Published in final edited form as:
Hum Vaccin. 2010 June ; 6(6): 467–475.

Acceptability of prophylactic human papillomavirus vaccination among adult men

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Abstract

Objectives—HPV vaccine acceptability was examined as part of a cohort study of HPV infection among adult males.

Methods—Between July 2004 and June 2007, 445 adult males aged ≥18 years were enrolled primarily from a university-based population. A structured questionnaire addressed HPV vaccine awareness, attitudes, and intention to be vaccinated.

Results—Overall, 69% of men reported that they were likely or very likely to be vaccinated against HPV if a prophylactic vaccine were available. Men most frequently cited side effects (69%), efficacy (65%), and safety (63%) as the major factors that would influence their decision to be vaccinated against HPV. Issues of vaccine costs and efficacy were important considerations for men of vaccine-eligible ages (18–26 years).

Men who cited cost as a major factor in their HPV vaccine decisions and those indicating cost as a potential barrier had greater intention to be vaccinated. Heterosexual men had less intention to be vaccinated compared to men who have sex with men.

Conclusion—Acceptability of HPV vaccination among males is generally high. Costs and sexual history may influence vaccine utilization.

Introduction

Human papillomavirus (HPV) is the primary causal agent of cervical cancer and also plays an etiologic role in malignancies of the vagina, vulva, anus, penis, oral cavity and oropharynx.[1] Two prophylactic HPV vaccines have been developed and are available internationally. The quadrivalent vaccine against HPV 6, 11, 16, and 18 has been available in the United States since June 2006 when it was approved for use in females ages 9–26 years for the prevention of cervical cancer and anogenital warts.2 In 2009, a bivalent vaccine against HPV 16 and 18 was approved in the U.S. for females of the same age group for the prevention of cervical cancer. Also in 2009, the quadrivalent vaccine was approved for use in the U.S. for the prevention of anogential warts in males ages 9–26. (http://www.cdc.gov/vaccines/recs/provisional/downloads/hpv-vac-dec2009-508.pdf)

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Disclosures: B. Hernandez has previously received consultation and research funds from the Merck Corporation, manufacturer of the quadrivalent HPV vaccine, *Gardasil*. The research funds were for a project unrelated to the study described in this manuscript.

Vaccine acceptability among parents will be a critical determinant of HPV vaccine usage among boys and adolescent males. Acceptability of the vaccine among young adult men themselves will influence its usage in this age group. While HPV vaccine attitudes have been examined in females and in parents, only a few such studies have included adult males.[3–5] Among Dutch college students, acceptance of HPV vaccination was greater among women than men and among younger than older individuals.[3] In a sample of U.S. men, vaccine acceptance was greater among men with a higher education, those engaging in sexual and non-sexual high-risk behaviors, and men with a greater knowledge of HPV.[4] In the present study, we examined HPV vaccine awareness, attitudes, and intent to be vaccinated in a cohort of U.S. adult men of a wide age range who were participating in a study of HPV infection. This study spanned a period both before and after availability of the first HPV vaccine approved for use in females in the U.S. and prior to approval of vaccine use in U.S. males.

Results

Between July 2004 and June 2007, 445 adult males aged 18–79 were enrolled. Table 1 summarizes the characteristics of the study population and the responses to vaccine-related questions. The study population was largely ≤26 years (62%), U.S.-born (82%), White (58%), unmarried (84%), sexually active heterosexual (80%) men. The majority were college students (66%) and 21% reported a history of a sexually transmitted infection (STI). The background of study participants was generally comparable relative to the date of enrollment before and after June 2006 when the quadrivalent vaccine was approved for use in U.S. females. An exception was sexual orientation: MSM consisted of a larger proportion of study participants enrolled before (24%) than after (15%) vaccine approval ($p = 0.04$). MSM were also substantially older than heterosexual study participants (77% vs. 27% >26 years, $p<0.0001$).

Overall, a total of 16% of men reported ever hearing about the HPV vaccine (Table 1). Vaccine awareness varied with date of enrollment. Among men enrolled in the study prior to June 1, 2006, only 7% had heard of the vaccine compared to 31% of men enrolled after that date ($p<0.0001$). Sixty-nine percent of men reported that they were likely or very likely to be vaccinated against HPV should it become available, and 31% responded that they were unlikely or very unlikely to be vaccinated. There were no differences in the intention to be vaccinated between the time periods before and after June 1, 2006.

The major issues men wanted information on before making a decision to be vaccinated were side effects (69%,), efficacy (65%), and safety (63%) (Table 1). Men enrolled in the study after June 1, 2006 cited vaccine side effects more frequently than those enrolled prior to vaccine approval (75% vs. 66%, $p = 0.05$). Men indicated cost as the predominant potential barrier that would prevent men from getting the HPV vaccine (73%). Other reported reasons were not thinking that the vaccine would work (35%) and having to go to the clinic for 3 shots over 6 months (27%). Twenty–four percent of respondents cited other reason(s). The majority of these self-described other reasons were related to vaccine safety (data not shown).

Responses to HPV vaccination questions were compared by groups age-eligible (18–26 years) and age-ineligible (>26 years) for vaccination. There were no differences in vaccine awareness or intent to be vaccinated by age group. Compared to those older than 26 years, younger men more frequently cited how well the vaccine works (58% vs. 69%, $p= 0.02$) and vaccine costs (35% vs. 52%, $p<0.001$) and less frequently indicated vaccine safety (70% vs. 59%, $p=0.02$) and health care provider recommendation (25% vs. 17%, $p=0.04$) as considerations in making a decision to be vaccinated. The vaccine schedule requiring 3 shots

over 6 months was more frequently reported to be a potential barrier to vaccination among men ≤26 years (31%) compared to men >26 years (22%) (p=0.05). Younger men also more frequently reported time off from work or school as potential barriers (19%) than men >26 years (11%) (p=0.03).

Intent to be vaccinated was examined with and without adjustment for age and date of enrollment (Table 2). Vaccination intent did not differ by enrollment date, age, race, education level, birthplace, marital status, age of initial sexual activity, number of female sexual partners, circumcision status, substance use history, female partner's Pap smear history, self-reported STI history, or genital HPV DNA status (unknown to the individual at the time of the interview).

There were some differences by sexual orientation and practices. Sixty-eight percent of heterosexual men intended to be vaccinated compared to 75% of MSM (adjusted OR 0.54, 95% CI 0.30–0.97). Among heterosexual men, 59% of men who engaged in male oral-female anal contact intended to be vaccinated compared to 72% of those who did not engage in this type of sexual contact (adjusted OR 0.57, 95% CI 0.35–0.93). Similarly, men with history of male hand-female anal contact had less intention to be vaccinated than those who did not (61% vs. 73%, respectively, adjusted OR 0.60, 95% CI 0.40–0.92).

Men indicating cost as a major factor in HPV vaccination decisions had greater intention to be vaccinated compared to men who did not (74% vs. 65%, respectively, adjusted OR 1.53, 95% CI 1.01–2.33). Similarly, men who reported cost as a potential barrier to vaccination had greater intention to be vaccinated (73% vs. 60%, respectively, adjusted OR 1.76, 95% CI 1.12–2.74). Men citing the opinion of their sexual partner as a major factor in their vaccination decision had less intention to be vaccinated compared to those who did not (42% vs. 71%, respectively, adjusted OR 0.30, 95% 0.13–0.69). Men who indicated that the vaccine schedule of three-shots over 6 months as a potential barrier to vaccination had less intention to be vaccinated than those who did not (61% vs. 72%, respectively, adjusted OR 0.57, 95% CI 0.37–0.89).

Discussion

We examined the acceptability of HPV vaccination—including vaccine awareness, attitudes, and intention to be vaccinated—in an exclusively adult male population. Our study spanned a period immediately before and after approval of the use of the quadrivalent HPV vaccine for U.S. females in June 2006 and prior to the approval of vaccine use in males in 2009. Awareness of HPV vaccination was substantially higher among participants enrolled after June 2006. This increased awareness is consistent with heightened local and national media attention in the U.S. which followed the availability of the vaccine. Overall, a large majority of men reported that they were likely or very likely to be vaccinated against HPV. Interestingly, the proportion of men indicating their intention to be vaccinated was comparable before and after the quadrivalent vaccine first became available for women. This may reflect the limited influence of female-targeted media and advertisements on males.

In 2009, the quadrivalent HPV vaccine was approved for use in the U.S. for the prevention of anogential warts in males ages 9–26. It is possible that HPV vaccine uptake in young men may be particularly challenging given a recent national study that found that HPV vaccine uptake in women ages 18–26 in the U.S. was far lower than that of females 13–17 years.[6] We were able to compare willingness to be vaccinated against HPV among adult men age-eligible and not age-eligible for vaccination. Interestingly, while concerns about HPV vaccine efficacy, safety, costs, as well as the influence of health care providers varied by

age, we observed no differences in the intention to be vaccinated between men ≤26 and >26 years.

Vaccine side effects were the most important factor that men indicated would influence their HPV vaccination decisions. A greater proportion of men enrolled in our study after vaccine approval were concerned about side effects compared to those enrolled earlier. This may also be attributed to increased media attention-- both favorable and unfavorable-- following vaccine approval. Vaccine safety was another important consideration in a man's decision to be vaccinated although men >26 years were more concerned about vaccine safety than those ≤26. Vaccine efficacy was also a major issue in vaccination decisions but was more of a concern among younger men. Efficacy is an important predictor of HPV vaccine acceptability among adult females and parents.[7]

Cost was the most important potential barrier to vaccination although no specific vaccine cost information was provided to study participants. Men ≤ 26 years more frequently indicated cost as a consideration in their decision to be vaccinated. It is likely that younger men represent a more uninsured and underinsured population with fewer financial resources. Other practical issues which may be related to income and economic stability-- time off from school or work and the 3-visit vaccine schedule-- were also considered to be greater potential barriers among young men. Interestingly, both men who cited cost as a major consideration in the decision to be vaccinated and those indicating cost as a potential barrier to vaccination had greater intention to be vaccinated. Cost was also found to be an independent predictor of HPV vaccine acceptability among U.S. male college students.[5]

Heterosexual men had less intention to be vaccinated than MSM. MSM were older and were more likely to be early enrollees in the study. Earlier enrollment may be attributed to greater interest in participating in research focused on sexual health due to perceived sexual risk. Nonetheless, the association of sexual orientation with intention to be vaccinated was observed when adjustment was made for both age and enrollment date.

Heterosexual men who engaged in anal contact with females not involving intercourse had less intention to be vaccinated. Such sexual practices may be perceived as low risk behaviors with respect to STI exposure. Consistent with these findings, in a study of U.S. men, HPV vaccine acceptance was greater among men engaging in sexual high-risk behaviors.[4] Sexual activity and perceived susceptibility to HPV infection were found to be independent predictors of HPV vaccine acceptability among male heterosexual college students.[5] Perceived risk of HPV infection is also a predictor of vaccine acceptability among U.S. adult females and parents.[7, 8] Interestingly, men who cited the importance of the opinion of their sexual partners in their vaccine decisions had less intention to be vaccinated.

The major focus of the cohort was to examine the epidemiology and natural history of HPV infection in adult men. It was not intended to provide an assessment of HPV vaccine acceptability in the general population of men in Hawaii. For this reason, a number of limitations must be considered in the interpretation of the results.

Our evaluation did not address knowledge or awareness of HPV among study participants. Men participating in this study may not represent the general population of adult men with respect to *a priori* knowledge of HPV and HPV vaccination or sexual risk behaviors and other practices that may influence attitudes towards vaccination. Rather, our study population may reflect men who are more motivated to be vaccinated against HPV. Given their participation in a study of HPV, the men in our study may have been more knowledgeable about HPV than the general population of U.S. men. Acceptance of HPV vaccination was observed to be greater among men with more knowledge of HPV.[4]

Given the nature of this study, participants were likely not representative of the general U.S. male population with respect to risk of sexually transmitted infections. Indeed, over 20% of participants reported a history of one or more STIs. Accordingly, the level of interest in HPV vaccination in this high-risk population may be more than that observed in other men.

In our population of sexually active men, a proportion are likely previously infected with one or more HPV types covered by the quadrivalent vaccine and would therefore not fully benefit from prophylactic vaccination. Indeed, in a previous analysis, HPV DNA was detected in the external genitals of over half of men in this cohort.[9]

The present evaluation identified a number of factors influencing HPV vaccine acceptability among adult males. Our study population included young men who fall within the age groups for whom the quadrivalent vaccination was recently approved in the U.S.. Acceptability will be critical to population coverage in this age group and its long-term effect on reducing HPV-associated disease among men, and, possibly, in their sexual partners.

Materials and Methods

Study Design and Recruitment

This natural history cohort was established to evaluate HPV infection in men.[9, 10] The study was approved by the Committee on Human Studies of the University of Hawaii and written, informed consent was obtained from all study subjects. Study participants were primarily recruited from a university-based population in Hawaii. The study was promoted through campus flyers, newspaper advertisements, and invitations sent to the e-mail addresses of enrolled male undergraduate and graduate students. The study was also promoted on a limited basis through general public venues. Eligible men were 18 years and older and English-speaking with no history of blood-clotting disorders (blood was collected for serologic testing). Study visits were conducted at the University of Hawaii's University Health Services and the Cancer Research Center of Hawaii. All participants received monetary compensation for their time and transportation. HPV status was unknown to the study participant at the time of the interview. HPV DNA testing methods and results are detailed elsewhere.[9, 10]

Interview

A comprehensive, structured questionnaire was administered by a trained interviewer at study enrollment. The questionnaire queried demographic information and medical, sexual and reproductive history. Of the 56 questions included in the questionnaire, four multiple-choice questions addressed HPV vaccine awareness, attitudes, and intention to be vaccinated: (1) “Have you ever heard of a vaccine for HPV (human papillomavirus)?” Yes/No; (2) “How likely is it that you would get a vaccine that prevents some HPV infections? Very unlikely/unlikely/likely/very likely; (3) “What would you want to know about the HPV vaccine before you made a decision to get the vaccine? Check the boxes for the 3 most important things you would want to know.”; and (4) “What do you think would prevent or stop you from getting the HPV vaccine? Check 2 boxes only.” For question 3, a list of 11 choices were listed including “Other (describe)”; for question 4, a list of 8 choices were listed including “Other”. Questions about general HPV knowledge or awareness of HPV were not included.

Statistical analysis

All analyses were conducted using SAS (version 9). Associations between factors and categorical responses to questions were examined using chi-square tests. The relationship of

factors with the likelihood of vaccination (likely or very likely versus very unlikely or unlikely) was evaluated using unconditional logistic regression to calculate odds ratios and 95% confidence intervals. Odds ratios were adjusted for age as a continuous variable and enrollment as a categorical variable (before or after June 1, 2006).

Acknowledgments

We extend our gratitude to the staff of the Cancer Research Center of the University of Hawaii (UH) and the UH University Health Services.

Financial support: Centers of Biomedical Research Excellence Program (award P20 RR018727 from the National Center for Research Resources, National Institutes of Health).

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Table 1

Male study population and HPV vaccination awareness, attitudes, and intent, Hawaii, 2004–2007

	All (n=445)		Before June 1, 2006[1] (n=275)		June 1, 2006 or later[1] (n=170)		
	No.	%	No.	%	No.	%	p[2]
Age (years)							
18–26	278	62	169	61	109	64	
>26	167	38	106	39	61	36	0.57
Race [3]							
White	258	58	163	59	95	56	
Asian	35	8	25	9	10	6	
Pacific Islander	41	9	21	8	20	12	
Other	111	25	66	24	45	26	0.29
Education level [4]							
< 4-year college degree	315	71	188	68	127	75	
4-year college degree or higher	130	29	87	32	43	25	0.15
Birthplace							
U.S.	364	82	221	80	143	84	
Non-U.S.	81	18	54	20	27	16	0.32
Marital status [5]							
Single, never married	373	84	232	85	141	83	
Ever married or living as married	71	16	42	15	29	17	0.63
Sexual history [6]							
Men who have sex with men	88	20	63	24	25	15	
Heterosexual	343	80	205	76	138	85	0.04
History of any STI (self-report; excludes genital warts)							
No	352	79	212	77	140	82	
Yes	93	21	63	23	30	18	0.18
Have you ever heard of a vaccine for HPV (human papillomavirus)?							
Yes	72	16	20	7	52	31	
No	373	84	255	93	118	69	<0.0001
How likely is it that you would get a vaccine that prevents some HPV infections?							

	All (n=445)		Before June 1, 2006[1] (n=275)		June 1, 2006 or later[1] (n=170)		
	No.	%	No.	%	No.	%	p[2]
Very unlikely	46	10	26	10	20	12	
Unlikely	91	21	66	24	25	15	
Likely	151	34	91	33	60	35	
Very likely	157	35	92	33	65	38	0.12
What would you want to know about the HPV vaccine before you made a decision to get the vaccine? Check the boxes for the 3 most important things you would want to know.							
What the side effects of the vaccine are	308	69	181	66	127	75	0.05
How well the vaccine works	289	65	180	65	109	64	0.80
How safe the vaccination is	282	63	178	65	104	61	0.47
How much the vaccination costs	203	46	126	46	77	45	0.89
If my health care provider thinks I should get the vaccine	87	20	59	22	28	17	0.19
What the vaccine is made of	55	12	31	11	24	14	0.38
If the vaccination hurts	32	7	17	6	15	9	0.30
If other people are getting the vaccination	22	5	13	5	9	5	0.79
If my sex partner thinks I should get the vaccine	24	5	16	6	8	5	0.61
If my friends or family think I should get the vaccine	8	2	5	2	3	2	0.96
Other reason (Describe)	24	5	18	7	6	4	0.17
What do you think would prevent or stop you from getting the HPV vaccine? Check 2 boxes only.							
Cost of the vaccine	326	73	200	73	126	74	0.75
If I don't think the vaccine will work	155	35	95	35	60	35	0.87
Going to the clinic for 3 shots over 6 months	122	27	77	28	45	27	0.73
No time off work and/or school to get to the clinic for the vaccination	73	16	38	14	35	21	0.06
Fear of vaccines	39	9	29	11	10	6	0.09
Fear of needles	38	9	24	9	14	8	0.86
Transportation to the clinic to get the vaccination	18	4	14	5	4	2	0.15
Other reason(s)	106	24	70	25	36	21	0.30

[1] In June 2006 the quadrivalent HPV vaccine was approved for use in the U.S. in females ages 9–26.

[2] p-value from chi-square test comparing the percentage before and after approval of the quadrivalent HPV vaccine for females in the U.S.

[3] Asians include Japanese, Chinese, Filipinos, Koreans; Pacific Islanders include Native Hawaiians, Samoans, and Micronesians; Other races include mixed race groups

[4] < 4-year college degree includes high school or below (3%), 2-year college or technical school (1%), current college students (66%)

[5] Excludes 1 individual who did not respond

[6] Excludes men with no history of vaginal intercourse (n=12) and 2 individuals who did not respond

Table 2

Intention to be vaccinated against HPV among adult males, Hawaii, 2004–2007

	Likelihood of HPV vaccination					
	Likely or Very Likely (n=308)		Unlikely or Very Unlikely (n=137)		Unadjusted	Adjusted
	No.	%[1]	No.	%[1]	OR (95% CI)[2]	OR (95% CI[2]
Enrollment						
Before June 1, 2006	183	67	92	33	1.00	1.00
June 1, 2006 and later	125	74	45	26	1.40 (0.92–2.13)	1.39 (0.91–2.12)[3]
Age (years)						
18–26	194	70	84	30	1.00	1.00
>26	114	68	53	32	0.93 (0.62–1.41)	0.94 (0.62–1.42)[3]
Race [3]						
White	174	67	84	33	1.00	1.00
Asian	26	74	9	26	1.40 (0.63–3.11)	1.46 (0.65–3.28)
Pacific Islander	31	76	10	24	1.50 (0.70–3.20)	1.43 (0.67–3.07)
Other	77	69	34	31	1.09 (0.68–1.77)	1.06 (0.65–1.72)
Education level [4]						
< 4-year college degree	217	69	98	31	1.00	1.00
4-year college degree or higher	91	70	39	30	1.05 (0.68–1.64)	1.25 (0.76–2.05)
Birthplace						
U.S.	254	70	110	30	1.00	1.00
Non-U.S.	54	67	27	33	0.87 (0.52–1.45)	0.88 (0.53–1.47)
Marital status [5]						
Single, never married	265	71	108	29	1.00	1.00
Ever married or living as married	43	61	28	39	0.63 (0.37–1.06)	0.65 (0.36–1.17)
Sexual history [6]						
Men who have sex with men	66	75	22	25	1.00	1.00
Heterosexual	233	68	110	32	0.71 (0.41–1.20)	0.54 (0.30–0.97)
Age of first sexual intercourse with female [7]						
<18	173	68	81	32	1.00	1.00

	Likelihood of HPV vaccination					
	Likely or Very Likely (n=308)		Unlikely or Very Unlikely (n=137)		Unadjusted	Adjusted
	No.	%[1]	No.	%[1]	OR (95% CI)[2]	OR (95% CI[2]
≥18	117	71	47	29	1.17 (0.76–1.79)	1.21 (0.78–1.88)
Lifetime no. of female partners [8]						
0–1	39	65	21	35	1.00	1.00
2–10	173	75	58	25	1.61 (0.87–2.95)	1.69 (0.92–3.13)
≥11	86	62	53	38	0.87 (0.46–1.64)	0.92 (0.48–1.77)
No. of female partners in past 4 months [8]						
0–1	236	69	104	31	1.00	1.00
≥2	62	69	28	31	0.98 (0.59–1.61)	0.93 (0.56–1.55)
Circumcised (self-report)						
No	58	67	29	33	1.00	1.00
Yes	250	70	108	30%	1.16 (0.70–1.91)	1.16 (0.70–1.91)
Genital HPV DNA positive [9]						
Negative	100	70	42	30	1.00	1.00
Positive	186	70	81	30	0.96 (0.62–1.51)	1.00 (0.64–1.56)
History of any STI (self-report; excludes genital warts)						
No	240	68	112	32	1.00	1.00
Yes	68	73	25	27	1.27 (0.76–2.11)	1.70 (0.94–3.07)
History of genital warts (self-report)						
No	267	68	123	32	1.00	1.00
Yes	41	74	14	26	1.35 (0.71–2.57)	1.43 (0.75–2.75)
Past/current female partner with abnormal Pap history [7]						
No or Don't know	247	68	115	32	1.00	1.00
Yes	43	77	13	23	1.54 (0.80–2.98)	1.52 (0.79–2.95)
Past/current female partner with STI history [7]						
No or Don't know	238	70	102	30	1.00	1.00
Yes	52	67	26	33	0.86 (0.51–1.45)	0.90 (0.53–1.53)
Types of sexual contact with females Male penis-female anus						
Never	189	69	86	31	1.00	1.00

Hum Vaccin. Author manuscript; available in PMC 2010 December 28.

	Likelihood of HPV vaccination					
	Likely or Very Likely (n=308)		Unlikely or Very Unlikely (n=137)		Unadjusted	Adjusted
	No.	%[1]	No.	%[1]	OR (95% CI)[2]	OR (95% CI[2]
Ever	119	70	51	30	1.06 (0.70–1.61)	1.07 (0.71–1.63)
Male mouth-female vagina						
Never	45	65	24	35	1.00	1.00
Ever	263	70	113	30	1.24 (0.72–2.14)	1.19 (0.69–2.06)
Female mouth-male penis						
Never	25	66	7	37	1.00	1.00
Ever	283	70	124	31	1.19 (0.59–2.40)	1.20 (0.59–2.42)
Male mouth-female anus						
Never	257	72	101	28	1.00	1.00
Ever	51	59	36	41	0.56 (0.34–0.90)	0.57 (0.35–0.93)
Female mouth-male anus						
Never	253	70	110	30	1.00	1.00
Ever	55	67	27	33	0.89 (0.53–1.48)	0.92 (0.54–1.56)
Male finger-finger vagina						
Never	22	67	11	33	1.00	1.00
Ever	286	69	126	31	1.14 (0.53–2.41)	1.08 (0.51–2.32)
Male finger-female anus						
Never	214	73	78	27	1.00	1.00
Ever	94	61	59	39	0.58 (0.38–0.88)	0.60 (0.40–0.92)
Female finger-male anus						
Never	248	69	111	31	1.00	1.00
Ever	60	70	26	30	1.03 (0.62–1.72)	1.09 (0.65–1.84)
Ever smoke cigarettes (daily for 6 months+)						
No	210	69	93	31	1.00	1.00
Yes	98	69	44	31	0.99 (0.64–1.52)	1.03 (0.66–1.59)
Ever drink alcohol (*at least one per week for 6 months+*)						
No	135	70	57	30	1.00	1.00
Yes	173	68	80	32	0.91 (0.61–1.37)	0.95 (0.63–1.44)
Ever use marijuana [10]						

	Likelihood of HPV vaccination					
	Likely or Very Likely (n=308)		Unlikely or Very Unlikely (n=137)		Unadjusted	Adjusted
	No.	%[1]	No.	%[1]	OR (95% CI)[2]	OR (95% CI[2]
No	70	74	24	26	1.00	1.00
Yes	237	68	112	32	0.73 (0.43–1.22)	0.74 (0.44–1.24)
What would you want to know about the HPV vaccine before you made a decision to get the vaccine?						
If the vaccination hurts						
No	284	69	129	31	1.00	1.00
Yes	24	75	8	25	1.36 (0.60–3.12)	1.29 (0.56–2.97)
How much the vaccination costs						
No	157	65	85	35	1.00	1.00
Yes	151	74	52	26	1.57 (1.04–2.37)	1.53 (1.01–2.33)
How safe the vaccination is						
No	108	66	55	34	1.00	
Yes	200	71	82	29	1.24 (0.82–1.88)	1.30 (0.85–1.97)
How well the vaccine works						
No	102	65	54	35	1.00	1.00
Yes	206	71	83	29	1.31 (0.87–1.99)	1.31 (0.86–1.99)
What the side effects of the vaccine are						
No	102	74	35	26	1.00	1.00
Yes	206	67	102	33	0.69 (0.44–1.09)	0.67 (0.42–1.06)
What the vaccine is made of						
No	270	69	120	31	1.00	1.00
Yes	38	69	17	31	0.99 (0.54–1.83)	0.99 (0.54–1.83)
If other people are getting the vaccination						
No	296	70	127	30	1.00	1.00
Yes	12	55	10	45	0.52 (0.22–1.22)	0.51 (0.21–1.22)
If my sex partner thinks I should get the vaccine						
No	298	71	123	29	1.00	1.00
Yes	10	42	14	58	0.30 (0.13–0.68)	0.30 (0.13–0.69)
If my health care provider thinks I should get the vaccine						
No	251	70	107	30	1.00	1.00

	Likelihood of HPV vaccination					
	Likely or Very Likely (n=308)		Unlikely or Very Unlikely (n=137)		Unadjusted	Adjusted
	No.	%[1]	No.	%[1]	OR (95% CI)[2]	OR (95% CI[2]
Yes	57	66	30	34	0.81 (0.49–1.33)	0.86 (0.52–1.43)
If my friends or family think I should get the vaccine						
No	303	69	134	31	1.00	1.00
Yes	5	62	3	38	0.74 (0.17–3.13)	0.72 (0.17–3.06)
What do you think would prevent or stop you from getting the HPV vaccine?						
Fear of vaccines						
No	283	70	123	30	1.00	1.00
Yes	25	64	14	36	0.78 (0.39–1.54)	085 (0.42–1.71)
Fear of needles						
No	278	68	129	32	1.00	1.00
Yes	30	79	8	21	1.74 (0.78–3.90)	1.76 (0.78–3.95)
Cost of the vaccine						
No	71	60	48	40	1.00	1.00
Yes	237	73	89	27	1.80 (1.16–2.80)	1.76 (1.12–2.74)
If I don't think the vaccine will work						
No	195	67	95	33	1.00	1.00
Yes	113	73	42	27	1.31 (0.85–2.02)	1.32 (0.86–2.04)
Going to the clinic for 3 shots over 6 months						
No	234	72	89	28	1.00	1.00
Yes	74	61	48	39	0.59 (0.38–0.91)	0.57 (0.37–0.89)
Transportation to the clinic to get the Vaccination						
No	296	69	131	31	1.00	1.00
Yes	12	67	6	33	0.88 (0.32–2.41)	0.94 (0.34–2.57)
No time off work and/or school to get to the clinic for the vaccination						
No	252	68	120	32	1.00	1.00
Yes	56	77	17	23	1.57 (0.87–2.81)	1.46 (0.81–2.64)

[1]Percentage totals run horizontally

[2]Unadjusted and adjusted odds ratio (OR) and 95% confidence interval (CI); adjustment for age (continuous) and date of study enrollment (before June 1, 2006/June 1, 2006 or later); Enrollment date adjusted for age only; age adjusted for enrollment date only

[3] Asians include Japanese, Chinese, Filipinos, Koreans; Pacific Islanders include Native Hawaiians, Samoans, and Micronesians; Other races include mixed race groups

[4] < 4-year college degree includes high school or below (3%), 2-year college or technical school (1%), current college students (66%)

[5] Excludes 1 individual who did not respond

[6] Excludes men with no history of vaginal intercourse (n=12) and 2 individuals who did not respond

[7] Excludes men who have sex with men exclusively (n=15) and men with no history of vaginal intercourse (n=12)

[8] Excludes men who have sex with men exclusively (n=15)

[9] Excludes 36 beta-globin negative specimen; HPV DNA status unknown to subject at time of questionnaire administration

[10] Excludes 2 individuals who did not respond