervical cancer cases, as well as the two other types that cause about 90% of genital warts cases. Gardasil also protects girls and young women, ages 9 to 26, against approximately 70% of vaginal cancer cases and up to 50% of vulvar cancer cases (“Gardasil,” 2013). In boys and young men, ages 9 to 26, Gardasil protects against approximately 90% of genital warts cases. (“Gardasil,” 2013).

The literature shows that there is a lack of knowledge about the availability of the vaccine and who can get it (Mendes, 2013). In an American Cancer Society study of 1,417 people, Mendes (2013) categorized those who are 9 to 26 years old or those who have immediate family members 9 to 26 years old as “HPV vaccine-relevant.” Although this is the target age group for the HPV vaccine, the vaccine works best when given to individuals before they have sexual contact with another person. Mendes (2013) found that seven in ten people said they “don’t know” when asked: “How successful is the HPV vaccine at preventing cervical cancer?” This suggests lack of knowledge about who can get the HPV vaccine, what it protects against, and how to get it. Further, a review of current studies shows several additional gaps in knowledge. Despite the fact that there is an interest in HPV vaccine research, few researchers have examined the attitudes, beliefs, behaviors, and knowledge of the HPV vaccine, particularly in males, minorities, and high-risk populations (e.g. college students) (Mehta, Sharma, & Lee, 2013; Patel, et al., 2012; Patel, et al., 2013; Bendik, Mayo, & Parker, 2011). Moreover, information is needed on how HPV information is made available and transmitted to the public (Aleshire, Lock, & Jensen, 2013; Sandfort & Pleasant, 2009; Lindsey, DeCristofaro, & James, 2009). The purpose of this study is twofold: (a) determine the relationship between beliefs/attitudes about HPV vaccination and stages of change and (b) investigate gender differences in beliefs/attitudes and stages of change. The design of this study is cross-sectional and descriptive correlational. The following questions are answered:

1. Is there a relationship between attitudes and beliefs about HPV vaccination and stages of change?

2. Are there gender differences in beliefs/attitudes and stages of change?

## **Review of the Literature**

### **Beliefs and Attitudes of HPV**

Many researchers have examined knowledge, beliefs, and attitudes regarding HPV. In a study of men, Newman, Logie, Doukas, and Asakura (2013) found that HPV vaccine benefits and healthcare provider recommendation were the two most influential predictors of HPV vaccine acceptability. In a study of women, researchers have found limited knowledge base regarding HPV and engagement in high-risk sexual behavior (Aleshire, Lock, & Jensen, 2013), however, Bendik, Mayo, and Parker (2011) found that knowledge, increased perceived severity of HPV, and cervical cancer were associated with receiving the vaccine. In studies of men and women, researchers have found that, overall, both men and women were in the contemplation stage of change regarding HPV beliefs and attitudes (Patel, et al., 2013). In summary, knowledge about HPV vaccine benefits, healthcare provider vaccine recommendation, and perceived severity of cervical cancer were associated with HPV vaccine acceptability and vaccination status. Moreover, the majority of the population is in the contemplation stage of change regarding HPV vaccine beliefs and attitudes, and the majority of individuals with HPV have not disclosed their STI to their partners, leading to higher levels of sexual anxiety and depression, and lower levels of sexual optimism and satisfaction.

### **Perceptions and Risks of HPV**

Researchers have also described perceptions and risks of HPV. In a study of men, Mehta, Sharma, & Lee (2013) found that there was a lack of perceived susceptibility to HPV, perceived

severity of HPV, and barriers to receiving the HPV vaccine. In a study of women, Ratanasiripong (2012) found that although women saw HPV as serious, many did not perceive themselves to be at risk of acquiring HPV, and barriers exist that prevent them from obtaining the vaccine. As a result of these two studies, both men and women face barriers to receiving the HPV vaccine. And although women perceive HPV to be more serious than men, both men and women do not perceive themselves to be at risk for acquiring HPV. They have also found that the majority of individuals with HPV who were in a relationship reported not having disclosed their sexually transmitted infection (STI) to their partners, leading to higher levels of sexual anxiety and depression, and lower levels of sexual optimism and satisfaction (Newton & McCabe, 2008) possibly contributing to attitudes and beliefs about the vaccine itself.

### **Outcomes of HPV Education Interventions**

Finally, researchers have investigated the effect of intervention on outcomes of HPV. Patel et al. (2012) examined the effect of an education based intervention on HPV vaccine uptake in 256 women. They found that the intervention (HPV-specific education and a mailed reminder two weeks after receiving the education) was not significantly associated with HPV vaccine uptake. Sandfort & Pleasant (2009) found that there is a need for publicly funded information programs about HPV. In summary, educational-based interventions do not significantly affect HPV vaccine uptake or compliance, and there is a need for publicly-funded information regarding HPV which targets specific groups, suggesting that there is a need for innovation in STI education. Also, innovative tests to detect cytologic changes associated with HPV infection,

such as anal pap smears, can be useful in the prevention, detection, and treatment of diseases related to HPV infection.

### **Theoretical Framework**

This study is guided by the Transtheoretical Model of Change (TMC). The TMC is a model that combines the process of change with the principles from different interventions and behavior changes over time as an individual goes through a series of stages (Prochaska, Redding, Harlow, Rossi, & Velicer, 1994 ). This theory allows for assessment of readiness to change by presenting change as a spectrum. The five stages of change are: precontemplation, contemplation, preparation, action, and maintenance. See Appendix A for an example of a model of the Transtheoretical Model of Change. Precontemplation is the stage at which people have no intention to change behavior in the foreseeable future. Many individuals in this stage are unaware or under-aware of this health risk. Contemplation is the stage in which people are aware that a problem exists and are seriously thinking about overcoming it but have not yet made a commitment to take action. Preparation is a stage that combines intention and behavioral criteria. Individuals in this stage are intending to take action in the next month and have unsuccessfully taken action in the past year. Action is the stage in which individuals modify their behavior, experiences, or environment to overcome their problems. Action involves the most overt behavioral changes and requires considerable commitment of time and energy. Maintenance is the stage in which people work to prevent relapse (Prochaska, et.al., 1994). The TMC is appropriate for this study because it allowed the participants to be assigned to categories to assess their readiness to change related to the HPV vaccine. By use of the TMC, the

researchers were able to draw conclusions related to beliefs and attitudes of the HPV vaccine and readiness to change. The following questions were used to assess stage of change. Participants answered yes or no to the following statements:

### **Precontemplation**

“I do not plan to get vaccinated.”

### **Contemplation**

“I am unsure about my intention to get vaccinated.”

“I do not plan to get vaccinated in the next 6 months.”

### **Preparation**

“I plan to get vaccinated (1st shot) in the *next 6 months* but have not tried to schedule an appointment.”

“I plan to get vaccinated (1st shot) in the *next month* but have not tried to schedule an appointment.”

“I have made or tried to make an appointment to discuss HPV vaccination with my medical provider.”

“I have made or tried to make an appointment to get vaccinated against HPV.”

### **Action/Maintenance**

“I have received at least 1 shot, but do not have plans for future shots.”



“I have received at least 1 shot, and am scheduled to receive the next shot in the HPV vaccine series.”

“I have received all 3 shots of the HPV vaccine.”

## **Method**

### **Design**

This quantitative study employs a cross-sectional, descriptive correlational design to gather data from a group of participants at one point in time. The study lacks manipulation of the intervention, control, and randomization, which defines it as a descriptive study. An online survey was used to collect data from participants who are students in a school of nursing. Descriptions of the study and consent forms were emailed to the students, creating a convenience sample rather than a random selection of participants. The study uses a descriptive design to construct a picture of the situation as it is naturally happening without manipulation. The descriptive correlational design is also used in this study to explain the relationship between beliefs and attitudes and readiness to change, which will be further examined as predictability. After the researchers obtained approval from the university’s institutional review board, recruitment and data collection took place.

### **Site and Sample**

The participants of this study include sophomores through seniors enrolled in the baccalaureate nursing program at large urban public university in the Midwest of the United States. The total number of students at the university for 2013 was 22,122. The number of

students in the school of nursing in 2013 was about 1,000 including undergraduate and graduate students. There are about 400 graduate students in the nursing program; the types of nursing programs for graduate students are Master of Science in Nursing (MSN), Doctor of Philosophy (PhD), and Doctor of Nursing Practice (DNP) programs. The undergraduate students make up about 600 students and the undergraduate programs include traditional Bachelor of Science in Nursing (BSN) (468 students), Registered Nurse (RN) to BSN, Accelerated BSN, and Licensed Practical Nurse (LPN) to BSN.

The convenience sample was comprised of undergraduate baccalaureate nursing students aged 18 years or older. Exclusion criteria include accelerated nursing students, RN/BSN, LPN/RN, and graduate nursing students. No persons were excluded based on gender, ethnicity, race, sexual orientation, marital status, or age provided that they were at least 18 years old.

### **Sampling and Data Collection Procedures**

To recruit participants for this study, the co-investigators (Co-Is) sent out three waves of emails to all nursing students in the undergraduate BSN program, explaining what the study is for, what it is about, who is conducting the study, and participant rights and responsibilities. The survey invites were sent approximately three weeks apart. In the emails, the co-investigators explained that submitting the survey will convey informed consent. Potential participants were informed that participation is voluntary. They were also told that they can choose to abort the survey at any time or not respond to a survey item. Those who elected to participate in the study accessed the survey by clicking the link in the email.

The email directed the participants to another survey website (Qualtrics) that allowed their identities to be concealed. Participants were allowed to complete the survey electronically and at their own convenience. Electronic survey completion allowed for automated data entry, decreasing error in collection. Disconnecting participants from their survey submissions further allowed for the protection of human participants.

### **Measures**

Beliefs and attitudes and readiness to change were measured with a 5-point Likert scale, modeled after the data collection tool used by researchers of a previous study (Patel, et. al., 2012). The instrument includes 13 questions about the HPV vaccine to assess beliefs and attitudes about HPV and its vaccine. Participants were asked to respond to each item on a 5-point Likert scale of strongly disagree, disagree, neutral, agree, and strongly agree, generating an ordinal level of measure. This survey was pretested for timing and comprehension and revised before collecting data in the study outlined by Patel, et. al. (2012). Item ratings were coded and summed, so higher scores indicate greater understanding of the disease itself and the vaccine. Summed ordinal levels of measure resulted in interval levels of measure, which then supported the use of multiple regression analysis. Readiness to change was assessed using a 10-question survey with dichotomous *yes/no* answers. Yes responses were coded as 1 with higher levels of readiness weighted so that higher overall scores indicated greater readiness to change. Level of measure was interval, further supporting use of Pearson correlation analysis. A sample of the survey that participants filled out can be found in Appendix B.

Patel et al. (2012) did not report any data on validity or reliability of the survey tools used. The tools were, however, pretested in a convenience sample of university students for timing and comprehension, and then revised before use in this study. It can be inferred that, given the expert knowledge of the researchers (PhD, MPH; MD, PhD (2); and MD), the tools have content validity, tested by face validity. The primary outcome measure, HPV vaccination stage of change, was assessed in accordance with the TMC. One of the core constructs of the TTM interprets change as a process which involves progress through a series of stages. The TTM was used to construct survey questions which directly correspond to each respective stage of change. Demographic data collected included: age, gender, level of education, ethnicity, marital status, sexual orientation, sexual activity, age of first sexual encounter, number of sexual partners, gender of sexual partners, and possession of health insurance.

### **Data Analysis**

Data were imported into IBM's SPSS, a software statistical program for social scientists. Descriptive statistics of percentages, frequencies, means, and standard deviation were used to describe the sample and variables, depending on the levels of measure. Significance levels were set at  $p$ -values less than 0.05. Question 1 is: Is there a relationship between HPV vaccination attitudes and beliefs and stage of change in obtaining the vaccine? Pearson correlations were used to determine relationships. Question 2 is: Are there gender differences in beliefs/attitudes and stages of change? An independent  $t$ -test was used to determine gender differences in HPV vaccine attitudes and beliefs and getting the vaccine. Level of statistical significance was set at  $p$  values < .05.

## Results

### Sample

In this study, 131 participants completed the online investigating the relationship between stages of changes and the HPV vaccine attitudes and beliefs in baccalaureate nursing students. Age ranged from 18-55 years with a mean age of 22.2 (SD= 5.435). Approximately 34% (N=44) were sophomores, 27% (N=35) were juniors, and 40% (N=52) were seniors. The vast majority was Caucasian (94%) with 3% African American, 2% Asian, and 1% Hispanic/Latino. Most (91%) were never married with 8% married, and 2% divorced. The majority of the participants were female (88%), 12% being males, and 1% identifying as transgender. Of the 131 participants 95% identify their sexual orientation as heterosexual, 2% identify as homosexual, 2% as bisexual, and 1% identifies as other. The average age that participants became sexually active was 16.6 (SD= 3.650). The number of sexual partners ranges from 0-36 with a mean of 4 (SD=5.523). IP numbers are identified on the surveys and analyzed to account for one participant completing more than one survey. Approximately 72% of participants of the survey reported that they are currently sexually active and 22% have never been sexually active. Of the 72% who are sexually active 69% have male partners, 7% have female partners, and 3% have both male and female partners. Most of the participants (93%) have health insurance and 7% are uninsured.

### Research Question #1

The first research question asked if there is a relationship between attitudes and beliefs about HPV vaccination and stages of change. The results showed that the stage of change was

positively and moderately related with attitude and beliefs about HPV vaccines ( $r=.36$ ,  $p<.001$ ; see Table 1), indicating that as attitudes and beliefs about HPV vaccination increase or become more favorable, so does stage of change. Therefore, those with more favorable beliefs and better attitudes about HPV vaccination are more likely to either be in the process of getting vaccinated or have already been vaccinated.

It was also found that one's attitudes and beliefs, whether in general or more personal, especially related to support from others, were positively and moderately related with stage of change ( $r=.29$ ,  $p<.01$ ;  $r=.33$ ,  $p<.001$ , respectively; see Table 1). Therefore, those who feel more supported by their family, religious institution, and healthcare providers, as well as those who possess a personal belief that the HPV vaccine is a good idea in general, are more likely to either be in the process of getting vaccinated or have already been vaccinated.

Table 1: Relationship Between Attitudes and Beliefs of HPV Vaccination and Stage of Change

	Attitudes and Beliefs (r)	Personal and Vulnerable Attitudes and Beliefs (r)	General Attitudes and Beliefs (r)
Stage of Change	0.36**	0.29*	0.33**

(\*\* $p<0.001$ , \* $p<0.01$ )

## Research Question #2

The second research question asked if there is a difference in beliefs/attitudes and stage of change related to gender. In this sample, HPV vaccine beliefs and attitudes scores ranged from 30 to 61 and averaged 47.27 ( $SD=7.96$ ). Scores for subjects identifying as males ( $n=15$ )

ranged from 30 to 61, averaging 47.27 (SD=7.96); those identifying as females (n=101) ranged from 29-59 and averaged 47.67 (SD=6.78). Scores for those identifying as transgender (n=1) were 57. An independent t-test was used to determine differences in male and female mean belief and attitude scores; no significant differences were found ( $t=-.21$ ,  $p=.83$ ). Therefore, male and female subjects were similar in HPV vaccine beliefs and attitudes.

Of male subjects (n=15), 71% were in the contemplative stage (n=10), 14% were in the preparation stage (n=2), and 14% were in the action and maintenance stage (n=2). Of female subjects (n=101), 3% were in the pre-contemplative stage (n=3), 28% in the contemplative stage (n=30), 11% in the preparation stage (n=11), and the remaining 56% in the action and maintenance stages (n=57). An independent t-test was used to determine differences in male and female mean change stage scores. There were statistically significant differences in change stage related to gender ( $t=-2.99$ ,  $p=.003$ ) with females more likely to be either in the process of getting vaccinated (preparation stage) or already vaccinated, compared with males who were more likely to be in the contemplative stage. Therefore, in spite of no gender differences in beliefs and attitudes about HPV vaccines, males were less likely to have made efforts to be vaccinated.

### **Discussion**

Key findings in relation to research question one include a relationship between having positive personal ideals about the HPV vaccine and being further along in the stages of change framework. Therefore, the Transtheoretical Model of Change was supported because a relationship between a supportive environment and feeling supported in obtaining the HPV

vaccine (by family, healthcare provider, religious institution, etc.) in general, are also more likely to be further along in the stages of change framework.

Although male and female subjects are similar in HPV vaccine beliefs and attitudes, female subjects indicated that they were more likely to be either in the process of getting vaccinated (preparation stage), whereas males indicated that they are more likely to be in the contemplative stage. One possible explanation for this is that the vaccine is recommended for males as well as females; however, not all men realize that it is equally recommended for men to be vaccinated due to the fact that they are carriers of the disease. A review of literature showed that men have a lack of perceived susceptibility to HPV and perceived severity of HPV (Mehta, Sharma, & Lee, 2013). It is possible that lack of knowledge accounts for disparity between men's beliefs and attitudes and the actions they are taking. Furthermore, it is shown that healthcare provider recommendations and vaccine benefits are the two most influential correlations to actually receiving the vaccine for males (Newman, Logie, Doukas, & Asakura, 2013). It is possible that healthcare provider recommendations are affecting this as well.

### **Limitations**

Limitations of this study include a small sample and a highly selective convenience sample. It is possible that the data could show different results with an increased sample size, larger number of male participants, larger number of LGBT participants, a more racially diverse sample, and inclusion of participants beyond the school of nursing. Therefore, researchers need to study larger and more diverse samples.



### **Conclusion**

This study provides insight on attitudes and beliefs of baccalaureate nursing students at a large urban public university in the Midwestern United States regarding the HPV vaccine and factors that affect intention and uptake of the vaccine. The results indicate that those with more favorable beliefs and better attitudes about HPV vaccination are more likely to either be in the process of getting vaccinated or have already been vaccinated. Moreover, those who feel a sense of support from others, as well as those who possess a personal belief that the HPV vaccine is a good idea in general, are more likely to either be in the process of getting vaccinated or have already been vaccinated. Lastly, despite the fact that male and female subjects were similar in HPV vaccine beliefs and attitudes, males were less likely to have made efforts to be vaccinated. Community health and primary care nurses especially should explore potential barriers to HPV vaccination in the male population and advocate for increased uptake in males. Further research should address barriers to vaccination, healthcare provider beliefs and attitudes of the HPV vaccine, and healthcare provider efforts to increase education, awareness, and uptake of the vaccine.

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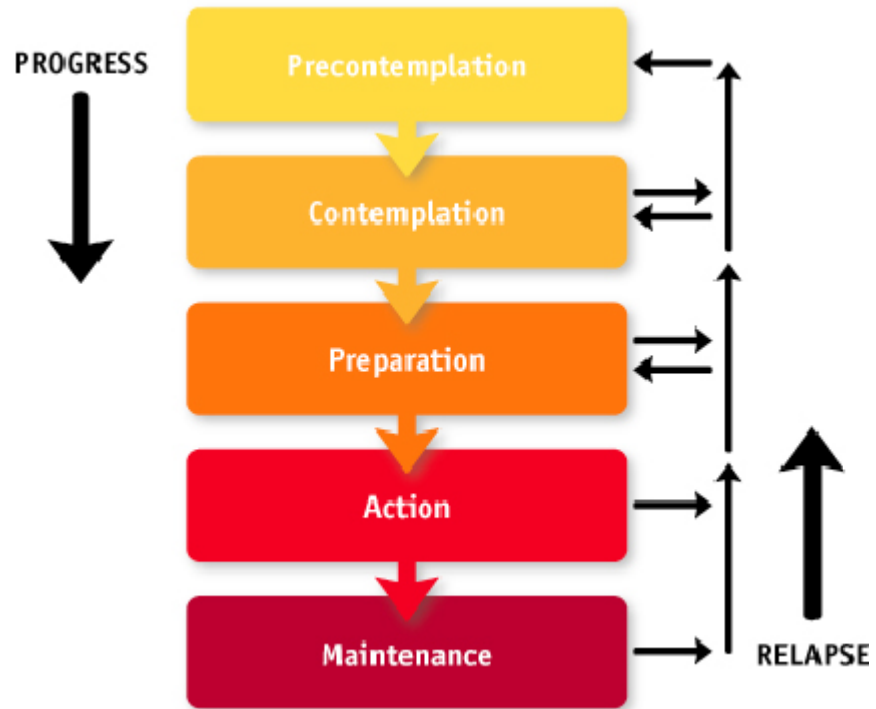
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Appendix A



**Appendix B**

Please select the response that best fits for you:

1. Having genital HPV would make it difficult for me to get a long-term partner.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

2. A vaccine that prevents a sexually transmitted infection is a good idea.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

3. A vaccine that prevents HPV-related cancer is a good idea.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

4. A vaccine that prevents genital warts is a good idea.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

5. Getting the HPV vaccine would help me stay healthy.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

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6. Getting the HPV vaccine would be a benefit to my partner.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

7. Getting the HPV vaccine would be a benefit to society.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

8. I am likely to get a genital HPV infection in my lifetime.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

9. I am likely to develop HPV-related cancer in my lifetime.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

10. I am likely to develop genital warts in my lifetime.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

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11. My parents would approve of me getting the HPV vaccine.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

12. My health care providers would approve of me getting the HPV vaccine.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5

13. My religious institution would approve of me getting the HPV vaccine.

<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	2	3	4	5



<b>Please select yes or no for the following:</b>	<b>Yes</b>	<b>No</b>
I do not plan to get vaccinated.		
I am unsure about my intention to get vaccinated.		
I do not plan to get vaccinated in the next 6 months.		
I plan to get vaccinated (1st shot) in the <i>next 6 months</i> but have not tried to schedule an appointment.		
I plan to get vaccinated (1st shot) in the <i>next month</i> but have not tried to schedule an appointment.		
I have made or tried to make an appointment to discuss HPV vaccination with my medical provider.		
I have made or tried to make an appointment to get vaccinated against HPV.		
I have received at least 1 shot, but do not have plans for future shots.		
I have received at least 1 shot, and am scheduled to receive the next shot in the HPV vaccine series.		
I have received all 3 shots of the HPV vaccine.		