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Human papillomavirus (HPV): college male's knowledge, perceived risk, sources of information, vaccine barriers and communication

Mira L. Katz, PhD,

College of Public Health, The Ohio State University, Suite 525, 1590 North High Street, Columbus, Ohio 43201, USA; and Comprehensive Cancer Center, The Ohio State University, OH, USA

Janice L. Krieger, PhD, and

Comprehensive Cancer Center, The Ohio State University; and School of Communication, The Ohio State University, Columbus, OH, USA

Anthony J. Roberto, PhD

Hugh Downs School of Human Communication, Arizona State University, Tempe, AZ, USA

Mira L. Katz: mira.katz@osumc.edu

Abstract

Background—Human papillomavirus (HPV) is a common sexually transmitted infection. With the U.S. Food and Drug Administration (FDA) approval of an indication for the HPV vaccine for males, it is important to assess male college student's HPV knowledge, perceived risk, and sources of information, as well as HPV vaccine barriers and communication.

Methods—This was a cross-sectional survey study of 165 male college students. The participants completed a survey about HPV and the HPV vaccine.

Results—Among the 165 participants, most males had poor HPV knowledge, in that 132 (80.0%) reported having had sexual intercourse, but only 20 (12.1%) perceived being at risk for acquiring HPV. Information sources about HPV were commercials/advertisements, friends, news and health education programs. Concern about the HPV vaccine's long-term effects and cost were the most frequently reported barriers. Most students reported having a regular healthcare provider, but had difficulty getting to their provider, and finding time to discuss the HPV vaccine with their provider. Additionally, most students reported relying on their parents when making medical decisions and being willing to discuss the HPV vaccine with their healthcare provider to make an informed decision about the vaccine.

Conclusions—Educational programs providing information about HPV, the HPV vaccine, and communication skills training are needed for male college students, parents, and healthcare providers. Findings from this study will guide the development of HPV vaccine messages and educational programs that should be tested in future research.

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Keywords

Human papillomavirus; HPV vaccine; Sexually transmitted infection; Males

Introduction

Human papillomavirus (HPV) is a common sexually transmitted infection (STI), with approximately 20 million individuals infected with HPV and another 6 million individuals becoming infected annually in the United States (U.S.) [1,2]. It is estimated that half of all sexually active males and females will become infected with HPV during their lifetime [1,2]. Most individuals infected with HPV are asymptomatic, however 4% of sexually active males in the U.S. report having a history of genital warts, and persistent infection with HPV among males may lead to penile, anal, and head and neck cancers [3–8]. College-age males are considered high-risk populations for STIs because of their risky sexual behaviors, including unprotected sex, having multiple sex partners, and having sexual partners with a history of STIs [2,9,10].

The U.S. Food and Drug Administration (FDA) approved the quadrivalent HPV vaccine for females (aged 9–26 years) in 2006. The HPV vaccine is given as 3 injections over a 6 month period. The HPV vaccine protects against cervical, vulvar and vaginal cancers caused by HPV types 16 and 18, and genital warts caused by HPV types 6 and 11 [11,12]. In 2009, the U.S. FDA approved the use of the quadrivalent HPV vaccine for males (aged 9–26 years) for the prevention of genital warts [13,14]. Recently, the FDA approved the use of the quadrivalent HPV vaccine to prevent anal cancer among males and females [15]. In addition, vaccinating males will indirectly assist with preventing HPV-related diseases (e.g. cervical cancer) among females [6].

Studies among males in the U.S. suggest that HPV vaccine acceptance is associated with several factors including being sexually active, having more lifetime sex partners, having a previous STI, HPV knowledge, perceiving themselves at risk for HPV, perceiving a direct personal benefit, and believing that significant individuals (e.g. parents, healthcare providers, etc) would encourage them to be vaccinated [16–19]. Barriers to HPV vaccination include concern about vaccine safety and side effects, vaccine cost, and lack of perceived susceptibility to HPV [16–19].

Previous reports of college students' sexual promiscuity and unsafe sexual behaviors suggest that college-age males may be unaware of their risk for acquiring HPV [4–8]. It is important to assess the factors that influence males' perceptions of their risk for HPV infection, such as the sources from which they receive HPV information, in efforts to develop strategies to promote HPV vaccination among males. Additionally, it is also important to assess who college-age males rely on when making important health decisions, such as whether to be vaccinated against HPV. Therefore, the purpose of this study was to better understand male college students' HPV: (i) knowledge; (ii) perceived risk; (iii) sources of information; (iv) barriers to, and communication about, vaccination, since most male college students are age-eligible to receive the HPV vaccine.

Materials and methods

This study was conducted among male undergraduate students enrolled at a Midwestern university just prior to the FDA approval of the HPV vaccine for males. The Institutional Review Board of The Ohio State University approved the protocol for this study.

Survey

The survey included items based on the Risk Behavior Diagnosis Scale [20] and measured demographic characteristics and items focused on the students': (i) sexual history; (ii) health behaviors; (iii) knowledge, concerns, perceived risk, and sources of information about HPV; and (iv) HPV vaccine communication and barriers. After completing items focused on HPV knowledge, sources of information, and vaccine awareness, students read the following message: "Currently, there is a vaccine available that prevents some types of human papillomavirus (HPV) in females. The HPV vaccine may be available for males in the near future. We are interested in what you think about HPV and the HPV vaccine if it is approved for males. *Please complete the remainder of the survey as if the HPV vaccine will become available for males.*"

Demographic characteristics—Students provided information regarding their age, race and ethnicity, marital status, year at the university, and health insurance. Students also reported if they had one person they considered to be their doctor or healthcare provider, whether they belonged to a church, synagogue, or any other religious organization, and whether they relied on their parents when making a medical decision (never/rarely/sometimes/often/always).

Sexual history—Students answered items regarding their sexual intercourse experience, age of first sexual intercourse experience, and the number of sexual intercourse partners. Students reported their relationship status, and their personal history of having a STI, HPV, or genital warts. Additionally, students responded to whether any of their sexual partners had a history of a STI.

Health behaviors—Students responded to items about their condom use (never/rarely/sometimes/often/veryoften/always/not applicable) and history of cigarette smoking ("Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?")

HPV knowledge, concerns, and perceived risk—HPV knowledge was measured by 14 true/false items and students responded to several items about STIs. Students were asked to select the one sexually transmitted infection they thought: (i) was the most common; (ii) concerns them the most; (iii) causes genital warts; (iv) causes liver cancer; and (v) causes cervical cancer. Responses to these items were a list of seven STIs (herpes, human immunodeficiency virus (HIV), HPV, syphilis, gonorrhea, *Chlamydia*, hepatitis B). Students also responded to the following two items about the HPV vaccine: "Have you ever heard of a shot or a vaccine to prevent cancer?" (no/yes). If yes, "What cancer?" and "Have you ever heard of a shot or a vaccine to prevent genital warts?" (no/yes).

Students responded to items about the severity of HPV ("HPV would be a severe threat to my health") and potential risk factors (e.g. having multiple sexual partners). Responses for these items were based on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Sources of HPV information—Students responded to the following item: "Before filling out this survey, had you ever heard of the human papillomavirus (also known as HPV)?" If a student responded that they had heard of HPV, they were asked: "How did you hear about HPV?" Responses included multiple communication sources (e. g., news programs, family, healthcare provider, friends) and source types (e.g., TV, radio, newspaper, internet, magazine). Students could mark multiple sources and source types.

HPV vaccine barriers and communication—Nine questions focused on barriers to receiving the HPV vaccine (i.e. “Cost would be a significant concern when deciding whether to get the HPV vaccine”). These items were measured on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Several items addressed the students’ affect and self-efficacy in communicating with healthcare providers and parents/guardians about the HPV vaccine. Responses for these items were based on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Students were asked if talking to their healthcare provider (or parents/guardians) about the HPV vaccine would make them feel: embarrassed, anxious, self-conscious, nervous, uncomfortable, or worried. Self-efficacy was measured by three items (e.g. “It would be easy for me to talk to my healthcare provider (parents/guardian) about getting the HPV vaccine”).

Procedures

Male students enrolled on courses were recruited to complete a self-administered questionnaire as part of a larger HPV vaccine research project. The students received course credit for completing the survey.

Analysis

Descriptive statistics (means, standard deviations, and percentages), Cronbach’s alpha, and Chi-square values were calculated for the measures using PASW Statistics 18 software (see Tables 1–6, below).

Results

Male undergraduate students ($n = 165$) completed the self-administered survey (Table 1). Their mean age was 21.2 years and their age range was 16–26 years. Most students self-identified as non-Hispanic Whites, which reflects the student population at the university. The majority of students were single ($n = 157$; 95.2%) and over half ($n = 95$; 57.6%) of the students were in their third and fourth years at the university. Approximately three quarters ($n = 123$; 74.5%) of the students had health insurance under their parents’ policy and reported having someone they considered to be their healthcare provider ($n = 124$; 75.2%). More than half ($n = 92$; 55.8%) reported belonging to a religious organization and only 19 (11.5%) students reported never/rarely relying on their parents when making a medical decision.

Among all of these male students, 65 (39.4%) reported not currently dating (Table 2) while 132 (80.0%) reported that they had engaged in sexual intercourse. Among the male students who reported having had sexual intercourse, 59 (44.7%) reported having sexual intercourse before age 17, while 58 (43.9%) reported having had five or more sexual partners. Additionally, among students who had a history of sexual intercourse, eight (6.1%) reported a history of a diagnosed STI, three (2.3%) reported having been diagnosed with HPV, and two (1.5%) students reported having a history of genital warts. Furthermore, among students who had sexual intercourse, only 52 (39.4%) reported always using condoms and 17 (12.9%) reported never/rarely using condoms. Among all students ($n = 165$), 42 (25.5%) reported a history of smoking 100 cigarettes during their lifetime, and 29 (17.6%) reported currently smoking.

STI awareness and knowledge

Students ($n = 165$) reported: (i) herpes was the most common STI ($n = 75$; 45.5%); (ii) being most concerned about HIV ($n = 111$; 67.3%); (iii) herpes caused genital warts ($n = 85$; 51.5%); (iv) hepatitis B caused liver cancer ($n = 67$; 40.6%); and (v) HPV caused cervical

cancer ($n = 96$; 58.2%). Twenty-nine students (17.6%) reported that HPV was the most common STI but only 35 (21.2%) students reported that HPV caused genital warts.

The correct answers for the 14 true/false HPV knowledge questions (Table 3) ranged from 0 to 13, with a mean of 6.4 (standard deviation (SD) = 3.7). Key findings included: (i) most students ($n = 133$; 80.6%) knew that women could get HPV but only 91 (55.2%) students knew that males could also get HPV; (ii) 118 (71.5%) students knew that HPV may spread from person to person by having sexual intercourse, but only 49 (29.7%) knew that HPV may spread from person to person by having oral sex; (iii) 43 (26.1%) students knew that HPV infection is not rare; (iv) 58 (35.2%) students knew that condoms do not effectively protect against HPV infection; and (v) 59 (35.8%) students knew that HPV infection cannot be cured by antibiotics.

Source of HPV information

Among all of the participants, 131 (79.4%) reported that they had heard about HPV prior to filling out the survey, 26 (15.8%) students reported having heard of a vaccine to prevent cancer, but only 19 (11.5%) had heard of a vaccine to prevent genital warts. Among those students ($n = 131$) reporting that they had heard of HPV, the most frequently reported sources of HPV information (Table 4) were commercials/advertisements ($n = 77$; 58.8%), friends ($n = 70$; 53.4%), news programs ($n = 65$; 49.6%), and health education programs ($n = 49$; 37.4%). The most frequent source types were TV and the internet.

HPV perceived risk factors and concerns

Among all participants, students reported the need to get the HPV vaccine if they had high numbers of sexual partners ($n = 123$; 74.6%) and if they had multiple partners ($n = 108$; 65.5%) (Table 5). Only 71 (43.0%) students perceived needing the HPV vaccine if they were gay and only 18 (10.9%) perceived a need for the HPV vaccine if they smoked.

Among all students, most reported that if they had HPV they would tell their life partner ($n = 146$; 88.5%), a sexual partner ($n = 134$; 81.2%), and a potential sexual partner ($n = 126$; 76.4%). Additionally, students reported that HPV would be a serious threat to their sex life ($n = 122$; 73.9%) and that HPV would make it difficult to find a long-term partner ($n = 101$; 61.2%). Slightly over half (53.9%) of the students reported that HPV would be a severe threat to their health and 48 (29.1%) thought they could get HPV from the vaccine. Approximately one-quarter of the students reported being concerned if their family members ($n = 44$; 26.7%), parents ($n = 37$; 22.4%), or close friends ($n = 35$; 21.2%) found out they had got the HPV vaccine.

HPV vaccine barriers and communication

The top barriers to HPV vaccination (Table 6) reported most frequently by all study participants included long-term effects ($n = 88$; 53.3%), health insurance coverage ($n = 79$; 47.9%) cost ($n = 73$; 44.2%), and hard to find time to talk to healthcare provider ($n = 69$; 41.8%). More students reported that they would be more comfortable talking to their healthcare provider (69.0%) about the HPV vaccine compared to talking to their parents (40.0%), $\chi^2(1, n = 163) = 11.73, P = 0.001$. Additionally, fewer students reported that it would be embarrassing to talk about the HPV vaccine with their healthcare provider (36.4%) compared to their parents (60.0%) $\chi^2(1, n = 165) = 15.71, P < 0.001$.

Discussion

HPV is a common sexually transmitted infection (STI) that may cause genital warts, and persistent HPV infection may cause anogenital and oral cancers among males [4–6,8].

Findings from our study suggest that college-age males' sources of information about HPV may not always be reliable since the most frequently reported sources of information were TV and internet commercials/advertisements and their friends. Additionally, even though the majority of male students reported having been sexually active, in general, they had limited knowledge about HPV and only a small percentage (4.5%) reported being concerned about HPV. These findings are similar to other studies focusing on males' awareness and knowledge about HPV and the HPV vaccine [16–19, 21–27].

It is interesting to note that, in this study, almost three-quarters of the students were on their parents' health insurance plan, only a small percentage (7.2%) of the students reported making medical decisions without/rarely relying on input from their parents, and almost a quarter of them reported that they would be concerned if their parents found out they received the HPV vaccine. These findings highlight the ongoing communication problem that parents and children have regarding sexual health issues [28–30]. In contrast, although male students reported having a difficult time getting to their healthcare provider, they also reported being more comfortable talking to their healthcare provider about the HPV vaccine compared to talking to their parents. Given that, in addition to the medical problems and expenses, there are psychological consequences associated with STIs, then developing effective HPV vaccine messages and educational programs that include communication skills training for college students, parents, and healthcare providers, emerge as a new important health issue for wellness programs [31,32].

This study is not without limitations. Firstly, this was a cross-sectional survey among a convenience sample of students, and this limits the generalizability of the study findings. Since the survey was completed just prior to FDA approval of the HPV vaccine for males, the timing of the survey may have affected the findings about the students' knowledge, perceived risk and concerns about HPV, and HPV vaccine barriers and communication issues. Although this is an important point, confidence in the findings is increased by similarities to other HPV vaccine studies among males regarding HPV knowledge and perceived risk [17,23,24]. The strengths of our study are that it provides information about the factors that may influence college-age males' perception of their risk, such as the sources of their HPV information, and who they potentially rely on when making important medical decisions.

Conclusion

In spite of its limitations, this study is important because it focused on multiple factors associated with HPV and the HPV vaccine among college-age males. This study suggests that many students may rely on inaccurate information sources about HPV and may be in need of programs to assist them with talking to parents and healthcare providers about the HPV vaccine. The fact that most students reported having been sexually active in the past, yet had limited knowledge and concern about one of the most prevalent STIs is reason for concern. The findings from this study are important for the development of effective HPV vaccine messages and educational programs.

Based on the findings from this study, healthcare providers are uniquely placed to provide accurate information about HPV and the HPV vaccine to college-age males. Males in this study did not have an appreciation of the prevalence of HPV or of HPV routes of transmission, and often used sources that may not provide accurate information. It is recommended that future research considerations include developing and testing HPV vaccine messages and educational programs for college students, parents, and healthcare providers.

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References

1. Dunne EF, Unger ER, Sternberg M, McQuillan G, Swan DC, Patel SS, et al. Prevalence of HPV infection among females in the United States. *J Am Med Assoc.* 2007; 297:813–19.
2. Weinstock H, Berman S, Cates W Jr. Sexually transmitted diseases among American youth: incidence and prevalence estimates, 2000. *Perspect Sex Reprod Health.* 2004; 36:6–10. [PubMed: 14982671]
3. Dinh TH, Sternberg M, Dunne EF, Markowitz LE. Genital warts among 18- to 59-year-olds in the United States, National Health and Nutrition Examination Survey, 1999–2004. *Sex Transm Dis.* 2008; 35:357–60. [PubMed: 18360316]
4. Munoz N, Castellsague X, de Gonzalez AB, Gissmann L. Chapter 1: HPV in the etiology of human cancer. *Vaccine.* 2006; 24(Suppl 3):S3/1–10.
5. Nielson CM, Flores R, Harris RB, Abrahamsen M, Papenfuss MR, Dunne EF, et al. Human papillomavirus prevalence and type distribution in male anogenital sites and semen. *Cancer Epidemiol Biomarkers Prev.* 2007; 16:1107–14. [PubMed: 17548671]
6. Palefsky JM. Human papillomavirus-related disease in men: not just a women's issue. *J Adolesc Health.* 2010; 46(4 Suppl):S12–19. [PubMed: 20307839]
7. Parkin DM, Bray F. Chapter 2: the burden of HPV-related cancers. *Vaccine.* 2006; 24(Suppl 3):S3/11–25. [PubMed: 16949997]
8. Gillison ML, Chaturvedi AK, Lowy DR. HPV prophylactic vaccines and the potential prevention of noncervical cancers in both men and women. *Cancer.* 2008; 113:3036–46. [PubMed: 18980286]
9. American College Health Association. American College Health Association – National College Health Assessment II, Reference Group Executive Summary, Spring 2010. Linthicum, MD: American College Health Association; 2010.
10. Siegel DM, Klein DI, Roghmann KJ. Sexual behavior, contraception, and risk among college students. *J Adolesc Health.* 1999; 25:336–43. [PubMed: 10551664]
11. United States Food and Drug Administration. FDA News Release. Silver Spring, MD: June 8. 2006 FDA Licenses New Vaccine for Prevention of Cervical Cancer and Other Diseases in Females Caused by Human Papillomavirus. Available at: <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/2006/ucm108666.htm>
12. United States Food and Drug Administration. FDA News Release. Silver Spring, MD: September 12. 2008 FDA Approves Expanded Use for Gardasil to Include Preventing Certain Vulvar and Vaginal Cancers. Available at: <http://www.fda.gov/newsevents/newsroom/pressannouncements/2008/ucm116945.htm>
13. Centers for Disease Control and Prevention (CDC). FDA licensure of quadrivalent human papillomavirus vaccine (HPV4, Gardasil) for use in males and guidance from the Advisory Committee on Immunization Practices (ACIP). *Morb Mortal Wkly Rep.* 2010; 59(20):630–2.
14. United States Food and Drug Administration. FDA News Release. Silver Spring, MD: October 16. 2009 FDA Approves New Indication for Gardasil to Prevent Genital Warts in Men and Boys. Available at: <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm187003.htm>
15. United States Food and Drug Administration. FDA News Release. Silver Spring, MD: December 22. 2010 Gardasil Approved to Prevent Anal Cancer. Available at: <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm237941.htm>
16. Daley EM, Marhefka SL, Buhi ER, Vamos CA, Hernandez ND, Giuliano AR. Human papillomavirus vaccine intentions among men participating in a human papillomavirus natural history study versus a comparison sample. *Sex Transm Dis.* 2010; 37:644–52. [PubMed: 20879088]

17. Hernandez BY, Wilkens LR, Thompson PJ, Shvetsov YB, Goodman MT, Ning L, et al. Acceptability of prophylactic human papillomavirus vaccination among adult men. *Hum Vaccin*. 2010; 6:467–75. [PubMed: 20671442]
18. Liddon N, Hood J, Wynn BA, Markowitz LE. Acceptability of human papillomavirus vaccine for males: a review of the literature. *J Adolesc Health*. 2010; 46:113–23. [PubMed: 20113917]
19. Reiter PL, Brewer NT, Smith JS. Human papillomavirus knowledge and vaccine acceptability among a national sample of heterosexual men. *Sex Transm Infect*. 2010; 86:241–6. [PubMed: 19951936]
20. Witte K, Cameron KA, McKeon JK, Berkowitz JM. Predicting risk behaviors: development and validation of a diagnostic scale. *J Health Commun*. 1996; 1:317–41. [PubMed: 10947367]
21. Brewer NT, Ng TW, McRee AL, Reiter PL. Men's beliefs about HPV-related disease. *J Behav Med*. 2010; 33:274–81. [PubMed: 20162346]
22. Ferris DG, Waller JL, Miller J, Patel P, Price GA, Jackson L, et al. Variables associated with human papillomavirus (HPV) vaccine acceptance by men. *J Am Board Fam Med*. 2009; 22:34–42. [PubMed: 19124631]
23. Gerend MA, Barley J. Human papillomavirus vaccine acceptability among young adult men. *Sex Transm Dis*. 2009; 36:58–62. [PubMed: 18830138]
24. Jones M, Cook R. Intent to receive an HPV vaccine among university men and women and implications for vaccine administration. *J Am Coll Health*. 2008; 57:23–32. [PubMed: 18682342]
25. Reiter PL, Brewer NT, McRee AL, Gilbert P, Smith JS. Acceptability of HPV vaccine among a national sample of gay and bisexual men. *Sex Transm Dis*. 2010; 37:197–203. [PubMed: 20118831]
26. Sandfort JR, Pleasant A. Knowledge, attitudes, and informational behaviors of college students in regard to the human papillomavirus. *J Am Coll Health*. 2009; 58:141–9. [PubMed: 19892651]
27. Allen JD, Fantasia HC, Fontenot H, Flaherty S, Santana J. College men's knowledge, attitudes, and beliefs about the human papillomavirus infection and vaccine. *J Adolesc Health*. 2009; 45:535–7. [PubMed: 19837363]
28. Robert AC, Sonenstein FL. Adolescents' reports of communication with their parents about sexually transmitted diseases and birth control: 1988, 1995, and 2002. *J Adolesc Health*. 2010; 46:532–7. [PubMed: 20472209]
29. Aspy CB, Vesely SK, Oman RF, Rodine S, Marshall L, McLeroy K. Parental communication and youth sexual behaviour. *J Adolesc*. 2007; 30:449–66. [PubMed: 16750265]
30. Miller KS, Levin ML, Whitaker DJ, Xu X. Patterns of condom use among adolescents: the impact of mother–adolescent communication. *Am J Public Health*. 1998; 88:1542–4. [PubMed: 9772860]
31. Cardarelli R, Cardarelli KM. Recommendations for primary care physicians to improve HPV vaccination rates during clinical encounters. *Osteopath Med Prim Care*. 2008; 2:10. [PubMed: 18947420]
32. McRee AL, Reiter PL, Chantala K, Brewer NT. Does framing human papillomavirus vaccine as preventing cancer in men increase vaccine acceptability? *Cancer Epidemiol Biomarkers Prev*. 2010; 19:1937–44. [PubMed: 20647398]

Table 1

Characteristics of male undergraduate college students (n=165)

| Characteristic | Frequency n (%) |
|---|-----------------|
| Age (years) | |
| Mean | 21.2 |
| Standard deviation | 1.8 |
| Range | 16–26 |
| Ethnicity | |
| Hispanic | 10 (6.1) |
| Non-Hispanic | 155 (93.9) |
| Race | |
| White | 131 (79.4) |
| African-American | 13 (7.9) |
| Asian | 11 (6.7) |
| Other (including mixed) | 10 (6.1) |
| Marital Status | |
| Single | 157 (95.2) |
| Married/living with partner | 4 (2.4) |
| Other | 4 (2.4) |
| OSU student (year) | |
| First | 13 (7.9) |
| Second | 29 (17.6) |
| Third | 44 (26.7) |
| Fourth | 51 (30.9) |
| Fifth | 28 (17.0) |
| Health insurance | |
| University | 29 (17.6) |
| Private with parents | 123 (74.5) |
| Other | 9 (5.5) |
| Do not know | 2 (1.2) |
| Have a healthcare provider | |
| | 124 (75.2) |
| Member of a religious organization (e.g. church) | |
| | 92 (55.8) |
| Never/rarely rely on parents when making medical decisions | |
| | 19 (11.5) |

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Table 2

Male undergraduate college students' sexual history and behaviors (n=165*)

| Characteristic | Frequency n (%) |
|--|-----------------|
| Relationship status | |
| Not dating | 65 (39.4) |
| Dating | 43 (26.1) |
| Steady partner | 40 (24.2) |
| Living together | 13 (7.9) |
| Sexual history | |
| Sexual intercourse | 132 (80) |
| Sexual history and behavior among students who reported a history of sexual intercourse (n=132) | |
| Sexual intercourse: ≤17 years old | 59 (44.7) |
| ≥5 sexual intercourse partners | 58 (43.9) |
| Sexually transmitted infection | 8 (6.1) |
| HPV | 3 (2.3) |
| Genital warts | 2 (1.5) |
| Condom use | |
| Never/rarely | 17 (12.9) |
| Sometimes/often | 28 (21.2) |
| Very often | 34 (25.8) |
| Always | 52 (39.4) |
| Smoking | |
| Never | 122 (73.9) |
| Former | 13 (17.6) |
| Current | 29 (17.6) |

* Numbers do not always equal total because of missing data

Table 3

HPV knowledge among male college students (n=165)

| | Correct answer n (%) |
|--|----------------------|
| 1. People with certain HPV types always develop health problems. [False] | 36 (21.8) |
| 2. Women can get HPV. [True] | 133 (80.6) |
| 3. Condoms effectively protect against HPV infection. [False] | 58 (35.2) |
| 4. HPV may spread from person to person by sexual intercourse. [True] | 118 (71.5) |
| 5. Males may be infected with HPV and not know it. [True] | 92 (55.8) |
| 6. HPV infection can be cured with antibiotics. [False] | 59 (35.8) |
| 7. Men can get HPV. [True] | 91 (55.2) |
| 8. If you get HPV, you will have HPV for life. [False] | 16 (9.7) |
| 9. Females may be infected with HPV and not know it. [True] | 103 (62.4) |
| 10. A person can get HPV by having sex. [True] | 119 (72.1) |
| 11. HPV infection among women is rare. [False] | 80 (48.5) |
| 12. Condoms always protect you from HPV. [False] | 91 (55.2) |
| 13. HPV may be spread from person to person through oral sex. [True] | 49 (29.7) |
| 14. HPV infection among men is rare. [False] | 43 (26.1) |

Table 4

HPV awareness and source of HPV information among male college students who had heard about HPV (n=131)

| Source of Information | n (%) | Source type* | n |
|------------------------------|-----------|--------------|----|
| Commercials/Advertisements | 77 (58.8) | TV | 76 |
| | | Radio | 15 |
| | | Newspaper | 9 |
| | | Internet | 19 |
| | | Magazine | 12 |
| Friends | 70 (53.4) | | |
| News program | 65 (49.6) | TV | 63 |
| | | Radio | 13 |
| | | Newspaper | 16 |
| | | Internet | 41 |
| | | Magazine | 15 |
| Health education program | 49 (37.4) | | |
| Parent | 23 (17.6) | | |
| Brochure | 22 (16.8) | | |
| Healthcare provider | 20 (15.3) | | |
| Clinic waiting room | 17 (13.0) | | |
| Feature/human interest story | 14 (10.7) | TV | 14 |
| | | Radio | 2 |
| | | Newspaper | 4 |
| | | Internet | 4 |
| | | Magazine | 3 |
| Family member | 12 (9.2) | | |
| Church | 1 (0.8) | | |

* Students could mark more than one choice for source of information and for source type within each source category

Table 5

HPV perceived risk factors and concerns among male college students (n=165)

| | Strongly agree and Agree n (%) |
|---|--------------------------------|
| Perceived risk factors | |
| I would need the HPV vaccine if I: | |
| Had a high number of sexual partners | 123 (74.6) |
| Had multiple sexual partners | 108 (65.5) |
| Had a family history of cervical cancer | 72 (44.8) |
| Was gay | 71 (43.0) |
| Had a family history of liver cancer | 55 (33.3) |
| Had a steady long-term partner | 51 (30.9) |
| Smoked | 18 (10.9) |
| Concerns | |
| I would tell my life partner if I had HPV | 146 (88.5) |
| I would tell my sexual partner if I had HPV | 134 (81.2) |
| I would tell my potential sexual partner if I had HPV | 126 (76.4) |
| HPV would be a serious threat to my sex life | 122 (73.9) |
| HPV would make it difficult to find a long-term partner | 101 (61.2) |
| HPV would be a severe threat to my health | 89 (53.9) |
| Get HPV from vaccine | 48 (29.1) |
| Family members would find out if I got the HPV vaccine | 44 (26.7) |
| Parents would find out if I got the HPV vaccine | 37 (22.4) |
| Close friends would find out if I got the HPV vaccine | 35 (21.2) |
| I am at risk for getting HPV | 20 (12.1) |

Table 6

Male students' HPV vaccine barriers and HPV vaccine communication with healthcare providers and parents/guardians (n=165*)

| | Strongly agree and Agree n (%) |
|--|---------------------------------------|
| | 23 |
| Vaccine barriers | |
| Long-term effects | 88 (53.3) |
| Only get vaccine if covered by health insurance | 79 (47.9) |
| Cost | 73 (44.2) |
| Hard to find time to talk to healthcare provider | 69 (41.8) |
| Difficult to get to healthcare provider's office | 63 (38.2) |
| Difficult to find time to talk to healthcare provider | 63 (38.2) |
| Discomfort with injection | 60 (36.4) |
| Vaccine is painful | 43 (26.1) |
| Healthcare provider is too busy to talk to me | 16 (9.7) |
| Communication: healthcare provider | |
| Affect (Cronbach's alpha = 0.938) | |
| Talking to healthcare provider about the HPV vaccine would make me feel: (Cronbach's alpha = 0.950) | |
| Embarrassed | 60 (36.4) |
| Anxious | 53 (32.1) |
| Self-conscious | 62 (37.6) |
| Nervous | 74 (44.9) |
| Uncomfortable | 74 (44.9) |
| Worried | 57 (34.6) |
| Self-efficacy (Cronbach's alpha = 0.914) | |
| It would be easy for me to talk to my healthcare provider about getting the HPV vaccine | 100 (60.6) |
| It would be simple for me to talk to my healthcare provider about getting the HPV vaccine | 111 (67.3) |
| It would be comfortable talking to my healthcare provider about getting the HPV vaccine | 114 (69.1) |
| Decision-making (Cronbach's alpha = 0.824) | |
| I would receive good information about the HPV vaccine by talking to my healthcare provider | 134 (81.2) |
| Talking to my healthcare provider would help me make a good decision about whether or not to get the HPV vaccine | 141 (85.5) |
| Talking to my healthcare provider would help me decide if I would benefit from the HPV vaccine | 143 (86.7) |
| Intention (Cronbach's alpha = 0.910) | |
| I intend to ask my healthcare provider about the HPV vaccine | 67 (40.1) |
| I would be willing to ask my healthcare provider about the HPV vaccine | 101 (61.2) |
| I plan to ask my healthcare provider about the HPV vaccine | 65 (39.4) |
| Likelihood* | |
| If the HPV vaccine becomes available and your doctor recommends the HPV vaccine to you, how likely would you be to get it? | |
| Very unlikely | 4 (2.4) |
| Unlikely | 21 (12.7) |
| Likely | 95 (57.6) |
| Very likely | 36 (21.8) |

Strongly agree and Agree n (%)**Communication: family****Affect** (Cronbach's alpha = 0.950)

Talking to parent/guardian about the HPV vaccine would make me feel:

| | |
|----------------|------------|
| Embarrassed | 99 (60.0) |
| Anxious | 76 (46.1) |
| Self-conscious | 82 (49.7) |
| Nervous | 96 (58.2) |
| Uncomfortable | 108 (65.5) |
| Worried | 69 (41.8) |

Self-efficacy (Cronbach's alpha = 0.940)

| | |
|---|-----------|
| It would be easy for me to talk to my parent/guardian about getting the HPV vaccine | 74 (44.9) |
| It would be simple for me to talk to my parent/guardian about getting the HPV vaccine | 67 (40.6) |
| It would be comfortable talking to my parent/guardian about getting the HPV vaccine | 66 (40.0) |

* Numbers do not equal 100% because of missing data