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Carolyn A. Gulas	April 13, 2010

Knowledge and acceptance of the HPV vaccine and sexual risk perceptions among Emory's undergraduate student population

By

Carolyn A. Gulas

Adviser Craig Hadley, Ph.D.

Department of Anthropology

_____

Craig Hadley, Ph.D.
Adviser

_____

Carol Worthman, Ph.D.
Committee Member

_____

Meggan Arp, Ph.D.
Committee Member

_____

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Abstract

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Following the approval of the first ever vaccine that protects females from HPV strains that are associated with the majority of cervical cancer cases, uptake of the vaccine has been a major health issue, and a plethora of studies have examined the factors that are associated with vaccine adoption among young adults and college students. This study follows up on current work that suggests that higher knowledge and awareness of HPV and the vaccine lead to greater vaccination coverage. Emory undergraduate students, both male and female, participated in an online survey and follow-up interviews to gauge students' perceptions of the vaccine and their views on sexual activity on college campuses under the influence of the "hook-up" culture that exists among the student community. The aim of the study was to gauge whether knowledge or culture held more weight in determining students' intentions to be vaccinated and their sexual decision-making processes that may lead to increased STD transmission. The results suggest that knowledge does not play a significant role in whether a student gets vaccinated or not; rather, perceptions of the vaccine and a student's own sexual activity level were more accurate predictors of vaccination intent. Students discussed the hook-up culture in their interviews in terms of its ambiguity and how it takes away some of the consequences of having sex with casual partners on Emory's campus. Among Emory's undergraduate student population, knowledge on safe sex competes with cultural ideals and norms that encourage or even reward increased sexual behavior among students. In this context, the importance of HPV vaccination is underscored, and vaccine marketing officials, public health practitioners, and health educators alike need to work around students' perceptions of the vaccine and the high cost to ensure maximum coverage in this most vulnerable age population.

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I. INTRODUCTION

Sexually transmitted diseases (STDs) remain a major threat to public health, with nearly 19 million new infections occurring every year in the United States, of which, about half occur in young women aged 15 to 24 (CDC, 2009). Human Papillomavirus (HPV) is the most common STD in the United States, with up to 20 million people currently infected. Of those infected, about half are between the ages of 15 to 24, indicating that many young adults acquire HPV shortly after becoming sexually active. Indeed, sexually active men and women have a 50% chance of contracting HPV at some point during their lives (Teitelman, Stringer, Averbuch, & Witkoski, 2009). HPV is unique among STDs because of its link to certain anogenital cancers, particularly cervical cancer, which remains a prime killer of women around the world, especially in developing countries, where mortality rates per 100,000 persons is 28.6, compared to 8 deaths per 100,000 in developed countries (Tsu & Levin, 2008). Despite falling incidence rates in the U.S. since implementation of cervical cancer screening programs in the 1960s, there are still approximately 3,700 cervical cancer deaths each year, which, to put into perspective, roughly equals a September 11th attack on women each year in the U.S. (Haber, Malow, & Zimet, 2007).

HPV received much media attention a few years ago after the U.S. Food and Drug Administration approved a vaccine that protects women from four strains of HPV, two of which are implicated in 70% of all cervical cancers (Saslow et al., 2007). The vaccine is commercially marketed under the name Gardasil® (Merck & Co.), and is recommended for girls and women aged 9 to 26. Just recently, Gardasil was approved by the FDA for use in males aged 9-26 for the prevention of genital warts, around the same time that a rival vaccine, Cervarix® (GlaxoSmithKline), was also

approved for HPV prevention (Associated Press, 2009). Given the high prevalence of HPV among young adults and adolescents, uptake of the HPV vaccines is a major public health issue in the fight against cervical cancer and HPV infection. As past studies have illustrated, a plethora of factors are involved in the seemingly simple decision of whether or not to be vaccinated.

The purpose of this study is to examine the specific factors that are associated with uptake of the HPV vaccine among Emory undergraduate men and women, and to determine to what extent the "hook-up" culture here at Emory plays a role in the spread of HPV and other preventable STDs. A specific aim of this research is to discover whether knowledge or culture carries more weight in sexual decision-making processes of young Emory college students, and to compare our behaviors to those of other college students across the nation.

This chapter will begin with a biological review of HPV infection and transmission, followed by an introduction to the vaccines and the controversy that surrounds them, including a review of risk compensation theory. The focus will then turn towards uptake of the HPV vaccine and the risky sexual behaviors that occur on college campuses that spread STDs, such as HPV. This section will first cover studies in public health that take a quantitative approach to vaccine uptake, specifically looking at knowledge and awareness factors. Then will follow a review of ethnographic works that take an in depth look at the sexual risk behaviors among young people that relates back to STD transmission and underscores the importance of HPV vaccine uptake among young adults.

HPV infection and disease

HPV is a type of DNA virus that can infect anogenital epithelial tissues of humans. There are over 100 HPV types, most of which are asymptomatic and

become undetectable a few years after initial infection. Only 14 types of HPV are considered "high risk" and can lead to adverse health outcomes (Teitelman et al., 2009). Persistent infection, however, is the most important risk factor for developing cervical cancer (Dunne, Datta, & Markowitz, 2008). Among cervical cancer cases in the United States, 70% are caused by HPV types 16 and 18, which are also implicated in 80-90% of all cases of anal cancer (4,000 cases diagnosed/year). Among the 500,000 new cases of genital warts diagnosed each year in the United States, approximately 90% of them are caused by HPV6 or HPV11. HPV is also related to a lesser extent with penile, vaginal, urethral, and certain kinds of head and neck cancers (Saslow et al., 2007).

While latex condoms offer the best protection against HPV, they are not 100% effective, and further protection measures are necessary to prevent infection. Transmission can occur through any type of sexual penetration, including anal sex. Oral-genital contact can also lead to infection, as well as sexual skin-to-skin contact (Teitelman et al., 2009).

Very few cases of HPV infection progress to cancer, but the burden is still significant. Every year, over 250,000 women die of cervical cancer worldwide (Saraiya, Goodman, Datta, Chen, & Wingo, 2008). Cervical cancer disproportionately affects lower socioeconomic status women, particularly those in developing countries where screening mechanisms, such as Papanicolaou (Pap) testing, are uncommon. Despite the declining rate of deaths from cervical cancer in the past century, there are still 10 women that die every day from cervical cancer in the United States (Teitelman et al., 2009). The virus causes uncontrolled cell growth after the HPV viral proteins E6 and E7 disrupt the regulation of the cell cycle, causing the cell to grow and divide unchecked (Saslow et al., 2007). If these cells are not

removed, cell division will continue until the tumor eventually metastasizes to other areas of the body through blood or lymphatic vessels, which is the most advanced and poorest prognosis stage of cervical cancer.

Pap testing

Cervical cancer is almost entirely preventable if appropriate measures, such as Pap testing, are done regularly and accurately. Among women diagnosed with cervical cancer, about half have never had a Pap test before in their lives (Saslow et al., 2007). There has been enormous success in reducing the number of cervical cancer cases in areas where screening has been introduced. In the United States, the incidence rate of cervical cancer fell by 75% within 50 years following the introduction of cervical cytology (Saslow et al., 2007). Despite this high efficacy rate, women around the world and in the U.S. do not undergo regular screening. This can be the result of a variety of factors, including cultural, religious and financial reasons, or a misunderstanding of one's risk. Since a person can be infected with HPV for years before cancer develops, screening is still very important even if a woman is no longer sexually active or is in a monogamous relationship.

Since the HPV vaccines do not protect against all strains of HPV that can lead to cervical cancer, routine Pap testing following vaccination is still necessary. One dangerous possibility is that young adult women will discontinue routine Pap testing following vaccination if they believe vaccination will make Pap exams unnecessary. Evidence suggests that young women have poor knowledge regarding testing, often confusing the Pap test with other gynecologic procedures, such as a STD test or a pelvic exam (Head, Crosby, & Moore, 2009). These results are discouraging in that young women may falsely believe that they are free of all STDs after a normal Pap

result. The importance and meaning of a Pap test is a necessary part of any educational campaign regarding HPV vaccination.

HPV vaccines

In June 2006, the FDA approved the first prophylactic quadrivalent HPV vaccine that protects women from HPV16 and HPV18, which cause 70% of all cervical cancers, and from HPV6 and HPV11 which cause 90% of all genital warts cases in the United States. In clinical trials, the vaccine was almost 100% effective in preventing the four HPV strains the vaccine protects against (Teitelman et al., 2009). Gardasil®, the commercial name for the vaccine, is composed of virus-like particles (VLPs) that mimic the outer protein coat of the virus. Since the vaccine contains no DNA, there is no risk of infection from the vaccine. A second vaccine developed by GlaxoSmithKline, called Cervarix®, protects women from HPV16 and 18, and was recently approved by the FDA in October 2009 (Saslow et al., 2007; Associated Press, 2009). Also in October, Gardasil, which before was administered exclusively to women, gained FDA approval for use in males aged 9-26, to combat the estimated 250,000 new cases of genital warts in males each year (Singer, 2009). In a head-to-head trial testing the efficacy of Gardasil versus Cervarix, researchers found that both vaccines had high efficacy rates; however, Cervarix was associated with higher frequencies of HPV-specific memory B-cells at seven months after the first injection. Cervarix also outcompeted Gardasil in several other measures; however, Cervarix had higher rates of adverse health outcomes following vaccination, most of which were injection site reactions (Einstein et al., 2009). Gardasil, while not quite as effective as Cervarix in preventing HPV16 and 18 infections, protects vaccinated women from two additional HPV strains not included in the Cervarix vaccine.

According to the American Cancer Society (Saslow et al., 2007), the 3-dose HPV vaccine is recommended for all girls aged 11-12 years; girls as young as 9 can also receive the vaccine, however it is not known yet whether administering the vaccine at this age will require a booster later on, but long-term trials are underway. Women younger than 26 can receive the vaccine; however, it is most effective if administered before sexual debut, as the vaccine cannot treat current infection. However, a woman infected with HPV can still receive some benefit from the vaccine as it covers four different strains of HPV. Males aged 9-26 are recommended for vaccination against genital warts. Women and men over 26 are not recommended to receive the vaccine. Routine Pap testing is still required following vaccination. Given the high prevalence of HPV infection in the general population and the ubiquity of behavioral risk factors involved in HPV transmission, targeting at-risk populations for HPV vaccination is impractical, and comprehensive vaccination of all eligible women appears to be the best approach (Dempsey, 2008).

Vaccine controversy

It is estimated that HPV-related disease screening and treatment costs around $2.9 billion each year, making HPV vaccination economically feasible. Despite the efficacy of vaccination and the cost associated with HPV-related disease, current research suggests that perceptions regarding HPV vaccination generate vaccination levels that do not reach those necessary to achieve the maximum health benefit for the population (Basu, Chapman, & Galvani, 2008). Perceptions of the vaccine as being associated with sexual activity also come into play in this study as a factor that decreases the odds of vaccination.

As of now, the HPV vaccine is administered mostly on a volunteer basis; out of the more than 20 states to consider mandates, only two (D.C. and Virginia) are now

asking parents to have their daughters vaccinated before entering the sixth grade (Alcindor, 2009; Udesky, 2007). However, the opt-out measures are simple and straightforward, but controversy surrounding mandatory vaccination is still being fueled.

In a review on progress made and obstacles still in the way against widespread HPV vaccination, Herzog et al. (2008) report that despite low levels of knowledge concerning HPV and what the HPV vaccine protects against, studies have reported anywhere from 55-100% of parents were willing to vaccinate their children against HPV. Despite these high numbers, controversy surrounding the vaccine persists and is centered on arguments against mandatory vaccination of pre-teen girls and the vaccine itself. The controversy was fueled further when it was discovered that at least three medical associations used funds from the vaccine manufacturer to promote the vaccine, including the American College Health Association, the American Society for Colposcopy and Cervical Pathology, and the Society for Gynecologic Oncologists (Stein, 2009). Arguments erupted when it was discovered that the vaccine manufacturer, Merck & Co., contributed funds to the re-election campaign of Texas governor Rick Perry, who issued an executive order in early 2007 requiring girls to be vaccinated before entering the sixth grade (Haber et al., 2007).

Despite the controversy surrounding the promotion of the vaccine, many other issues have been brought to the table. Many argue that it compromises a parent's autonomy in deciding the health of their daughters. Others argue that, unlike other childhood vaccines such as chicken pox and measles, HPV is not transmitted casually, and should therefore not be mandatory. The cost of the vaccine, around $120 a dose, is cited as too high a cost for parents, creating further health disparities in underserved and uninsured populations. Some argue that limited healthcare dollars should be

directed elsewhere. Still others argue that mandatory vaccination will only provide a band-aid for the real problem concerning HPV infection, which stems from human sexual behavior (Haber et al., 2007; Vamos, McDermott, & Daley, 2008). This study will address risky sexual behaviors on Emory's campus in the context of the sex culture that exists among students.

Controversies surrounding the vaccine itself include questions on the long-term side effects, still unknown, of the vaccine, and the length of vaccine efficacy, both of which are currently being studied (Haber et al., 2007). Complaints that the HPV shots are particularly painful have also been added to the debate (Hammoud, 2008). Perhaps the most heated argument stems from the fact that unlike most childhood vaccines, the HPV vaccine protects adolescents from a sexually transmitted pathogen, which many argue will give vaccinated children a false sense of protection against STDs, which may in turn lead to sexual disinhibition. Others cite that mandating HPV vaccination will send mixed messages to an age-group that should be learning abstinence-only education. Supporters of mandatory vaccination argue that parents need not tell their adolescent daughters that they are receiving a vaccination against a STD, while others argue that compared to other STDs, such as HIV or herpes, HPV is relatively unknown, and young women will not change their sexual patterns due to fear of these other more widely discussed STDs (Haber et al., 2007). Others simply argue for the great public health breakthrough that the HPV vaccine affords women in preventing a disease that still claims thousands of lives each year (Vamos et al., 2008). Sexual risk compensation following vaccination has been a heated debate ever since mandates for HPV vaccination were first proposed, and this controversial topic will be explored next.

Risk compensation following vaccination

Concerns that vaccination against a sexually transmitted disease will lead to sexual risk compensation or sexual disinhibition have been widespread since the release of the HPV vaccine. These concerns are based on theories of risk compensation (aka risk homeostasis), which state that people tend to have a set preference for adopting risk, and a feeling of safety stemming from a preventive behavior (such as HPV vaccination) will create a surplus of risk that will be spent elsewhere. In the case of HPV vaccination, it will be spent on other risky sexual activities (N. T. Brewer, Cuite, Herrington, & Weinstein, 2007).

Proponents for vaccination argue against these claims. Among their counterarguments they cite sex education campaigns, condom distribution in high schools and college campuses, and the introduction of emergency contraception (the morning-after pill), all of which studies have shown do not increase risky sexual behaviors or decrease age at first sexual debut (Monk & Wiley, 2006; Zimet, Shew, & Kahn, 2008). Others cite programs that provide free needle exchanges to injection drug users, which have led to a decrease in HIV transmission while not increasing injecting drug behaviors (N. T. Brewer et al., 2007). This study supports these arguments to the extent that condom distribution and sex education campaigns on Emory's campus appear to encourage an open dialogue amongst students that will encourage them to seek sexual health advice and be more likely to use protection during sex.

Studies on risk compensation following the introduction of highly active antiretroviral treatment (HAART) for people living with AIDS offer mixed results, but the majority of these studies show no correlation between HAART and increased levels of risky sexual behaviors (Zimet et al., 2008).

Monk & Wiley (2006) argue that opponents of vaccination should direct their energies at other strategies that influence adolescent sexual behavior instead of at an effective vaccine that can save lives. Parental supervision and honest and open dialogue with adolescents is the best deterrent of risky behavior the authors argue. Opponents of the vaccine should concentrate their efforts on promoting parental dialogue on sexual intercourse with young children and on decreasing the amounts of sexually explicit content on television. Indeed, parental monitoring and communication have been shown to compensate for other factors that increase the risk for adolescent sexual behavior (Fergus & Zimmerman, 2005).

Studies that have examined or tried to quantify risk compensation offer mixed results. In one study, about one quarter of mothers believed risk compensation would result from vaccination, and 16% of girls acknowledged that their sexual behavior might change following vaccination (Marlow et al., 2009). When asked about risk compensation following hypothetical AIDS vaccination, nearly a quarter of respondents surveyed responded that their levels of risky sexual activity would increase (Crosby & Holtgrave, 2006). Another study quantified risk compensation following Lyme disease vaccination, showing that vaccinated individuals increased some protective behaviors and decreased others, supporting the results of risk compensation theory to a minor extent (Brewer et al., 2007).

The theory of risk compensation following HPV vaccination remains speculation, as studies looking into this relationship will not be available until after widespread adoption of the vaccine among adolescent girls and young women. This study will include students' views on risk compensation theory that stem from associating the vaccine with being sexually active and determine whether this plays a role in vaccine adoption.

HPV knowledge, normative belief, and vaccination intention

The present study aims to follow up on recent work that suggests higher levels of knowledge correlate with increased acceptance of the HPV vaccine (Allen et al., 2008; Caskey, Lindau, & Alexander, 2009; Chan, Yan Ng, Lo, Cheung, & Hung Chung, 2009; Jones & Cook, 2008; Kahn, Rosenthal, Hamann, & Bernstein, 2003; Licht et al., 2009). A strength of this study is that it will examine the specific cultural values and ideals among young adults on Emory's campus that may encourage and/or reward risky sexual behaviors in addition to knowledge correlates.

Recent work suggests that young girls' knowledge of common STDs is incomplete or lacking. Ragin et al. (2009) illustrate high awareness of HPV and the vaccine but also many misunderstandings on the various benefits of vaccination. For instance, in many cases, individuals knew the link between HPV and cervical cancer, but not HPV and genital warts. Despite reported beliefs that their knowledge of STDs was high, pre-adolescent and adolescent girls demonstrated poor knowledge on the most common STDs among their age group, including HPV, and even worse knowledge regarding curability, placing their actual levels of knowledge far below the national standards for each age group (Clark, Jackson, & Allen-Taylor, 2002). Importantly, the authors of this study report higher levels of knowledge concerning HIV infection, which is far less common among this age group than other STDs, such as HPV, perhaps indicating that sexual health education places too great an emphasis on HIV at the expense of other STDs. This study will quantify knowledge levels among Emory students in relation to HPV vaccine adoption and will examine the HPV vs. HIV issue.

Past studies on the issue have shown links between increased knowledge/awareness of HPV and vaccination intent, among other factors, including

normative behavior. Among a sample of female college students, the highest knowledge scores were among those who had already been vaccinated or were preparing for vaccination. Normative behavior in vaccination was the strongest predictor of vaccine intention. The perception that peers were either already vaccinated or intending to be vaccinated was correlated strongly with intention to be vaccinated (Allen et al., 2008). In Kahn et al. (2003), normative behavior extended to the belief that others would approve of vaccination, including parents, healthcare providers, partners, and religious institutions. Additional studies demonstrated links between vaccination intention and higher knowledge (Caskey et al., 2009) and more sexual partners (Jones & Cook, 2008). Caskey et al. (2009) also showed that respondents were far more likely to be vaccinated if recommended by their healthcare provider or parent or a close friend, again stressing the importance of normative belief in vaccination intention. Indeed, normative belief was the only attitudinal predictor of vaccination in Conroy et al. (2009). The present study examines normative behaviors regarding vaccination and sex in relation to the influence of friends and fellow peers on getting the vaccine and the sexual norms that students try to exemplify in order to fit in.

Information framing on young women was also shown to increase vaccination intention in Chan et al. (2009) after young adolescent girls were given an information pamphlet on HPV; however normative belief was negatively correlated with vaccine intent, a different finding from the studies presented above.

A number of studies examined knowledge and attitudinal differences between sexes and races. One study (Gerend & Magloire, 2008) showed that knowledge of HPV infection was generally high among college students, but women had higher knowledge. This study also showed common misconceptions regarding HPV

infection and genital warts and a disinclination to get the vaccine if sexually inexperienced. Ragin et al. (2009) found racial differences on awareness and knowledge of HPV and the vaccine. The authors found that overall whites had greater awareness and knowledge regarding HPV and the vaccine than blacks.

A number of studies, many already cited above, show that vaccination intent is strongly correlated with already being sexually active. A review study looking at predictors of HPV vaccination illustrates that many people incorrectly believe that vaccination is most appropriate for those currently sexually active, indicating that vaccination campaigns may need to emphasize the importance of vaccination before sexual debut (Brewer & Fazekas, 2007). The present study will examine sexual activity status to see if it is associated with vaccine adoption (in women) and intent to be vaccinated in men.

With the recent FDA approval of the HPV vaccine in men, it is important to understand men's views on the vaccine and their knowledge of HPV and perceived risk. One study showed poor knowledge in young college men on HPV infection and transmission along with the belief that HPV primarily affects women (Allen, Fantasia, Fontenot, Flaherty, & Santana, 2009). Two related studies demonstrated that men's intentions for vaccination were primarily self-interested. Gerend & Barley (2009) showed that heterosexual male college students from Florida State University receiving a partner protection message of HPV vaccination were no more likely to be vaccinated than men receiving a self-protection message only. Similar to these findings, Jones & Cook (2008) report men were less willing to be vaccinated if the vaccine protected against cervical cancer alone rather than cervical cancer and genital warts.

Another study (Ferris et al., 2009) showed that among a convenience sample of men aged 18-45 recruited from both Augusta and Atlanta, Georgia, study participants with high-risk sexual behaviors were most accepting of the vaccine, and male virgins who participated in the study were more likely to be undecided. These are similar findings to those in women that show sexually active women were more likely to be vaccinated.

Culturally shared perceptions of risk and sex

Focus groups composed of young multiethnic college women (YMCW) discussed their sexual decision-making processes in Kennedy & Roberts (2009). Two alarming themes emerged. First, the YMCW explained that they often did not use condoms because they were not in control of their sexual behavior when being in the moment, and second, alcohol often led to sexual disinhibition. These behaviors were peer-accepted because of the culturally shared belief that they couldn't help themselves and therefore cannot be blamed. Upon closer examination, the authors discovered that these women knew that these beliefs were myths, but were propagated by the women as an excuse and/or justification for their past risky sexual behaviors. These same focus-group women agreed that men were almost universally not to be trusted, yet interestingly, the YMCW declared that their sexual partners were faithful to them. As a sign of this faithfulness, they forwent condom use to demonstrate their trust and commitment. The YMCW stated that their sexual partners had a tacit understanding of what this noncondom use meant.

Very similar to the present study, Jones et al. (2006) examined knowledge on STD transmission and safe sex among college students in focus group sessions against cultural values and ideals that put students at risk for STDs. The results showed that high knowledge of STDs had no effect on sexual behavior among the students. Study

participants were savvy on symptoms associated with an infection and potential consequences of disease. Despite this high familiarity, the authors reported high rates of unsafe sex. They suggest that young adults engage in risky sexual behaviors because they do not see themselves personally at risk for infection. Indeed, studies have documented low risk perception among young adults when in fact, their actual risk or risk factors for HPV were high (McNair, Power, & Carr, 2009; Ramirez, Ramos, Clayton, Kanowitz, & Moscicki, 1997). Perceived risk is addressed in this study as well, as one possible factor in HPV vaccination.

A number of studies examine the social and cultural construction of risk. Mellers, Schwartz & Cooke (1998) argue that risk has no objective definition; rather, risk is socially-constructed in order to deal with certain dangers in life. Citing scholarly work from Douglas and Wildavsky, Heimer (1988) and Clarke (1993) explain that risk and perceptions of danger are socially-constructed, governed by certain social institutions in which people live, and these institutions dictate how we view and classify risk. In her ethnographic work on the culture of adolescent risk-taking, Cynthia Lightfoot argues that risk-taking is a meaningful experience only when it is shared between individuals that have similar interests and points of view within a particular group; indeed, she found a pattern between the risk patterns of individuals and the risks accepted by the group that each individual belonged to or associated with (Lightfoot, 1997). Groups are united by the accepted risks that are taken on, and consequently there is a shared view on unacceptable, deviant, or nonnormative risky behavior that will break up the group if allowed (Douglas, 2003). This is again tied into normative behavior and the influence of friends, which will be discussed in this study in relation to intent to be vaccinated and risky sexual behaviors among Emory students.

A study looking at cultural beliefs among recent and established Latina immigrants related to cervical cancer risk and prevention (Chavez, McMullin, Mishra, & Hubbell, 2001), revealed that both cultural beliefs and structural, or socioeconomic, factors matter in determining behaviors, including Pap exams. Multivariate analysis showed that structural factors, including medical insurance, education and acculturation were correlated with use of the Pap exam. Ethnographic work included in this study revealed a cultural consonance on cervical cancer risk. Latinas associated cervical cancer risk with immoral behavior that is nonnormative, rather than an emphasis on infection transmission as a result of this immoral behavior. These findings might relate to adoption of the HPV vaccine among Emory undergraduate students in how they view students who get the vaccine. With the high cost of HPV vaccination, structural factors, such as insurance coverage, might dictate vaccine adoption as well.

Sexual risk perception is influenced by social and cultural factors of a particular group. If one's peers do not have STDs, then self-risk perception is low. Students and sexually active persons in general tend to gauge their risk for STDs based on those around them. A number of studies illustrate this culture as knowledge phenomenon. Swora (2003) shows that both men and women reached a cultural consensus on STD risk and what constitutes risky sexual behavior. These shared risk perceptions extend to the lesbian and bisexual community. Power, McNair & Carr (2009) showed that lesbians and bisexual women do not perceive themselves to be at risk for common STDs, including HPV, because they are often excluded from sexual health messages that target heterosexuals primarily. As a result of this perceived invisibility, lesbian or bisexual women assume that media messages refer only to heterosexual intercourse. This creates a flawed sense of risk among this population

resulting from this cultural script that informs lesbian and bisexual women that they are immune to STDs.

Flood (2003) revealed shared perceptions of STD risk among seventeen young adult men who participated in in-depth interviews. In the study, men cited a perceived higher risk for pregnancy over STDs, and in that respect, they relied on their partner's use of contraceptive measures, such as birth control pills, instead of condoms. This theme of women as the gatekeepers of sexual health and prevention of pregnancy was revealed in many of the interviews. Even in casual sexual encounters, men still relied on the woman's use of the pill; one interviewee explained his reasoning as: "I am going to have sex with this woman. Therefore she is sexually active. Therefore she is on the pill". Another reason men cited for tossing the condom was that it decreased their physical satisfaction; it was like taking a "shower in a raincoat". Many men also explained that condoms "[killed] the moment", and in a moment of passion considerations such as STD risk were temporarily overridden. Trust and implied monogamy were also cited as reasons for unsafe sex. Using a condom in an agreed-upon monogamous relationship implied dishonesty. The trust between two partners was "antithetical to ongoing condom use" as explained by Flood. Apparently this trust even extends to casual hook-ups; one male explained how he and a casual partner used a condom the first time they had sex, but then tossed the condom later that night when they had sex again. In many cases, having sex with someone (even a casual partner) establishes trust between them. Perhaps the most intriguing (and dangerous) assumption made by the men in this study is that their social network, the so-called 'heterosexual community' was immune to the risk of HIV and other STDs. They associated transmission of HIV and other STDs to homosexuality, and they did not link a risk of infection to those in their social

network. Similar findings on condom use and perceived immunity to STDs are discussed in this study.

Kathleen A. Bogle discusses this culture as knowledge concept in her ethnography about sex on college campuses, *Hooking Up: Sex, Dating, and Relationships on Campus*. One factor that may explain low perception of risk among her study population is that students overestimate the sexual experience of their colleagues, and they feel less at risk in comparison. Scholly, Katz, Gascoigne, & Holck (2005) reached similar conclusions and found that students' perceptions of social norms encouraged unsafe sexual behavior if they felt their peers were more promiscuous than they. Bogle explains that the ambiguity surrounding the term "hooking up" means that college students tend to overestimate the sexual experience of others, thinking that virginity was extremely rare among their friends. Since "hooking up" can have a range of meanings, depending on who is speaking, what actually happens between two partners leaves much to guesswork for their peers. Students feel that their own sexual behavior is more conservative in comparison. Bogle also reveals that college students are more comfortable hooking up with their peers given the similarity of going to the same school and the familiarity that goes with it. Men participating in a focus group in Allen et al. (2009) also felt that sex was safer with peers and more risky with people not enrolled at their school.

One final perspective that sheds more light on the culture surrounding sex and perceptions of risk among young adults comes from *Virginity Loss: An Intimate Portrait of First Sexual Experiences*. In her ethnography, Laura M. Carpenter shares stories that can explain high rates of unsafe sex on college campuses. One important theme that emerged was that men generally stigmatize male virginity. Many of the men that she interviewed wanted to get rid of their virginity, and they hid their virgin

status from peers until they did. This stigma associated with virginity is amplified in American pop culture, from movies such as American Pie to the infamous case of the nerdy teenage boy, named Frances D. Cornworth, who tried to auction off his virginity on eBay. It is no wonder then that men who stigmatize virginity jump at the first chance they get to have sex, which in many personal accounts was with a person he had only just met. Especially for men losing their virginity to a woman more sexually experienced than they, they would do anything to conceal their virginity, even going against their better judgment and not using protection. Bill offered one account where he lost his virginity during freshman year to a girl he had just met, Diane (Carpenter, 2005, p. 120). Diane was more sexually experienced than he, and when she told him that she was "okay" and he did not need to use a condom, he was too nervous to disagree. This type of story was repeated in many accounts of first time sexual encounters, particularly by men who were so eager and anxious to rid themselves of their virginity that they either forgot about using a condom or went against their better judgment so as to not reveal their virgin status to their partner. Indeed, Carpenter concludes that this desire for concealment was the principle reason for not using protection. Stigmatizers also often lost their virginity to a casual partner so that if expectations were not met they would not have to worry about the relationship afterwards.

These accounts illustrate how young adults often engage in unprotected sex and overestimate the sexual experience of their friends, which partly stems from the ambiguity of the hook-up culture. Another theme that emerged was that students feel their social group is at lower risk for STDs compared to people outside their social group.

Present study

The above review highlights the potentially important roles of knowledge, risk perception, and sexual activity status on Emory students' intentions to be vaccinated against HPV. In addition, the above review shows that sexual norms and perceptions on risk are shared amongst friends and within specific communities, which may lead to unsafe sex and transmission of STDs. This study contributes to the existing literature on factors that are associated with uptake of the HPV vaccine among a small sample of Emory undergraduate students. This study will attempt to shed light on the hook-up culture at Emory as it relates to what students view as normal and how it may lead to unsafe sex and transmission of STDs, such as HPV. The results of this study will have important implications for sexual health campaigns at Emory and also how best to market the HPV vaccine to young men and women who would benefit most from vaccination.

II. METHODS

Study Location

The entirety of this study took place at Emory University. Following Emory Institutional Review Board (IRB) approval in late fall 2009, undergraduate Emory students were recruited to participate in an online survey and optional follow-up interview. Data collection took place from mid-December 2009 to early February 2010 when the last interviews were held.

Sample population

Only Emory undergraduate female and male students were allowed to participate in the online survey and the optional follow-up interviews.

Survey data collection

A brief 5 to 10 minute survey was posted online for Emory undergraduate students to take. The only inclusion criterion was being an Emory undergraduate student. The survey link was sent out to the author's personal acquaintances in mid-December 2009, and through the 'snowball effect' slowly generated responses throughout December and the start of January. To reach a minimum of 200 respondents, the author approached professors of relatively large lecture classes to speak to their students about taking the online survey. Twelve classes were reached in total, and the survey was taken down in early February after the minimum goal of 200 students had been well surpassed. Respondents gave their consent by marking the appropriate box on the first page of the survey. Both men and women were encouraged to take the survey, and different questions were generated for each sex. The aim of the survey was to estimate students' knowledge of HPV and its diseases and to identify any factors that might be related to vaccine uptake in women, and intent to be vaccinated in men. Students were also asked to give their opinions on

sexual activity on Emory's campus. This included questions on how they perceive themselves and their friends compared to the rest of the Emory undergraduate student population in terms of sexual activity. Students were also asked whether they believed getting the vaccine would alter their or another's sexual behaviors.

Interview data collection

The online survey asked whether each respondent was interested in a follow-up interview to discuss their views on the vaccine and sexual activity on college campuses in more detail. Interested students were asked to leave their contact email address which temporarily linked interested interview participants to their survey answers. These students were contacted through email about setting up an interview shortly after the online survey came down. All interviews took place on Emory's main campus or the Clairmont Campus, at a time and location suitable to the student interviewee. With the student's permission, all interviews were audio-recorded and then immediately transcribed. Oral consent was obtained at the start of each interview after the student read a consent form describing their rights as a student research volunteer. The students' identities were kept confidential during the interview, and only the student's sex and year at Emory were matched to their responses. In the rare instance when the student did divulge identifying information, it was not included in the transcripts. Once the interview was complete, the email address of the student was deleted from the data records. The interviews were semi-structured. Questions on knowledge of HPV and the vaccine and questions on the sexual culture of college students in general and Emory in particular were thought out ahead of time, but the ultimate direction the interview took was based on student responses and their desire to discuss certain subjects over others. Both the online survey questions and interview discussion questions are included in the appendix at the back.

Survey data analysis

All data were downloaded in Microsoft Excel format, cleaned, and then uploaded for analysis in SPSS v17.0. One respondent was not an undergraduate student, so this student's answers were excluded from the analysis. For the remaining students, a knowledge score on HPV was generated on a scale from 1 to 10, with 10 being the highest knowledge score. One point was given for each correct answer to the 10 knowledge questions posted on the online survey. Responses of 'Don't Know' were counted as incorrect, and no points were given. Knowledge scores were also divided into three categories, representing low, medium, and high scores. This variable is referred to as knowledge level.

Frequencies were generated for basic sample characteristics and responses to the male and female-only opinion questions and for vaccine adoption status in women. Chi-square tests were run to determine if men and women had different levels of HPV transmission and prevention knowledge and if they had different opinions regarding vaccination and sexual activity on college campuses. Chi-square tests were also used to see if opinions on sexual matters and knowledge varied between women who had already been vaccinated and those who had not. Chi-square tests were also run to determine if differences in knowledge and sexual opinion matters differed between sexually active students and those who were not yet sexually active. Independent samples T-tests were run to determine if average knowledge scores were associated with vaccination status (in women), desire to be vaccinated (men-only), whether student had already taken the PE 101 health requirement, and whether student had ever been sexually active. Binary logistic regression models were used to predict factors associated with vaccine adoption in women and wanting to get the vaccine in men. Among the factors were class year, perception of HPV

risk, association of vaccine with sex, knowledge score, and whether respondent had ever been sexually active. Additionally, knowledge of when the vaccine was most effective and risk of HPV infection from the vaccine itself were factors in the female adoption of the vaccine regression model.

Interview data analysis

Interview transcripts were read through multiple times and common themes that emerged were taken note of. For the most part, student's responses were paraphrased, but when the student had something significant or unique to say, direct quotations were recorded. Quotation marks appearing in the results and discussion sections to follow are used only for direct quotations from the student interviewees; everything else is a summation or paraphrase of what was said.

The purpose of the interviews was to delve deeper into students' perceptions and opinions on the HPV vaccine and sexual activity on Emory's campus. The responses were used to the best of my ability to make sense of the results from the survey data analysis, but inevitably, some significant results from the survey data results cannot be fully explained from the responses of a small sample of eight student interviewees.

III. RESULTS

Description of the study population

Table 1 Sample Characteristics

Year at Emory	N	Percent
Freshman	101	34.2
Sophomore	75	25.4
Junior	37	12.5
Senior	81	27.5
Other	1	0.3
Total	295	100
Race/Ethnicity	N	Percent
Asian/Pacific Islander	65	22.1
Black	32	10.9
Hispanic	10	3.4
White	172	58.5
Other	14	4.8
PE 101	N	Percent
Yes	229	77.9
No	65	22.1
Sex Status	N	Percent
Currently sexually active	113	38.4
Not currently sexually active	68	23.1
Never sexually active	113	38.4
Relationship Status	N	Percent
In a monogamous relationship	109	37.1
In a relationship, non-monogamous	8	2.7
Not in a relationship	173	58.8
Other- Married	1	0.3
Other- Almost in a relationship	1	0.3
Other- Dating, not sexually active	1	0.3
Other- Not sure if in relationship yet, but definitely monogamous	1	0.3
Have you ever heard of HPV?	N	Percent
Yes	289	98.3
No	5	1.7
Have you ever heard of the HPV vaccine?	N	Percent
Yes	282	95.9
No	12	4.1
Sex	N	Percent
Female	225	76.5
Male	69	23.5

The characteristics of the sample population are presented in Table 1, above. A total of 295 participants took the survey. One respondent did not identify herself as an undergraduate student, so her responses were excluded from the data analysis, making a grand total of 294 survey respondents included in the data analysis. Of the

respondents, the vast majority were female (77%) and white (59%). All four classes were represented, but the freshman class was slightly overrepresented, while the junior class was underrepresented. This most likely occurred because the large lecture classrooms that were targeted during data collection are primarily made up of freshmen and sophomores, and many of the seniors that took the survey were personal acquaintances. The majority of survey respondents had already taken the PE 101 health requirement at the time of the survey, and through the follow-up interviews, it appeared that many students were currently taking PE 101 in the spring 2010 semester. The vast majority of survey respondents were not in any kind of relationship (59%), and more than a third (38%) of respondents had never been sexually active. Virtually all survey respondents had heard of HPV (98%) and the HPV vaccine (96%).

HPV knowledge

Table 2 Descriptive knowledge score results

N	Minimum	Maximum	Mean	Std. Dev
294	0	10	5.96	2.163

Figure 1 Knowledge score distribution

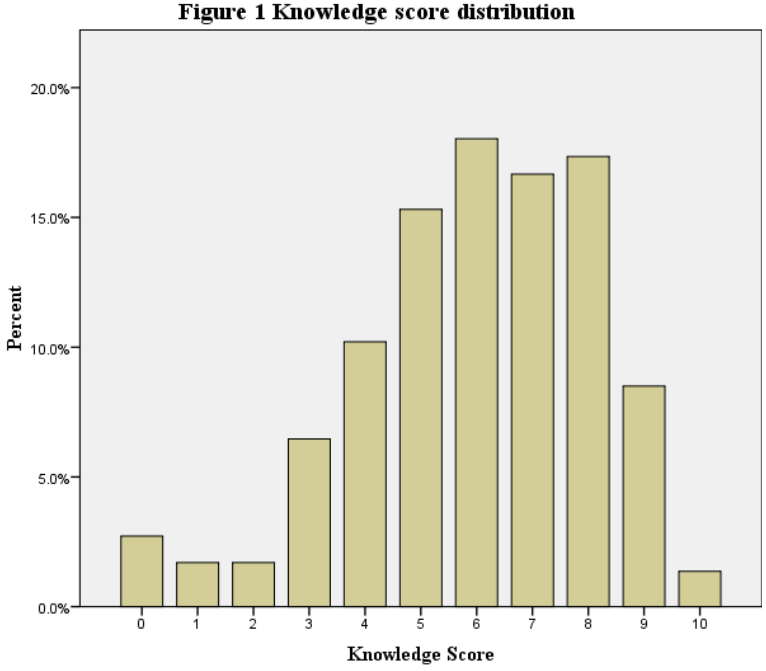

Table 2, above, gives information on the knowledge scores of the survey respondents. On a scale from 0 to 10, the average score was 5.96. Figure 1, above, illustrates that the knowledge scores approximately fit the normal distribution curve. Percentages of correct responses to the 10 knowledge questions are presented in the tables that follow, categorized by sex, vaccine adoption status, and sexual activity status.

Male opinion on vaccine

Table 3 Opinions on getting the vaccine (men-only)

You would want to be vaccinated against HPV.	N	Percent
Agree	36	52.2
Disagree	12	17.4
Don't Know	20	29
All women eligible for the vaccine should receive it.	N	Percent
Agree	42	60.9
Disagree	13	18.8
Don't Know	14	20.3
I would be more willing to get the vaccine if my doctor recommended it.	N	Percent
Agree	61	88.4
Disagree	5	7.2
Don't Know	1	1.4
I would be more willing to get the vaccine if it was covered by my insurance.	N	Percent
Agree	52	75.4
Disagree	12	17.4
Don't Know	3	4.3
I would be more willing to get the vaccine if it was free.	N	Percent
Agree	51	73.9
Disagree	14	20.3
Don't Know	2	2.9

Responses to the male-only questions are provided in Table 3, above. The majority of male survey respondents indicated that they would want to be vaccinated against HPV (52%). Almost a third of male respondents (29%) did not know whether they would want to be vaccinated or not. A greater majority responded that they would be more willing to get the vaccine if their doctor recommended it (88%), if it was covered by their insurance (75%), and if the vaccine was free (74%). The

majority of men responded that all women eligible for the vaccine should receive it (61%).

Female knowledge and opinion on vaccine and adoption status

Table 4 Knowledge of HPV infection, vaccine and opinions on vaccination (women-only)

Vaccinated women no longer need Pap tests.	N	Percent
Agree	0	0.0
Disagree	206	91.6
Don't Know	19	8.4
An abnormal Pap test result may indicate an HPV infection.	N	Percent
Agree	152	67.6
Disagree	7	3.1
Don't Know	65	28.9
The HPV vaccine has been approved for girls and women aged 9-26 years.	N	Percent
Agree	188	83.6
Disagree	8	3.6
Don't Know	29	12.9
The vaccine is most effective if administered before sexual debut.	N	Percent
Agree	134	59.6
Disagree	17	7.6
Don't Know	73	32.4
There is a small risk of contracting HPV from the vaccine.	N	Percent
Agree	77	34.2
Disagree	49	21.8
Don't Know	98	43.6
If I chose to be vaccinated, it would be relatively easy to do so.	N	Percent
Agree	203	90.2
Disagree	8	3.6
Don't Know	14	6.2
I would be able to get the vaccine at Emory's student health clinic if I wanted to.	N	Percent
Agree	168	74.7
Disagree	4	1.8
Don't Know	53	23.6
All men eligible for the vaccine should receive it.	N	Percent
Agree	134	59.6
Disagree	13	5.8
Don't Know	76	33.8

Table 4, above, reports knowledge and opinion levels on the female-only survey questions. Overall, female survey respondents were very knowledgeable on the importance of Pap testing after vaccination (92%) and guidelines for vaccination among adolescent girls and young women (84%). While the majority of female survey takers knew that an abnormal Pap test result could indicate an HPV infection

(68%), almost a third (29%) did not know this purpose of the Pap test. Similarly, the majority of female students who took the survey knew that the vaccine was most effective before sexual debut, while 32% of students responded 'Don't Know' to this question. The HPV vaccine is composed of virus-like particles (VLPs), and there is no chance of infection through vaccination; however, 34% of female students who took the survey thought that vaccination posed a small risk of infection. An even greater proportion of female respondents (44%) did not know whether there was a risk or not. In terms of ease of vaccination, the majority of female survey respondents stated it would be relatively simple to be vaccinated if they wanted to (90%), and that they could be vaccinated at Emory's Student Health Clinic (75%) (which they can). Very similar to the male response on whether all women should be vaccinated, 60% of female survey respondents stated that all men eligible for vaccination should receive it.

HPV vaccine adoption status frequencies are presented in Table 5, below. Over 60% of women had already been vaccinated at the time of the survey. Only 10% of women had decided against vaccination, while the rest were either unsure of whether to be vaccinated, unaware of the vaccine, or planning to be vaccinated at some point.

Table 5 HPV vaccine adoption status (women-only)

	N	Percent
Unaware of HPV and/or the vaccine.	2	0.9
Undecided whether to receive vaccine or not.	45	20.0
Planning to be vaccinated in near future.	15	6.7
Already vaccinated with all three doses (or have gotten 1 or 2 doses and plan to finish).	140	62.2
Decided not to receive the vaccine.	22	9.8

Chi-square results

Table 6 Differences in knowledge of HPV infection by sex

	Female			Male			p*
	A	D	DK	A	D	DK	
1. Certain strains of HPV can cause cancer. AGREE	90.2%	0.0%	9.8%	81.2%	0.0%	18.8%	**0.042**
2. Certain strains of HPV can cause genital warts. AGREE	70.5%	5.4%	24.1%	56.5%	7.2%	36.2%	0.093
3. HPV can cause genital herpes. DISAGREE	36.2%	23.2%	40.6%	41.2%	25.0%	33.8%	0.595
4. HPV can cause cancer of the penis or anus in men. AGREE	25.3%	19.1%	55.6%	30.9%	25.0%	44.1%	0.249
5. People cannot transmit HPV to their partner(s) if they have no symptoms of HPV. DISAGREE	11.1%	78.7%	10.2%	5.8%	79.7%	14.5%	0.305
6. HPV infection is relatively uncommon. DISAGREE	5.4%	82.1%	12.5%	4.3%	72.5%	23.2%	0.094
7. A person may be infected with HPV and not know it. AGREE	93.8%	1.8%	4.5%	85.3%	2.9%	11.8%	0.072
8. Condoms prevent all transmission of HPV. DISAGREE	8.9%	71.6%	19.6%	8.7%	68.1%	23.2%	0.806
9. HPV is the most common sexually transmitted disease in the US. AGREE	36.0%	19.1%	44.9%	33.3%	24.6%	42.0%	0.608
10. HPV can be transmitted via skin contact. AGREE	33.8%	26.2%	40.0%	37.7%	24.6%	37.7%	0.837
Average total knowledge score	6.04			5.68			0.289†
Knowledge level	Low	Medium	High	Low	Medium	High	
	38.2%	33.8%	28.0%	37.7%	37.7%	24.6%	0.796

*Chi-square

† T test

Table 7 Differences in opinion on HPV vaccination, risk, and severity by sex

	Female			Male			p*
	A	D	DK	A	D	DK	
1. Compared to other sexually transmitted diseases, such as HIV, genital herpes, syphilis, or gonorrhea, HPV infection is not as severe.	12.4%	67.1%	20.4%	20.3%	56.5%	23.2%	0.185
2. Compared to other students like myself, I am at a lower risk of contracting HPV.	52.4%	30.7%	16.9%	55.1%	23.2%	21.7%	0.411
3. HPV vaccination may encourage risky sexual behavior in adolescents who receive the vaccine.	12.4%	78.2%	9.3%	31.9%	56.5%	11.6%	**0.000**
4. My friends are generally more sexually experienced than me.	51.1%	38.2%	10.7%	40.6%	39.1%	20.3%	0.082
5. Other students at Emory are generally more sexually experienced than me.	63.1%	18.2%	18.7%	56.7%	19.4%	23.9%	0.580
6. If most of my friends were vaccinated against HPV, it would mean they were sexually active.	4.0%	90.2%	5.8%	11.8%	77.9%	10.3%	**0.019**
7. Getting vaccinated would encourage a man or woman to lose his/her virginity.	1.8%	95.1%	3.1%	2.9%	88.2%	8.8%	0.110
8. If I dated a man/woman who got the vaccine, it would signal to me that he/she wants to have sex.	3.6%	93.3%	3.1%	7.4%	83.8%	8.8%	**0.048**
9. Most people my age who get the vaccine are sexually active.	23.6%	57.8%	18.7%	33.8%	29.4%	36.8%	**0.000**
10. Getting vaccinated would make people less likely to use condoms during sexual intercourse.	6.7%	85.3%	8.0%	13.2%	75.0%	11.8%	0.119
11. Getting vaccinated would encourage other risky sexual behaviors besides intercourse.	4.5%	86.6%	8.9%	13.2%	76.5%	10.3%	**0.032**
12. Getting vaccinated makes it safer to have multiple sexual partners.	13.8%	80.4%	5.8%	10.4%	85.1%	4.5%	0.692
13. Receiving the HPV vaccine would not alter my sexual behaviors at all.	85.3%	8.4%	6.2%	85.3%	7.4%	7.4%	0.914

*Chi-square

Tables 6 and 7, above, show the results of chi-squares tests showing the relationship, if any, between sex and knowledge and sex and opinion, respectively. Women knew more than men that HPV can lead to cancer (90% vs. 81%, P= 0.042). Men and women answered similarly on the other nine questions, but it is interesting to note the common misconceptions shared between men and women about HPV infection. Among the survey respondents, 36% of women and 41% of men mistook HPV as the herpes virus. Similarly, the majority of students that took the survey did not know the link between HPV and anal or penile cancer in men. There was also poor knowledge among both men and women on the prevalence of HPV infection and the possibility of transmitting HPV through skin contact. The independent samples T-test revealed no significant difference in knowledge between men and women; the average knowledge score for each sex was similar (P= 0.289). There was also no significant difference in knowledge levels between men and women (P= 0.796). Clearly, knowledge scores are not associated with sex at Emory.

More significant differences in opinion appear between men and women in Table 7. Significantly more men than women (32% vs. 12%, P< 0.01), believe that adolescents who receive the vaccine will engage in more risky sexual activities. Men were also more likely to think that their own friends who are vaccinated are more likely to be sexually active and women they date who are vaccinated are more likely to be interested in having sex. Men were also more likely to think that most people their own age vaccinated against HPV were sexually active. Additionally, men were much more likely to say that HPV vaccination may encourage risky sexual behaviors besides intercourse. These results point out that men at Emory are more likely to believe that risk compensation will follow vaccination and to associate the vaccine with sex.

Table 8 Differences in knowledge of HPV infection by vaccine adoption status

	Did not get vaccine			Got vaccine			p*
	A	D	DK	A	D	DK	
1. Certain strains of HPV can cause cancer. AGREE	85.7%	0.0%	14.3%	93.6%	0.0%	6.4%	0.051
2. Certain strains of HPV can cause genital warts. AGREE	70.2%	7.1%	22.6%	70.5%	4.3%	25.2%	0.631
3. HPV can cause genital herpes. DISAGREE	43.4%	20.5%	36.1%	31.4%	25.0%	43.6%	0.199
4. HPV can cause cancer of the penis or anus in men. AGREE	28.6%	11.9%	59.5%	23.6%	23.6%	52.9%	0.097
5. People cannot transmit HPV to their partner(s) if they have no symptoms of HPV. DISAGREE	7.1%	76.2%	16.7%	13.6%	80.0%	6.4%	**0.025**
6. HPV infection is relatively uncommon. DISAGREE	3.6%	81.0%	15.5%	6.5%	82.7%	10.8%	0.416
7. A person may be infected with HPV and not know it. AGREE	91.6%	2.4%	6.0%	95.0%	1.4%	3.6%	0.593
8. Condoms prevent all transmission of HPV. DISAGREE	9.5%	72.6%	17.9%	8.6%	70.7%	20.7%	0.861
9. HPV is the most common sexually transmitted disease in the US. AGREE	39.3%	19.0%	41.7%	34.3%	19.3%	46.4%	0.729
10. HPV can be transmitted via skin contact. AGREE	36.9%	26.2%	36.9%	32.1%	26.4%	41.4%	0.733

*Chi-square

Table 9 Differences in opinion on HPV vaccination, risk, and severity by vaccine adoption status

	Did not get vaccine			Got vaccine			p*
	A	D	DK	A	D	DK	
1. Compared to other sexually transmitted diseases, such as HIV, genital herpes, syphilis, or gonorrhea, HPV infection is not as severe.	13.1%	71.4%	15.5%	12.1%	65.0%	22.9%	0.410
2. Compared to other students like myself, I am at a lower risk of contracting HPV.	54.8%	26.2%	19.0%	50.7%	33.6%	15.7%	0.487
3. HPV vaccination may encourage risky sexual behavior in adolescents who receive the vaccine.	16.7%	66.7%	16.7%	10.0%	85.7%	4.3%	**0.001**
4. My friends are generally more sexually experienced than me.	56.0%	29.8%	14.3%	48.6%	42.9%	8.6%	0.104
5. Other students at Emory are generally more sexually experienced than me.	70.2%	10.7%	19.0%	58.6%	22.9%	18.6%	0.068
6. If most of my friends were vaccinated against HPV, it would mean they were sexually active.	9.5%	83.3%	7.1%	0.7%	95.0%	4.3%	**0.003**
7. Getting vaccinated would encourage a man or woman to lose his/her virginity.	1.2%	92.8%	6.0%	2.1%	97.1%	0.7%	0.054
8. If I dated a man/woman who got the vaccine, it would signal to me that he/she wants to have sex.	8.3%	84.5%	7.1%	0.7%	98.6%	0.7%	**0.000**
9. Most people my age who get the vaccine are sexually active.	36.9%	44.0%	19.0%	15.7%	66.4%	17.9%	**0.001**
10. Getting vaccinated would make people less likely to use condoms during sexual intercourse.	8.3%	78.6%	13.1%	5.7%	90.0%	4.3%	**0.035**
11. Getting vaccinated would encourage other risky sexual behaviors besides intercourse.	3.6%	81.0%	15.5%	5.0%	90.6%	4.3%	**0.014**
12. Getting vaccinated makes it safer to have multiple sexual partners.	10.7%	83.3%	6.0%	15.7%	79.3%	5.0%	0.564
13. Receiving the HPV vaccine would not alter my sexual behaviors at all.	78.6%	10.7%	10.7%	89.3%	7.1%	3.6%	0.056

*Chi-square

Knowledge and opinion levels are presented according to vaccination status in Tables 8 and 9, above, respectively. Vaccinated women were slightly more aware that HPV can lead to certain cancers than unvaccinated women. This result was marginally significant (P= 0.051). More unvaccinated women responded 'Don't Know' to whether or not nonsymptomatic persons with HPV can transmit HPV to their partners; however, vaccinated women were more likely to agree to the statement that nonsymptomatic persons cannot transmit HPV to their partners. Vaccination status did not matter for the rest of the knowledge questions; however, levels of 'Don't Know' were high for many of the responses. In addition to sex, vaccination status is not associated with knowledge among students at Emory.

Once again, more differences in opinion appear between vaccinated and nonvaccinated women (Table 9). Similar to male survey respondents, nonvaccinated women were far more likely to agree or respond 'Don't Know' to the statement that vaccinated adolescents will increase risky sexual behaviors. Interestingly, nonvaccinated women were far more likely to agree that friends who were vaccinated would mean they were sexually active (10% vs. 1%, P< 0.01). Nonvaccinated women were more likely to think that if they dated a man who had gotten vaccinated, he would be more interested in having sex. Also highly significant was that nonvaccinated women were more than twice as likely to agree that women their age who had gotten the vaccine were sexually active (37% vs. 16%, P< 0.01). Also significant were opinion questions 10 and 11 (P= 0.035, 0.014). Vaccinated women were more likely to disagree that vaccination will lead others to practice unsafe sex and engage in more risky sexual behaviors besides intercourse. Greater numbers of vaccinated women agreed that they were unlikely to change their sexual behaviors following vaccination than unvaccinated women. This result was marginally

significant (P= 0.056). In addition to men, unvaccinated women at Emory were more likely to believe risk compensation would follow vaccination and to associate the vaccine with being sexually active.

Table 10 Differences in knowledge of HPV infection by sexual activity status

	Never sexually active			Has been sexually active			p*
	A	D	DK	A	D	DK	
1. Certain strains of HPV can cause cancer. AGREE	83.2%	0.0%	16.8%	91.2%	0.0%	8.8%	**0.040**
2. Certain strains of HPV can cause genital warts. AGREE	70.8%	2.7%	26.5%	65.0%	7.8%	27.2%	0.174
3. HPV can cause genital herpes. DISAGREE	43.4%	17.7%	38.9%	33.5%	27.4%	39.1%	0.103
4. HPV can cause cancer of the penis or anus in men. AGREE	23.9%	13.3%	62.8%	28.3%	25.0%	46.7%	**0.014**
5. People cannot transmit HPV to their partner(s) if they have no symptoms of HPV. DISAGREE	6.2%	78.8%	15.0%	12.2%	79.0%	8.8%	0.087
6. HPV infection is relatively uncommon. DISAGREE	6.2%	78.8%	15.0%	4.4%	80.6%	15.0%	0.801
7. A person may be infected with HPV and not know it. AGREE	90.3%	1.8%	8.0%	92.7%	2.2%	5.0%	0.580
8. Condoms prevent all transmission of HPV. DISAGREE	7.1%	76.1%	16.8%	9.9%	67.4%	22.7%	0.279
9. HPV is the most common sexually transmitted disease in the US. AGREE	23.9%	22.1%	54.0%	42.5%	19.3%	38.1%	**0.004**
10. HPV can be transmitted via skin contact. AGREE	30.1%	21.2%	48.7%	37.6%	28.7%	33.7%	**0.037**

*Chi-square

Table 11 Differences in opinion on HPV vaccination, risk, and severity by sexual activity status

	Never sexually active			Has been sexually active			p*
	A	D	DK	A	D	DK	
1. Compared to other sexually transmitted diseases, such as HIV, genital herpes, syphilis, or gonorrhea, HPV infection is not as severe.	12.4%	62.8%	24.8%	15.5%	65.7%	18.8%	0.419
2. Compared to other students like myself, I am at a lower risk of contracting HPV.	63.7%	16.8%	19.5%	46.4%	36.5%	17.1%	**0.001**
3. HPV vaccination may encourage risky sexual behavior in adolescents who receive the vaccine.	21.2%	67.3%	11.5%	14.4%	76.8%	8.8%	0.192
4. My friends are generally more sexually experienced than me.	68.1%	22.1%	9.7%	36.5%	48.6%	14.9%	**0.000**
5. Other students at Emory are generally more sexually experienced than me.	92.0%	0.9%	7.1%	42.5%	29.6%	27.9%	**0.000**
6. If most of my friends were vaccinated against HPV, it would mean they were sexually active.	7.1%	83.2%	9.7%	5.0%	90.0%	5.0%	0.205
7. Getting vaccinated would encourage a man or woman to lose his/her virginity.	2.7%	91.2%	6.2%	1.7%	95.0%	3.4%	0.430
8. If I dated a man/woman who got the vaccine, it would signal to me that he/she wants to have sex.	3.5%	90.3%	6.2%	5.0%	91.7%	3.3%	0.443
9. Most people my age who get the vaccine are sexually active.	23.9%	52.2%	23.9%	27.2%	50.6%	22.2%	0.811
10. Getting vaccinated would make people less likely to use condoms during sexual intercourse.	9.7%	74.3%	15.9%	7.2%	88.3%	4.4%	**0.002**
11. Getting vaccinated would encourage other risky sexual behaviors besides intercourse.	8.0%	77.9%	14.2%	5.6%	88.3%	6.1%	**0.043**
12. Getting vaccinated makes it safer to have multiple sexual partners.	15.2%	75.0%	9.8%	11.7%	85.6%	2.8%	**0.020**
13. Receiving the HPV vaccine would not alter my sexual behaviors at all.	82.3%	8.8%	8.8%	87.2%	7.8%	5.0%	0.390

*Chi-square

Lastly, differences on knowledge and opinion between men and women who have been sexually active and those who have never been sexually active are presented in Tables 10 and 11, above, respectively. Men and women who have previously been sexually active were more likely to know that HPV can cause certain strains of cancer (P= 0.040). Sixty-three percent of never sexually active respondents responded 'Don't Know' to HPV can lead to anal and penile cancer in men, compared to 47% in previously sexually active students (P= 0.014). Additionally, previously sexually active students were more aware that HPV was the most common sexually transmitted disease in the U.S. and that it can be transmitted through skin contact. For these same two questions, never sexually active students responded 'Don't Know' more often than previously sexually active students (54% vs. 38%, P< 0.01 and 49% vs. 34%, P= 0.037 for questions 9 and 10, respectively). While previously sexually active students answered more knowledgeably on some questions, a student's sexual activity status was not associated to a great extent with HPV knowledge.

Table 11 shows the differences between previously sexually active and never sexually active Emory undergraduate students on their opinions on sexual activity on Emory's campus and the HPV vaccine. Never sexually active students did not associate vaccination with increased sexual activity anymore than sexually active students. Never sexually active students had a much lower perception of risk of HPV infection than their previously sexually active counterparts, as demonstrated in questions 2, 4, and 5 (P< 0.01). For questions 10, 11, and 12 which ask students about their perceptions on the vaccine and the possibility of risky sexual activity following vaccination, previously sexually active students were far more likely to disagree to these statements, whereas never sexually active students were more likely to respond 'Don't Know' (P< 0.01, P= 0.043, 0.020, respectively). These results

show that Emory students understood their relative risk of HPV infection compared to their peers. While there was no difference in opinion on associating the vaccine with sex between students that have had sex and those that never have had sex, previously sexually active students disagreed more to risk compensation theory.

T-test results

Table 12 Differences in knowledge score by vaccine adoption status, wanting the vaccine (men-only), PE 101, and sexual activity status

	N	Average knowledge score	Std. Dev
Got the vaccine (women only).	140	6.06	1.928
Did not get vaccine.	84	6.01	2.193
p†	0.852		
Wants the vaccine (men only).	36	6.08	2.534
Does not want vaccine.	32	5.22	2.599
p†	0.170		
Already took PE 101.	229	6.1	2.09
Have not taken PE 101 (yet).	65	5.43	2.345
p†	**0.026**		
Never sexually active.	113	5.73	2.146
Has been sexually active.	181	6.09	2.167
p†	0.166		

† T test

Table 12, above, shows the results of the independent samples T-tests. Mean knowledge scores were compared by the categories listed above. Vaccination status, wanting the vaccine or not (men-only) and sexual activity status were not associated with knowledge score. Having already taken the mandatory PE 101 health requirement was the only significant predictor of knowledge score. Those students who already took PE 101 scored significantly higher on the knowledge questions than those students who have not taken it yet.

Binary logistic regression model results

Table 13 Association between getting the vaccine in women and perceived HPV risk and associating the vaccine with sex

					95% C.I. for EXP (B)	
	B	S.E.	Sig.	Exp (B)	Lower	Upper
Perceived lower risk of HPV infection	-0.568	0.304	0.062	0.566	0.312	1.028
Associate vaccine with sex	-1.465	0.609	**0.016**	0.231	0.070	0.762
Constant	0.98	0.246	0	2.664		

Table 13, above, is predicting whether perceived risk of HPV infection and perception of the HPV vaccine with regards to sex are predictors of whether a female undergraduate student at Emory gets the vaccine. The odds of getting the vaccine as opposed to not getting it are reduced by 43% if a woman perceives herself to be at lower risk for HPV infection (OR 0.566 95% CI 0.312-1.028). This result was marginally significant (P= 0.062). Similarly, the odds of getting the vaccine as opposed to not getting it are reduced by 77% if a woman perceives the vaccine to be associated with sex (OR 0.231 95% CI 0.070-0.762). This result was significant (P= 0.016).

Table 14 Association between wanting the vaccine in men and perceived HPV risk and associating the vaccine with sex

					95% C.I. for EXP (B)	
	B	S.E.	Sig.	Exp (B)	Lower	Upper
Perceived lower risk of HPV infection	-0.789	0.507	0.120	0.454	0.168	1.228
Associate vaccine with sex	-0.003	0.631	0.996	0.997	0.290	3.434
Constant	0.588	0.417	0.158	1.801		

Table 14, above, is predicting whether perceived risk and perception of vaccine with regards to sex are predictors of whether a man wants the vaccine or not. The results show no association in men.

Table 15 Association between getting the vaccine in women and knowledge of when vaccine is most effective and risk of vaccination

					95% C.I. for EXP (B)	
	B	S.E.	Sig.	Exp (B)	Lower	Upper
No knowledge of when vaccine is most effective	-1.045	0.293	**0.000**	0.352	0.198	0.625
No knowledge of no vaccine risk	-0.907	0.396	**0.022**	0.404	0.186	0.878
Constant	1.725	0.382	0.000	5.612		

In Table 15, above, adoption status is predicted by knowledge of when the vaccine is most effective and knowledge of risk of infection from the vaccine itself. The odds of getting the vaccine as opposed to not getting it are reduced by 65% if the woman did not answer correctly that the vaccine is most effective if administered before sexual debut (OR 0.352 95% CI 0.198-0.625). Similarly, the odds of getting the vaccine as opposed to not getting the vaccine are reduced by 60% if the woman did not answer correctly that there was no risk of contracting HPV from the vaccine (OR 0.404 95% CI 0.186-0.878). Both of these results were statistically significant (P< 0.01, P= 0.022). An Emory female undergraduate student was more likely to be vaccinated if she knew it was best to be vaccinated before sexual debut and knew that there was no risk of HPV infection from getting vaccinated.

Table 16 Association between getting the vaccine in women and any knowledge of when the vaccine is most effective and risk of vaccination

					95% C.I. for EXP (B)	
	B	S.E.	Sig.	Exp (B)	Lower	Upper
No knowledge of when vaccine is most effective (2)	-1.177	0.311	**0.000**	0.308	0.167	0.567
No knowledge of no vaccine risk (2)	0.17	0.303	0.576	1.185	0.654	2.148
Constant	0.877	0.208	0.000	2.404		

Whether or not vaccine adoption is correlated with having any knowledge (either correct or incorrect) versus no knowledge at all (response of 'Don't Know') is predicted in Table 16, above. Compared to female survey respondents who demonstrated knowledge by answering 'Agree' or 'Disagree', the odds of getting the vaccine of those who had no knowledge and responded 'Don't Know' to when the vaccine is most effective were reduced by 69% (OR 0.308 95% CI 0.167-0.567). This result was highly significant (P< 0.01). Conversely, whether a woman had any knowledge on whether the vaccine itself could infect a young woman with HPV was not significant and was not associated with vaccine adoption.

Table 17 All factors associated with getting the vaccine in women

					95% C.I. for EXP (B)	
	B	S.E.	Sig.	Exp (B)	Lower	Upper
Freshman (ref)			0.218			
Sophomore	0.163	0.430	0.705	1.177	0.507	2.736
Junior	-0.753	0.474	0.112	0.471	0.186	1.193
Senior	-0.438	0.409	0.285	0.645	0.289	1.439
No knowledge of when vaccine is most effective	-1.379	0.344	**0.000**	0.252	0.128	0.494
No knowledge of no vaccine risk	-0.779	0.422	0.065	0.459	0.201	1.049
Perceived lower risk of HPV infection	-0.273	0.389	0.484	0.761	0.355	1.633
Associate vaccine with sex	-1.917	0.720	**0.008**	0.147	0.036	0.603
Ever sexually active	0.808	0.383	**0.035**	2.244	1.060	4.751
Knowledge score	-0.219	0.088	**0.013**	0.803	0.676	0.954
Constant	3.143	0.863	0.000	23.162		

Several variables are included in one comprehensive regression model to ascertain all possible predictors of getting the vaccine (women-only) in Table 17, above. Class year was not associated with getting the vaccine. Whether or not a female student knew when the vaccine was most effective remained highly significant in this model (P< 0.01). If a woman did not answer correctly that the vaccine was most effective when administered before a girl began having sex, her odds of getting the vaccine were reduced by 75% (OR 0.252 95% CI 0.128-0.494). Knowledge of risk of infection from the vaccine itself was somewhat associated with vaccine adoption status. If a woman did not answer correctly that there was no risk of infection from the HPV vaccine, the odds of her being vaccinated were reduced by 54% (OR 0.459 95% CI 0.201-1.049). This result was marginally significant (P= 0.056). Interestingly, perceived personal risk of HPV infection lost its significance when included in this model. Perception of the vaccine as it relates to increased sexual activity remained significant in this model (P< 0.01). If a woman perceived the vaccine to be associated with increased sexual activity, the odds of her getting vaccinated were reduced by 85% (OR 0.147 95% CI 0.036-0.603). If a woman had previously been sexually active, her odds of getting vaccinated increased by 124%

(OR 2.244 95% CI 1.060-4.751). This result was statistically significant (P= 0.035). Interestingly, knowledge score became significant when included in this model (P= 0.013). For every one point increase in knowledge score, the odds of getting vaccinated were reduced by 20% (OR 0.803 95% CI 0.676-0.954). This might be an issue of collinearity, in that another variable in the model might also be measuring knowledge in students. An Emory undergraduate female student was more likely to get the HPV vaccine if she knew when the vaccine was best administered, has had sex, did not associate the vaccine with sex, and had a lower knowledge score. In terms of associating the vaccine with sex, unvaccinated female students were right in thinking that sexually active students were more likely to get the vaccine.

Table 18 All factors associated with wanting the vaccine in men

					95% C.I. for EXP (B)	
	B	S.E.	Sig.	Exp (B)	Lower	Upper
Freshman (ref)			0.079			
Sophomore	0.412	0.765	0.590	1.510	0.337	6.766
Junior	-1.953	1.274	0.125	0.142	0.012	1.724
Senior	-1.235	0.672	0.066	0.291	0.078	1.086
Perceived lower risk of HPV infection	-0.726	0.620	0.241	0.484	0.144	1.629
Associate vaccine with sex	0.608	0.783	0.437	1.836	0.396	8.514
Ever sexually active	1.442	0.693	**0.037**	4.229	1.088	16.448
Knowledge score	0.209	0.124	0.091	1.233	0.967	1.572
Constant	-1.326	1.044	0.204	0.266		

Regression model results for wanting the vaccine in men are presented in Table 18, above. Similar to the results for women, class year has no association with wanting to get the vaccine in men. However, being a senior compared to a freshman is marginally significant (P= 0.066). Compared to their freshman counterparts, male seniors were more likely to want the vaccine (OR 0.291 95% CI 0.078-1.086). Perception of personal risk of HPV infection and perception that the HPV vaccine is linked to sex were not associated with wanting the vaccine in men. Having ever been sexually active was the only indicator of wanting the vaccine in men (P= 0.037). The odds of wanting the vaccine as opposed to not wanting the vaccine were increased by

323% in men who have been sexually active (OR 4.229 95% CI 1.088-16.448). Knowledge score was not associated with wanting the vaccine in male survey respondents. While both Emory men and women were more likely to be vaccinated (or to want the vaccine) if they have ever had sex, having had sex was the only predictor of wanting the vaccine in men.

Interview results

Eight Emory undergraduate students were interviewed following the survey, of which two were males. Of the eight interviewed students, three were freshmen, one was a sophomore, and the rest were seniors. The two males that were interviewed were a freshman and senior. All six female students had already been vaccinated, and both male students expressed an interest in receiving the vaccine, but were not already vaccinated themselves. One freshman female had two adverse reactions following the first two doses, so she did not receive the third dose. Five of the students had already taken the required PE 101, and the other three were currently in the class, but had not covered the STD section yet. Those who had already taken PE 101 had mixed comments about the class; a few students remarked that they personally had gotten a lot out of the class, while others stated that they did not remember much from the class or they "[didn't] know if people take the class seriously enough."

Professed knowledge of HPV infection and the vaccine was low overall. Students expressed their knowledge of the link between HPV and cervical cancer, but knew relatively little else concerning HPV infection, its link to genital warts, or that the vaccine had been approved for men. The male freshman student openly acknowledged that his reason for doing the interview was to gain knowledge on STDs and get information on how to get the HPV vaccine, saying that he did not gain much knowledge on STDs from having taken PE 101. Although the two males that were

interviewed both were interested in receiving the HPV vaccine, their reasons were very different. The male senior expressed a partner protection interest as his primary reason for wanting the vaccine, while the freshman male student wanted the vaccine for self-interested reasons, being a sexually active student at Emory with casual partners. There was a general consensus among those students who discussed it that it would be much more difficult to market the vaccine to men; vaccine manufacturers would need to deal with the "baggage" of the vaccine being only for females since its first approval in 2006. Among the female students that were interviewed, many expressed that getting the vaccine was simply a "precautionary thing for my health", and that it would not hurt to get the vaccine. All of the female students had discussed getting the vaccine with their mothers, and often their doctors as well. One female senior's mother was a doctor who administered the vaccine at her office. None of the students had been vaccinated without their mother's consent. A few had gotten vaccinated, no questions asked, when their mother had told them they should be vaccinated. Other motivating factors were being sexually active, the feeling that they should get the vaccine, and seeing the "One Less" vaccine commercials for Gardasil. A few women mentioned that fellow peers receiving the vaccine would make them consider vaccination, but this usually was not brought up by the student herself or was thought of last.

Many opinions were expressed on the topic of whether or not parental consent should be required before vaccination. In general, most students agreed that college students had more independence in terms of their sexual health than they did when they lived at home. One female student noted that girls as young as 9 do not really know how to take care of their bodies, and in that case, parental consent should be required, but as girls start having sex, they should be able to make decisions about

their sexual health without parental consent. Another girl stated that it depends on who is paying for the vaccine. Yet another female student stated that parental consent should be required up to a certain age, but girls who start having sex young should be an exception, in that young sexually active girls who would benefit the most from early vaccination would be least likely to talk to their parents about vaccination. Other interviewees simply had no opinion. When asked whether being vaccinated would encourage risky sexual behaviors in adolescents and young women (risk compensation theory), all eight students disagreed, some more adamantly than others ("I think that's just horrible logic"). Many emphasized that the vaccine only protects against one STD, and there are many more still out there. One female student stated that if a girl is smart enough to get the vaccine, she's not going to think she's protected with a "get out of jail free card".

Almost all interviewed students were opposed to mandatory vaccination; however, many expressed the sentiment that the vaccine should be strongly encouraged, but the choice was ultimately up to the patient. One student used logistical reasoning to oppose mandatory vaccination, saying that unlike flu and meningitis vaccines, the HPV vaccination would be too difficult to monitor for a college. One female student expressed honestly that her knowledge of the vaccine was too limited to say whether or not it should be mandatory, but from what she's heard about it, she thinks vaccination should be strongly encouraged.

One important theme that emerged during many of the interviews was the notion that college students just do not get STDs. One female senior student shared, "I have a lot of gay friends, and I just can't imagine someone our age contracting it [HIV], and then getting AIDS". She later clarified that it's "so much harder to imagine college kids having HIV versus HPV, but I'm sure it's out there". A female

freshman stated that this invincible mentality is generalized, “I think it’s in our attitudes, where we’re finally away from home, and we have all this freedom, and we have this mind-set that we are indestructible”. A female sophomore simply stated that college students don’t really view STDs as impacting their lives really. Several students viewed pregnancy as more of a concern than STDs. A female freshman stated that “people see getting pregnant as a larger consequence and almost more likely to happen”. A female senior expressed that many STDs are curable, while pregnancy is not, it is “immediate” and “a bigger deal”, especially if a woman is not okay with Plan B or abortion. A female sophomore talked about the repercussions of having a family while still in school in reference to career aspirations. A male freshman student discussed the relief he feels in hearing a girl is on the pill before he has sex with her, yet not being on the pill would not deter him or his friends from having sex necessarily.

There was a general consensus in all the interviewed students that the transition from high school to college allows a person to redefine themselves if they want. College is a time to experiment with self and others, and the absence of parents means more freedom and less secrecy in sexual decision-making. Everyone was unanimous that college is a much more open environment, and sex is a given. A female freshman simply stated, “There’s a general consensus that yeah, people are going to be having sex on campus. It’s just a different understanding of things [from high school]”. A female senior stated that the college environment makes it more okay to have sex and more casually. The male senior emphasized the ability to become a totally different person from high school, making it “a lot easier to enter in and buy in to the mentality of free sex”. A female sophomore shared that she had friends in high school who were in abstinence clubs, some of whom are still virgins,

while others are now having sex in college. Living on one's own, taking care of oneself, and being put into this "pseudo-adult" role are all factors in this transition. One student explained that a person gets to know themselves so much better when they have to take care of themselves for the first time, and that goes along with whether they decide to be responsible or not.

The transition to college led inevitably to discussion of the hook-up culture here at Emory. "I think it's pretty strong. I think it's pretty often", said one female freshman. There was a general consensus among the students interviewed that the hook-up culture was strongest freshman year. The only male freshman to be interviewed explained the excitement of not knowing anybody, especially those first few weeks of school. He explained in high school, there was the "struggle for a door you can lock", and there is a thrill of having a place at college to bring a girl back to. Several other students spoke of what it meant to not have parents around. A female senior reflected on what it was like freshman year:

> I think most of it is living on campus with boys your age. When you're in high school, you're living at home in a family unit, and when you're at college you're living with your peers, and it's so easy to just walk down the hall and have sex with anyone. A lot of people end up dating people on their freshman hall, because it's so easy, and you don't have to like plan out when your parents aren't going to be home…"

Others commented that the hook-up culture gave sex a casual air. The same senior quoted above remarked that sex is "just kind of normal". She explained that among her friends, "It's not like 'Oh my God, you had sex', it's like 'Yeah, we had sex'…I know when I came to college, I certainly felt like it was more of a big deal, and now it's not as much". She feels that this hook-up culture devalues sex, and she finds that she will have sex with someone quickly if she doesn't like him, but she'll wait to have sex with a guy she likes, at the same time putting more value with sex for waiting.

Among freshman especially, hooking-up and sex are topics that are endlessly discussed among friends and social groups, because this is the "cool attitude to have" for freshman who want to fit in immediately. One freshman female offered insight into this, explaining that "it's definitely a large topic of conversation among your friends or when you're hanging out with people. Either you don't say anything, or you talk it up, and so I feel like most people kind of want to have something to say". The senior male shared that among his male a cappella group friends that he spends the most time with, they often talk about the weekend and how "crazy" it was. He explains that, "It does become kind of a competition, just inherently. If you hear someone else talking about their endeavors with women, you're probably going to want to pipe up and say something about what you did…try to one-up them even".

The ambiguity of the term hooking-up and the implications of young people using this term were also discussed with a number of the student interviewees. Students each had their own meaning of hooking-up, but they all agreed that it was ambiguous. For a freshman female, the term simply meant making out, but she knew of some people where hooking-up meant having sex. When asked how she and her friends distinguish the two, she explained one must follow up by asking, such as "How far did you go?" The freshman male explained how he hates the term. He and his friends use hooking-up to mean anything past making out, everything leading up to and including sex. He discusses how annoying it is to hear fellow pledges talk about it; "I hear like 'Oh yeah, I was totally hooking-up with that girl on the dance floor', and I'm like 'What?! What are you talking about? No you weren't'". The senior male put it this way:

> I think the term 'hook-up' is on purpose, in that it is ambiguous. It can mean anything from kissing to having sex, any form of sex. So I feel like some people who aren't very sexually active will use the term with those who are in order to appear sexually active…to fit in, and those that are sexually active will use it just because it's the term…the lingo of the day.

The freshman male shares that on any given weekend, he and his friends will bring girls back with them and hook-up with them, but, “it’s not a sure-fire sign that they’re going to go that far at all [sex]. It can be kind of misleading”. A freshman female explained that people can get the wrong impression and think others are more sexually active than they really are. They’ll make assumptions based on what they hear, without knowing the entire story.

Several of the students shied away from using the term peer pressure, but they discussed the influence of friends and fellow peers nevertheless. Those students not participating in the hook-up culture might change their mind if they see others doing it. “It might take away some of the consequences, because if they’re like everyone else is doing it and they’re fine, then you’ll be like ‘I’m going to be fine too’. Another freshman discussed it as being a different kind of pressure: “The fact that everyone around you is doing it makes you reconsider. It’s not like your friends are actually pressuring you to do it, but you still feel pressured”. Several of the students agreed that people in the same friend group or social group will share similar sexual experiences. A senior female explained that girls will segregate into groups that they are comfortable with. “I can see a girl who’s not sexually active hanging out with a bunch of sexually active girls, but that’s kind of awkward”. She agrees that she and her friends are “on the same page with the majority of things in our life”. A different senior female explained that girls can experience different sexual experiences, but she adds: “Part of it is very personal, but also part of it is what you personally think is okay is often based on what is normal to you, and what is normal to you is what your friends are doing”. Positive influence from friends was also discussed in regards to practicing safe sex and getting the vaccine. Another senior female explained that all of her friends use condoms: “If I were to have sex with someone, then the first thing

I'm sure my friends would ask is 'Did you use a condom?' So like, that's a big thing, and if I didn't [use a condom], you know, they would freak out". A senior female opined that if many of your friends on your freshman hall were getting the vaccine, then that might convince you to get vaccinated, but she also felt that similar to those "really strange Yaz commercials, where they're all sitting having drinks and they're all talking about birth control", a group of girls talking about the vaccine is unrealistic and she doesn't think that that would happen. When asked if she had discussed the vaccine amongst her friends, another girl said that it briefly came up; one of her friends said it hurt a lot, but that was the extent of it.

Student interviewees had different opinions on how Emory students compared to other college students in general. A number of students talked about Emory students' more educated and affluent backgrounds that make them less at risk for STDs compared to other schools. Several students agreed that Emory's approach to sex education, along with being associated with medical and public health communities make students more aware of the risks and make them practice safer sex or have less sex in general. A senior female said that student and academic life is more demanding at Emory, and Emory students are more likely to be in a library on Friday night rather than going out, getting drunk, and having sex. A senior female acknowledged that there's probably a huge range of sexual activity on Emory's campus, while another girl commented that Emory has gotten the reputation of "studying hard and partying hard". When she thinks of Emory, she thinks of a liberal school where religious morals do not come into play as they do in other schools. Also being in a metro area makes people have fewer reservations about having sex. A senior male thinks that Emory's smaller size means students are having less sex, but being a liberal university, students have an "everything goes" mentality, and may not

be practicing safe sex. Emory was compared to the average state school by several students. There was a general consensus that students at state schools are much more sexually active, that sex is more generalized. A male freshman had interesting comments on the topic, "…[Emory] isn't a school necessarily known for being the prettiest group of people, you know, and so, because of that too, it's not as important to people [to hook-up]…but when I was at Texas [state school], it was a much different ball game". He explained that people at state schools are "much smarter…it's more of an art there". In explaining being smarter, he shared that at Emory, he thinks that white rich kids who went to preppy high schools go much crazier in college and "[make] the worst decisions when they go out". Yet he thinks that while Emory students aren't smart in their sexual decision-making, students here are much less sexually active because of our smaller size and our demographics. He feels that "the Asian population, which is sizeable here, you don't see out as much drinking, so it just affects the party, sex scene". Also, at state schools with many more students, "you can hook-up with somebody and not see them again, and that's not the case here. It follows you here". He later contradicts himself somewhat in observing that sexually active students at Emory are smart enough to use protection and that "for the most part…the vast majority of guys, you know, wrap up".

Students generally agreed that education and awareness about HPV and other STDs leads to safer sex. The male senior shared that increased awareness probably does play a role, at least in the sense that it might scare people into practicing safe sex, yet he also acknowledged that alcohol almost always plays a role, and even sober students may forego the risks if they "got caught up in the moment". Interviewed students also reached a general consensus that HPV is much less discussed than other STDs, notably HIV. The male senior opined that PE 101 emphasized other STDs at

the expense of HPV. A freshman female commented that "[HPV] isn't the top STD that comes to mind when I think about STDs". She feels that HPV must have "some importance to it, otherwise the vaccine wouldn't be such a big deal, but I also feel that it's not as well known". Interestingly, several students were glad that HIV was more emphasized despite its being less common among college students. The male freshman stated, "I don't think they play up HIV. I just think that in college campuses, because there's this sort of scare of HIV, it has encouraged people to wear condoms, so for that I'm pretty thankful actually that it is that way and HPV is more prevalent than HIV, because it's much scarier". A senior female had a similar comment: "I think that if you're going to make people scared enough to use a condom, then you should use something that's very immediately scary to people". HIV is seen as more scary than HPV, so HIV should be discussed more to encourage safe sex among young adults.

In terms of spreading greater awareness about HPV and other STDs and encouraging young people to practice safe sex, Emory students agreed that greater education was needed, especially in middle and high schools where sex ed curricula are often lacking. Since some schools preach abstinence only sex education, there was the acknowledgement that targeting middle and high schoolers would not suffice. Getting the message across in college curricula and doctor's offices was also suggested. The media campaign for Gardasil, featuring the "One Less" commercials, was very effective, but a few students felt that there needs to be more education on HPV infection, not just the vaccine. In terms of marketing the vaccine for men, the senior male suggested putting it in context of the female vaccine, suggesting that the vaccine manufacturers should emphasize that men can now take steps to protect themselves and their partners as well, that "it's not just on the woman's shoulders to

take care of". A female senior discussed how it's unlikely a girl will get the vaccine unless someone tells her to. "I would say unless someone like a parent or a doctor strongly recommended it, I think it's hard for them to know to get it, unless they talk about it with their friends a lot". She later clarified that you need the message of HPV vaccination "from multiple directions". Girls won't get the vaccine unless someone actively pushes them to get vaccinated. The best way to do this and to encourage safe sex among young adults is to speak openly about it, according to one female senior.

IV. DISCUSSION

The present study aimed to determine separate factors that are associated with uptake of the HPV vaccine in women and intention to be vaccinated in men at Emory. This study adds to the existing literature on the subject and may reflect more accurate findings since the vaccine has been administered for over three years now, giving Emory female students with the intention of getting vaccinated the time to follow through. Moreover, this study may be unique in that it examines factors associated with both men and women receiving the vaccine in the same setting. No doubt more studies will follow now that men are permitted to receive the HPV vaccine. In addition, this study uses both quantitative and qualitative methods to examine perceptions of the vaccine and opinions on sexual activity on Emory's campus. The attempt was to shed light on the influence of cultural ideals and values among Emory undergraduate students that can explain certain aspects of the hook-up culture and that might cancel out some of the positive effects of knowledge regarding safe sex.

Vaccine adoption

In Table 5, we see that 62% of Emory female students have gotten at least one dose of the HPV vaccine series, a huge increase from other studies. In Allen et al. (2009) 12% of the female study population had received the vaccine at a private New England University, but data collection took place only a year after the vaccine came out. In Caskey et al. (2009) only 9% of 18-26 year olds reported receipt of at least one HPV injection. In Conroy et al. (2009), 36% of study participants (13-26 year old girls and women from an urban, hospital-based clinic), had gotten at least one dose of HPV. According to national statistics, 9.9% of 18-26 year old females had gotten at least one dose (NIS, 2007), while the National Health Interview Survey reported 11% of 19-26 year old females had gotten at least one dose (NHIS, 2009). This could be a

case of Emory female students being more likely to take the HPV survey if they had already been vaccinated, but this probably does not account for all of it. Similarly, men at Emory were more likely to want the vaccine (52%, Table 3) than men in other studies. In Ferris et al. (2009), 33% of the male study population wanted to be vaccinated against HPV. These men were aged 18-45 and were recruited in various places in Augusta and Atlanta, Georgia. This study included an education component before asking the men whether they wanted the vaccine or not, while many Emory males that took the survey were completely unfamiliar with the vaccine or what it protects against. Emory students come from relatively homogenized affluent, educated backgrounds, where getting an expensive vaccine would be relatively simple to do. With medical and public health communities as our next door neighbors, Emory students and parents alike are more aware of the advances of biomedicine and generally have greater trust in the medical establishment, making students more likely to get vaccinated. These ideas will be fleshed out later on.

Marketing the vaccine and HPV knowledge

Knowledge scores and levels were not significantly different between males and females (see Table 6), a different finding from Gerend & Magloire (2008). The only significant result was that more females than males knew that certain strains of HPV can cause cancer. Marketing the vaccine these past three and a half years exclusively for women might play a role in this, especially considering the male senior's comments that he sort of blocked out the vaccine message during PE 101 when his TA said it was only for women. He feels that the "One Less" commercials and past marketing campaigns for the vaccine have been "very feminine" and "girly". This will no doubt hinder marketing efforts aimed at men in the future. Vaccine manufacturers will have to deal with the "baggage of having just the female one first".

They will need to emphasize that the vaccine is now for both men and women and be very clear about what the vaccine protects against in men. This is made clear by the fact that both male students that were interviewed had no idea what the male vaccine was for; the male senior was very confused, as he thought it was just for cervical cancer prevention. The male freshman had only heard of the male vaccine when a fellow student asked about it in his PE 101 lab, and nothing was discussed about it afterwards. The male senior did not know there was a male vaccine until he saw the questions on the survey and realized there was one. This is not that strange in that the vaccine for men was only approved last October, and there has been little media coverage of it since. If males are to receive the HPV vaccine at the same rate as females, vaccine manufacturers, public health officials, and physicians will need to increase awareness among males of what the vaccine protects against in men, and they need to emphasize the impact HPV infection can have on men as well as women.

Each male that was interviewed had their own opinion on why they would primarily want to get vaccinated. One explained that protecting future sexual partners from cervical cancer was his motive, while the other was self-interested. Literature on the topic has sided with the latter motive. Gerend & Barley (2009) and Jones & Cook (2008) both showed that spreading the message to men that getting vaccinated would also protect their sexual partners had no effect on men expressing an interest in being vaccinated. While this question was not specifically addressed in this study, it would be interesting to see if men at Emory consider partner protection as a motive for vaccination.

All of the female students who were interviewed knew the link between HPV and cervical cancer, but knowledge on HPV infection and other diseases was professed lacking. Several of the girls expressed a wish that the media campaign for

the vaccine did more to educate women on HPV infection, not just the link to cervical cancer. This is easier said than done. With a short amount of commercial time to market the vaccine on TV, vaccine manufacturers are going to emphasize the prevention of cervical cancer at the expense of specifics on HPV infection and other HPV diseases. It is up to health education curricula, physicians, and public health officials to ensure information on HPV reaches the target population.

PE 101

The only significant difference in average knowledge score was whether or not a student had already taken PE 101 (Table 12). Despite some students' complaints concerning PE 101, these results illustrate that PE 101 is effective in educating students on sexual health topics. Yet several students made comments they didn't really learn very much about STDs in PE 101, because they try to "force a lot of information into you". One female senior commented that the overall message on the HPV vaccine in her PE 101 class was that you should get the shot to protect yourself from cervical cancer. Another student commented that the emphasis in PE 101 was to practice safe sex, and many classes practiced with condoms. A senior female discussed how important it is to become familiar with condom usage; in her opinion, practicing and being comfortable with condoms will make one more likely to use them. With the emphasis on safe sex, it is not surprising that seniors who took PE 101 their freshman year do not remember details, only the overarching themes of the class. This is demonstrated in some of the knowledge questions which asked for very specific information on HPV, such as its link to anal or penile cancer in men or its prevalence in the U.S., where incorrect answers and responses of 'Don't Know' were very high. Conversely, in questions that could apply to many STDs, such as being able to infect others with no symptoms and being infected and not knowing it, correct

response rates were high. While students do not remember the specifics of every STD that is introduced to them in PE 101, they take away the important concepts regarding STD transmission and how to practice safe sex. Perhaps improvements could be made to the structure of PE 101 to make the class more enjoyable for students. The freshman male commented that while everyone hated the lectures, "everybody really didn't mind the labs"; he suggested having two lab meetings per week instead of the large lecture and one lab meeting. He feels that having a discussion-oriented class instead of a large lecture would make the material easier to learn. It would also give much needed experience for the TAs to practice their teaching skills.

It's important to quickly note the misconceptions between HPV and the herpes virus. Thirty-six percent of women and 41% of men thought that HPV caused genital herpes, while 41% of women and 34% of men responded 'Don't Know.' This is similar to other studies, such as Caskey et al. (2009), where the majority of respondents either confused the two viral infections or responded that they did not know. This can be explained again by the lack of specific knowledge on certain STDs for more general knowledge on STD transmission and prevention, making for easy confusion between two viral STDs that share many characteristics in common.

Knowledge associated with vaccine adoption or intention

Unlike many other studies that cited greater knowledge and awareness of HPV as a factor that increased the likelihood of vaccination (Allen et al., 2008; Caskey, Lindau, & Alexander, 2009; Chan, Yan Ng, Lo, Cheung, & Hung Chung, 2009; Jones & Cook, 2008; Kahn, Rosenthal, Hamann, & Bernstein, 2003; Licht et al., 2009), this study did not find that to be the case. There was no significant difference in average knowledge score by vaccination status, nor in predicting whether men would want the vaccine, nor whether or not students had ever been sexually active. The survey results

are supported by comments that students had learned about HPV infection only after vaccination. One girl commented that she got the vaccine when her mother-doctor told her to get it, no questions asked, only learning about HPV infection afterwards. Another girl's mother and doctor both recommended the vaccine, so she got it, and she "didn't really bother to ask more". Given Emory students' relatively homogenous backgrounds from more affluent, educated families, the fact that knowledge scores are not significantly different between students should come as no surprise.

It is interesting that 52% of men responded that they would want to be vaccinated, despite having very little knowledge on the male vaccine and what it protects against. Both interviewed men professed very little knowledge on HPV infection, yet both were inclined to be vaccinated. Looking at America's trust and faith in biomedicine may explain these results. Discussing the male HPV vaccine, the freshman male reasoned that "if it's approved, then that means it's healthy, and I'm not going to die from this vaccine". In other words, since the FDA approved the vaccine, it is safe, so I should be vaccinated. A female senior explained that one motivating factor for getting the shot is the feeling that you should get the shot, similar to getting the flu shot. Another girl commented, "I just get everything". With our close medical and public health community and extensive cutting edge research in vaccine development here at Emory, students have an innate trust in the medical establishment and biomedicine, which gives students this sense that they should be vaccinated against HPV since the vaccine was developed in the first place. This might also explain how over a third of female students thought that there was a risk of HPV infection from the vaccine itself, yet vaccine risk was not significantly associated with vaccination status in women. Additionally, 44% of female students did not know whether the vaccine posed any risk or not. This is somewhat

remarkable, given the implications of HPV infection, that knowledge of vaccine risk was not associated with adoption status in female students.

Associating the vaccine with sex and risk compensation

Men were more likely to opine that vaccination might lead to sexual risk compensation and to associate the vaccine with sex (Table 7). This goes along with one male's comments that he would feel more strongly against adolescent men getting vaccinated versus adolescent girls, in that adolescent men tend to seek sexual partners more than women. He feels that getting vaccinated might give young boys the message that it's okay to have sex, but not girls necessarily. It is possible that male survey respondents answered the risk compensation questions thinking about adolescent boys, and their general quest for sexual partners at that age, while female survey respondents were less likely to think that adolescent girls would be sexually disinhibited following vaccination, given the societal ideal that girls should not actively seek sexual partners. Men were also more likely than women to link the vaccine with sex, and this is supported by both male student interviewees who shared that sexually active men who have sex with casual partners should especially be vaccinated. Men have been left out of marketing campaigns for the vaccine in previous years, since it was marketed exclusively for women, so the only opinions they have on the vaccine are those they form themselves. Given that HPV is a STD, and given men's generalized quest for sexual partners, it is not a far stretch of the imagination to see that men might be more inclined to associate the vaccine with sex than women.

Unvaccinated women were also more likely to give merit to risk compensation following vaccination and associate the vaccine with sex (Table 9). All 6 female interviewees had been vaccinated, and all 6 disagreed with risk compensation theory.

Unfortunately, no unvaccinated Emory undergraduate women volunteered for an interview, so their perspective was not obtained. The female interviewees made similar comments regarding risk compensation, emphasizing that the vaccine only protects against one STD, and there are many more out there that the vaccine does not protect against, notably HIV, an argument put forth by Haber et al. (2007). While one girl explicitly stated being sexually active as one motivation for getting the vaccine, many others did not see any association with having sex; many emphasized that they got vaccinated as a precautionary measure. Several girls observed that even if a girl waited till marriage to have sex, her husband could give her HPV, or a girl could become infected in an instance of rape even. They also emphasized the importance of getting vaccinated regardless of a girl's intentions to have sex. There was a general consensus among vaccinated women that getting vaccinated was a good precaution against unforeseeable circumstances, like those mentioned above. While no unvaccinated female students were interviewed, at least one female student observed that her one friend did not get the vaccine, because her mother "didn't think that she would need it", and that they had come from a "strong Christian family that teaches abstinence before marriage". If a woman associates the vaccine with being sexually active, and she has no intention of having sex, then it is clear to see the reasoning behind thinking that she doesn't need the vaccine. This mindset that one does not need to be vaccinated against HPV because they are not sexually active is alarming. The best time to be vaccinated is before a woman first has sex, and with each sexual encounter, she increases her chances of becoming infected with HPV. While the students who said sexually active students should be vaccinated are correct, their reasoning may be wrong. Since the vaccine protects against four different strains of HPV, the chances of a sexually active student being infected with all four strains is

highly unlikely. In the majority of cases, a sexually active student will still receive some benefit from vaccination. Even for girls that do plan to wait till marriage to have sex, vaccination may still be beneficial, because you cannot control the past sexual encounters of your spouse.

Never sexually active students had a lower perceived personal risk of HPV infection and believed that their friends and other Emory students in general were more sexually experienced than they (Table 11). This demonstrates that never sexually active students are linking HPV transmission to sex. In Table 1, we see that 62% of all Emory students have previously been sexually active, so for a never sexually active student, the majority of his/her peers are more sexually experienced than they. Never sexually active students were also slightly more likely to think there would be risk compensation following vaccination (Table 11); however, this finding was not explicitly supported in any of the interviews.

Factors associated with vaccine adoption or intention

Looking at the binary logistic regression results, an interesting finding to point out is that women who gave an answer for when the vaccine was most effective, even if it was incorrect, were more likely to get the vaccine than women who responded 'Don't Know,' indicating no knowledge at all of when vaccination is most beneficial (Table 16). This demonstrates that women who understand or are familiar with the concept of maximum vaccine benefit were more likely to get vaccinated. This underscores the importance of including the message of early vaccination in HPV awareness campaigns. If young women understand that people benefit differently from vaccination based on their sexual activity status, then they will be more likely to get the vaccine sooner rather than later to receive the maximum benefit from the vaccine.

In the comprehensive female regression model (Table 17), women were less likely to get the vaccine if they did not know when the vaccine was most effectively administered. The odds of vaccination increased if a female student had previously been sexually active. Knowing that the vaccine is most effective if received before having sex will add a sense of urgency to women and get them into the doctor's office faster. Women without this knowledge will put vaccination low on their list of priorities, and especially for students at Emory, work and extracurricular activities make for busy schedules with limited free time to plan and space out three vaccinations. Indeed, several students listed bad timing and hectic schedules as deterrents to vaccination. Cost, another deterrent, will be discussed later. Sexually active students were more likely to be vaccinated than never sexually active students. Again, this is supported by several students commenting that being sexually active was a motivating factor to get the vaccine. Students that are having sex will be more concerned with their sexual health, and the idea of being vaccinated against a STD is far more appealing to them compared to a student who has never been sexually active and who does not worry about contracting a STD. This same finding that sexually active persons are more likely to be vaccinated or want to be vaccinated also appears in several other studies (Ferris et al., 2009; Allen et al., 2008; Brewer & Fazekas, 2007; Jones & Cook, 2008). While sexually active students will most likely receive some benefit from vaccination, never sexually active students would benefit the most, so the finding that virgins are least likely to be vaccinated is concerning. Marketing companies need to target virgins particularly for vaccination campaigns. As many student interviewees suggested, the vaccine should be emphasized as a preventive or precautionary measure. This might convince more people to be vaccinated that might not have done so previously.

Associating the vaccine with sex also decreased the odds of a woman getting vaccinated in the final regression model (Table 17). Only one female student interviewee listed being sexually active as a motivation to be vaccinated; the rest of the female students that were interviewed emphasized that getting vaccinated was more of a precautionary measure, and they also discussed the important breakthrough of the vaccine in the field of public health. Looking at the final regression model for men (Table 18), the only factor associated with wanting the vaccine is ever being sexually active. Whether or not men associate the vaccine with sex does not increase or decrease the odds of being vaccinated. Looking at the sexual double standard that exists between men and women may explain these results. Going back to the male senior's comments that adolescent boys tend to seek sexual partners more than adolescent girls, we see that our culture creates gender roles in relation to sexual decision-making. Flood (2003) succinctly states that women have the "traditional position as the gatekeepers and guardians of sexual health and sexual morality". On the other hand, male sexuality is seen as normal and expected. This is evident enough in the term 'slut,' which has developed such a negative connotation in the current American youth culture. Conversely, if a male is known to have multiple sexual partners, he is termed a 'player,' and is even envied amongst his peers for being sexually experienced. This goes back to the male senior's comments that guys will compete with each other, each male trying to one-up the previous one in describing their hook-ups with women over the weekend. Guys who aren't sexually active will use the term "hook-up" to appear as if they are more sexually active. In her ethnography on virginity loss, Carpenter describes how men are more likely to stigmatize their virgin status and go to great lengths, such as forgoing their better judgment and having unprotected sex, to conceal their virginity. Women, meanwhile,

more often fit the category of “gifters” and treasured their virginity until they gave it away to that special someone when the time was right. Given this cultural paradigm, it is rational for a woman to not want to get or to not think she needs to get a vaccine that she associates with being sexually active. Men on the other hand, think of the vaccine in terms of their own sexual health and not whether the vaccine implies they are sexually active or not.

Pregnancy vs. STDs and being “invincible”

Fear of pregnancy over STDs was discussed in the interviews. This also fit in with the mentality among college students that they are “invincible” and cannot contract STDs. In Flood (2003), discussed above, men often had unprotected sex with casual partners. They relied on the woman’s use of the pill to avoid pregnancy, and they did not view the heterosexual community as at risk for STDs such as HIV, which they associated with homosexuality. Similar to Flood’s findings, several of the interviewed students for this study discussed pregnancy as more of a concern and more likely to happen among college students than STDs. Jones et al. (2006) found that while students knew they should have safe sex, many didn’t, because they didn’t see themselves as at risk for STDs. In this study, comments such as ‘college students are invincible’ or ‘STDs do not impact students’ lives that much’ were common among study participants. The male freshman talked about how reassuring it is to hear a girl say she is on the pill before he has sex with her, but the fact that he would still have sex with her even if she wasn’t on the pill plays into the college students are “invincible” mentality once again. Young adults also engage in unprotected sex within seemingly monogamous relationships. Using a condom with a boyfriend or girlfriend implies dishonesty and cheating. The freshman male talked about having sex with his now ex-girlfriend versus a casual hook-up. With the girlfriend, the fear

was always pregnancy, and with the causal hook-up, in which alcohol almost always played a role, the fear was more of contracting STDs because of the unfamiliarity with this person. The student implied that he would have sex with a girlfriend without a condom if she was on the pill. This is a dangerous mentality, because a person can bring a STD into a monogamous relationship. Monogamy only works if both partners are truly faithful and are tested negative for STDs before they have sex for the first time. Since many STDs are curable with antibiotics and pregnancy is not, as one female student noted, it makes sense that pregnancy will be on the forefront of students' minds. Birth control pills only prevent pregnancy, and it is dangerous for students to think they are safe as long as the female partner is on the pill. Students that don't regularly "wrap-up" need to use condoms every time they have sex, not only with casual hook-ups. In order to do this, society can no longer view condom use as antithetical to trust, and partners will also need to be realistic about expectations of monogamy and agree to use condoms until both partners are completely faithful.

Transition to college and the hook-up culture at Emory

The transition from high school to college and entering in to the "hook-up" culture was discussed by students in terms of buying in to new mentalities such as "anything goes" on college campuses and having a general consensus that sex is going to happen. Particularly with Emory's liberal background, students enter in to a new mentality when they arrive on campus that things are accepted here that were not accepted in high school when parents were watching over their backs. Students can redefine themselves and be a completely different person from high school. College is a time to "experiment…to have fun and be care-free and what-not".

Part of this experimentation and redefining oneself is participating in the hook-up culture here at Emory. Every student agreed that the hook-up culture was indeed on Emory's campus, but you can also "make of it what you want", meaning you can participate in it and accept the consequences, or you do not participate in it and might miss out on a unique college experience. Generally, students will want to participate in it, because it is "the cool attitude to have" if a freshman wants to fit in amongst his/her peers immediately. There was a general consensus that the hook-up culture is strongest freshman year, when everyone is living in close proximity in dorms. The one and only freshman male interviewed in the study explained the excitement freshman year of not knowing anybody and of having a locked door that had always been the elusive Holy Grail in high school. This excitement over meeting new boys and girls your own age can lead some students to be "careless about it", and students will often "use alcohol as an excuse" to cover up their behavior.

The ambiguity of the term "hook-up" may lead students to think that their peers are more sexually-experienced than they actually are (Bogle, 2008). Among the students interviewed, hooking-up meant anything from making-out to having sex. Groups of friends usually had the same definition of hooking-up, but students agreed that there is much guesswork involved in trying to find out just how far two people go on any given night. People will make assumptions, and often they make wrong assumptions, as in the case of the one freshman girl who had many guy friends on her freshman hall that often hung out in her room, which inevitably led some of the girls on her hall to assume she was hooking-up with some of the guys. Among groups of friends, especially freshman year, who's having sex with who is "definitely a large topic of conversation". In order to fit in, a student will "talk it up" and discuss his/her own hook-ups. The alternative is to not say anything, but "most people kind of want

to have something to say". This happens especially in a group of guy friends, where "it becomes kind of a competition, just inherently". Guys will compete to see who can "one-up" the previous guy by relating a better story about hooking-up with a girl. Once again, "you're probably going to want to pipe-up and say something about what you did…" versus the alternative of saying nothing. There is also a tendency among men to play up sex and pretend that they are more sexually active than they really are. We see this in both the male's comments about his friends, above, and in Carpenter's ethnography of men trying to rid themselves of their virginity before it is discovered by their friends. The student acknowledged that men like to appear more sexually active to their friends, which in turn leads friends and fellow peers to overestimate the sexual experience of others.

Influence of friends and normative behavior

Fellow peers and close friends influence a student's sexual decision-making. Lightfoot (1997) argues that groups of friends often share similar levels of risk, and they judge normalcy by what their friends are doing. One girl explained that if your friends are less sexually active than you, then you will be more likely to think critically of yourself. If you view your behavior as deviant, because it is different from your friends, you'll be more likely to think what you're doing is bad. Sexual activity is relative, depending on your personal group of friends. While students agreed that being in the same friend group didn't necessarily mean you share the same sexual experiences as your friends, it does dictate what you view as normal behavior. Normative behavior is what your friends are doing, and anything else is seen as deviant or nonnormative behavior. For instance, one senior female discussed condom use amongst her friends as automatic, "like putting on a seatbelt". If she didn't use a condom when she had sex, her friends would "freak out", which influences her to use

condoms every time she has sex. In terms of getting the HPV vaccine, several students opined that a girl would be more likely to get the vaccine (or at least think about getting it) if her friends or all the girls on her freshman hall had gotten vaccinated. This can also work the other way, too. While students shied away from the term peer pressure, they readily discussed the influence of friends on having sex: "The fact that everyone around you is doing it [sex] makes you reconsider". While you're not actually being pressured into having sex, the fact that everyone talks about it still puts pressure on.

The 'college students are invincible' mentality, the ambiguity of the hook-up culture, and the influence of fellow peers having sex can all change a student's perspectives on sex and may influence them to change their behaviors in college. If students are responsible about having sex, then this would not be such a great issue, but the enormous rates of STDs, such as HPV, striking young adults in the U.S. each year suggest otherwise. Until hooking-up is no longer the "cool attitude to have", efforts to increase condom use and decrease STD rates on college campuses are crucial. Efforts to increase HPV vaccination rates among young adults become more important in light of this.

How Emory matches up

One aim of this study was to see how Emory students compare to other college campuses in terms of having sex and hooking-up and to see if Emory students use their better education and resources to their advantage and practice safer sex. While there was a range of responses, most students felt that Emory students were less sexually active than the average state school, citing Emory's smaller size and more demanding academic life as reasons. Compared to other studies of universities in the U.S., it appears that students might be right. In Jones & Cook (2008), among 340

university students at a northeastern U.S. university, 25% had never had sex, compared to 38% here at Emory (Table 1). In Gerend & Magloire (2008), 22% of respondents from Florida State University and another local school had never had sex. Of course, this says nothing about what students do once they start having sex. Whether or not Emory students are practicing safer sex is difficult to compare between schools given that students tend to inaccurately report condom usage. In general, though, interviewed students came to a general consensus that Emory students use their higher socioeconomic and educated backgrounds to their advantage both in terms of access to condoms and contraception and in their knowledge of the importance of having safe sex. Other students talked about how being associated with such a large medical and public health community puts students at lower risk for STDs, along with Emory's open environment about sex and condoms ("There have been several times I've gone to Wonderful Wednesday and…[they give out] condoms as like party favors"). Being in an open environment, where sex and condoms aren't taboo subjects, encourages students to be open with each other and seek out sexual advice and use condoms.

Other motivating factors for getting the vaccine

Many of the students that were interviewed discussed the notion of increased independence in sexual decision-making in the transition from high school to college. With parents out of the equation, students expressed that having sexual partners in college was so much easier, because there is much less secrecy compared to high school. Students do not have to plan around when their parents are not going to be home. The absence of this family unit is apparent with the observation by one female student that in college it is so easy to have sex with anyone on your freshman hall. Students also emphasized that having this independence also comes with the personal

decision of whether to be responsible or not. While students stressed their freedom to make their own sexual health decisions in college, discrepancies arose when the girls discussed their motivating factors for being vaccinated. Interestingly, all six female students that were interviewed had gotten the vaccine because they were told by their doctor and/or mother that they should get it; this being despite the professed independence in college that students have to make sexual health decisions on their own. Being vaccinated against a STD is an important sexual health decision for a student to make on his/her own, and from the interviews, it was obvious that girls discussed the vaccine first with their mother before making this decision. Going behind a parent's back to get the vaccine is hard to do, even in college. Several of the girls discussed that talking to a trusted person was important for them to do before they got the vaccine, to make sure the vaccine was a good thing to get. This is shown in the male survey questions, where the majority of males indicated they'd be more likely to get the vaccine if their doctor recommended it. This was also a key finding from Caskey et al. (2009).

Another issue with the vaccine is the cost. Unless their health insurance covers the vaccine, a college student will be unlikely to pay out of pocket for the vaccine, a total expense of well over $400. The freshman male wanted the vaccine, but explicitly stated he would never pay that much for a HPV vaccine. If a student does the appropriate research on the vaccine and sees that it is covered by their insurance, the vaccine cost will still show up on the insurance statement that their parents view. All of this makes it highly unlikely that a student will try to be vaccinated without their parents knowing. Therefore, unless a student brings up the topic with his/her parents and asks to be vaccinated, a girl will be unlikely to get the vaccine unless her mother wants her to. One girl commented that if a girl is sexually

active and wants the vaccine, her bringing up the vaccine with her mother will be awkward and unlikely to happen; the girl wouldn't want her mother to think she is having sex. Therefore, one can deduce that a girl will not be vaccinated unless the mother has a favorable opinion on the vaccine for her daughter. If the mother believes that risk compensation will follow vaccination, or if the girl comes from a "strong Christian family" where the mother does not think the girl will need the vaccine, the girl is not getting the vaccine. With this is mind, marketing firms must also work to convince mothers that the vaccine is a good idea for their daughters. It will be interesting to see if men also rely on their parent's support before being vaccinated as more and more men seek vaccination.

Comparing HPV to HIV

Many students compared HPV to HIV, saying that while HPV is a big issue, HIV is seen as the scary STD that every college student fears. One freshman male explained that he would gladly shell out $450 for a vaccine against HIV, but not HPV, saying that to not have to worry about HIV would be something worthwhile to invest in. This is interesting in that college students are far more likely to contract HPV than HIV at some point in their lives, yet HIV is portrayed in the media and discussed in class as the scariest STD out there, and it works to scare college students into thinking they might contract it. Clark et al. (2002) found higher knowledge of HIV in their study population despite much lower levels of the disease. While everyone acknowledged that HIV is definitely discussed more and is in the media more than HPV, only a few students thought that HIV was emphasized at the expense of HPV. One student shared that he's glad they play up HIV, because it scares kids into using condoms. Another student shared that it doesn't matter if they play up HIV, because if you're protecting against one, you're protecting against them all. This 'whatever it

takes to get them to use condoms' mentality is not exactly the most responsible mentality to have, in that college students do not properly understand their risk for certain STDs. While the seriousness of HIV cannot be downplayed, perhaps it would benefit students if educators and public health officials alike stressed safe sex in the context of actual risk for certain STDs versus perceived risk.

Getting vaccinated at Emory

No matter how well the vaccine is marketed to men and women, very few students are going to pay the $166 per dose it costs at the Emory Student Health Clinic out of pocket, unless their health insurance covers the vaccine. Emory's Aetna Student Health Insurance Policy covers the vaccine 100% (along with all other immunizations) for both men and women. While this is great news for the student that wants to get the vaccine at school without necessarily letting their parents know, many students remain on their parents' health insurance plan when they go off to college. Emory's student health clinic does not accept most health insurance plans, meaning many students will have to get the vaccine at their home doctor. Indeed, many of the girls said that they were vaccinated before the start of freshman year at home. Planning out three doses, spaced an entire half year apart, is difficult to do, and even more difficult if a student lives far away from home, thus creating this small 'window of opportunity' for a student to get vaccinated before they start college. This also makes it virtually impossible for a student to get the vaccine if their parents are against it. Out of an estimated total student population of 13,000, there are 4,800 students currently on Emory's Aetna plan[1]. Enrollment on the plan is growing every year, up 5.6% as of November 2009. While this is encouraging, there are still many students that cannot get the vaccine at Emory without paying the exorbitant price for

[1] Information obtained through direct correspondence with Kimberly Taylor, Supervisor for Emory University Student Health Insurance Policy, February 24, 2010.

the vaccine. Until the vaccine manufacturer lowers the price of the vaccine, Emory should work to make the vaccine affordable for students that are interested by accepting more insurance plans that will cover the vaccine for the student that wants it, or perhaps they can offer discounts for students that are on financial aid or work study award packages. This should extend to other services as well, including confidential STD testing. The day of his interview, the freshman male had gone to Emory's Student Health Services interested in having a STD test, only to find out that the test was going to cost him a lot of money out of pocket. He expressed his frustration of going to a well-to-do university such as Emory, yet having to pay great amounts of money to obtain certain health services. For students paying out of pocket, STD tests can range from $20 for an anonymous HIV test to $124 for a HIV PCR test. Most tests averaged about $40 or less. The cost of these services may prevent students from getting them done. Realistically, most students are not going to ask their parents for money to get tested for a STD. Without getting tested, students will suffer the repercussions that stem from an untreated STD, and they will also have the opportunity to pass it on to all their sexual partners. Emory should make the sexual health of its students a priority in more ways than simply educating them through PE 101 and spreading awareness through campus events; they need to reach those students for whom this education and awareness was not enough.

Limitations

Out of 295 respondents, only eight followed through with an interview. Of these, only two were male. While many of the opinions and comments of the eight student interviewees overlapped considerably, obviously more opinions on the subject matter exist on campus, but were not obtained for this study. All of the female student interviewees had already been vaccinated, so no perspective from an

unvaccinated student was obtained, which could have shed more light on many of the differences that were observed between females that had been vaccinated and those that had not. Due to the sensitive nature of some topics, (and myself being a fellow student instead of a researcher with no ties to the university), some students chose not to share their own personal sexual experiences and that of their friends.

This study was not equipped to address the issue of reverse causality. Specifically for perceptions of the HPV vaccine, it is unclear whether vaccinated female students never associated the vaccine with sex or changed their perceptions of the vaccine only after getting vaccinated themselves. The implications of this could be great. If the perception that the vaccine is associated with sex does not dictate whether or not a female student gets vaccinated, then that might place greater weight on other factors, such as sexual activity status or the influence of a student's mother. A possible follow-up study could follow a sample of young, unvaccinated women and assess any changes in their perceptions of the vaccine over time as some of them get vaccinated against HPV.

Further research

The aim of this study was to gauge students' perspectives of the HPV vaccine and what factors are associated with uptake of the vaccine. Whether or not college students at Emory partake in risk compensation following vaccination warrants further study. Since males are now able to be vaccinated alongside women, it would be interesting to see if gender differences exist in risk compensation. As the price of vaccination goes down, further research could show whether or not students would be more likely to pick up the cost of the vaccine without their parents knowing. As more and more men become aware that they can also be vaccinated, further research could

show what factors are associated with uptake of the HPV vaccine in males and whether they differ from wanting the vaccine, as this study tried to show.

There are several paths forward in order to better understand the cultural dimensions surrounding risky sex and transmission of STDs on college campuses. All students that participated in the interviews either partook in the hook-up culture or had close friends that did, but nonetheless, rates of not having had sex were high. Students who choose to not participate in the hook-up culture may create their own cultural values and ideals regarding sex and intimacy, which warrants investigation. As this study suggests, cultural ideals and norms are not mutually exclusive from structural factors, such as health insurance coverage, educational background, etc. Further study could show the extent to which these two factors play off one another and if they are reinforcing or at odds with health-seeking behaviors such as HPV vaccination. Instead of taking a scientific approach, health curricula could emphasize certain healthy behaviors as normative. Future work could show the effect this different approach may have on sexual decision-making on college campuses. Finally, the makeup of Emory's student body is relatively homogenous; most students arrive at school from wealthy, educated backgrounds. This means that the results from this study cannot be generalized to other college campuses. It would be interesting to do a comparison study to see the differences in the hook-up cultures at different schools, both public and private, and how they factor in to different rates of sexual activity and STDs.

V. CONCLUSION

The aim of this study was to identify what factors are associated with uptake of the HPV vaccine in women and intention to be vaccinated in men. Vaccination rates among Emory female undergraduate students are far higher than similar rates at the national level and at other colleges. Similarly, more men at Emory are interested in being vaccinated than other studies show. While Emory students' relatively homogenized backgrounds, our close affiliation with both a medical and public health community, and our open environment where topics surrounding sex are common likely explain why rates are higher here (and also why knowledge levels are the same among students), a closer look at the data reveal differences in vaccination status in women and how students perceive the vaccine. Particularly concerning was the finding that never sexually active students were least likely to be vaccinated. There were several critical misconceptions surrounding when the vaccine is best administered. Targeting virgin students and other young adults should be a priority of vaccine marketing companies, as this is the ideal time to be vaccinated. Since vaccine manufacturers will be largely self-interested in their marketing schemes, it is also the responsibility of public health officials and health educators alike to ensure that these students are targeted particularly. HPV vaccination should be emphasized as an overall health measure or a precautionary measure, rather than be framed in the context of sex and STDs so that never sexually active students will be more prone to get vaccinated. Young adults need to feel a sense of urgency towards vaccination, so that they'll get the vaccine when it is most effective for them. In addition, students stressed that more information on HPV infection instead of the link to cervical cancer would be readily absorbed. Marketing the male vaccine may be difficult, because many male students are unaware of what the vaccine does for men. Awareness and

marketing efforts should emphasize the impact HPV can have on males as well as women. Since it appears that mothers are active decision-makers in terms of getting their child vaccinated against HPV, this population should be targeted as well with the message that getting their daughter vaccinated is a good safe measure for the future. Parents cannot be under the delusion that their children will stay the same from high school to college and will not become sexually active. For parents concerned that vaccination will lead to risk compensation, talking to their children about safe sex and being open are the best means to ensure their child will make safe decisions in college.

Another aim of this study was to address students' perceptions of sex on Emory's campus within the scope of the hook-up culture among American young adults as it relates to risky sex and high STD rates across the country. Amidst the American youth culture's sexual double standard where men must seek sexual partners and strive to appear sexually experienced to his peers while women must remain the "gatekeepers" to sexual morality, the ambiguous hook-up culture on college campuses across the nation emerges. In this context, students will make assumptions about their peers (oftentimes incorrect assumptions) and then judge their own behavior by what they view as normal to them. With the freshman dorm setting making it so easy for students to just walk down the hall and have sex with their classmates and "hooking-up" being the "cool attitude to have" on campus in order fit in immediately amongst one's peers, it would seem the hook-up culture is here to stay. Until society changes these cultural ideals that reward promiscuity among young adults, HPV and other STDs will continue to spread throughout this population.

Despite Emory's already high HPV vaccination rates compared to other figures, obtaining the vaccine at Emory can be difficult and prohibitively costly, unless you are on the Aetna Student Health Insurance Policy. By accepting more health insurance plans and offering student discounts to those students that may truly need them, Emory Student Health Services would break down many remaining structural barriers to obtaining the vaccine. It may also encourage students to take more charge of their sexual health by getting tested for STDs. Emory already has in place a great system for spreading sexual health awareness and knowledge and creating a community with an open dialogue on issues related to sex, so why stop there?

VI. APPENDIX

Proposed interview outline for HPV study at Emory University*

1. How familiar are you with HPV and/or the HPV vaccine? Please share any knowledge you know regarding HPV or the HPV vaccine.

2. Compared to other sexually-transmitted infections, such as HIV, herpes, gonorrhea, etc. how severe do you think HPV infection is? Why?

3. Do you feel that Emory students as a whole are less at risk for acquiring HPV than their counterparts at other universities across the country?

4. Do you feel that increased awareness or knowledge of HPV and other sexually-transmitted infections leads to less risky sexual behaviors among college students?

5. Have you already taken the PE 101 Health requirement? If so, do you remember discussing HPV, and, if so, how effective was the class in communicating information about HPV infection and prevention?

6. What are your thoughts on the HPV vaccine? Should all girls eligible for the vaccine be required to get it? What about college students? Should parental consent be required for underage girls to receive the vaccine? Do you feel that vaccination will give girls and young women a false sense of security that will lead to increased risky sexual behaviors?

7. What do you think would be the best way to market the vaccine for girls and young adults (or if against vaccination, what would you propose instead for HPV prevention)?

8. Is there anything else you would like to comment on concerning HPV or the HPV vaccine?

9. Year at Emory?

10. Sex (interviewer will note sex without asking).

*This is only a proposed outline of the interview; interview questions will vary depending on students' responses and if they are willing to discuss personal circumstances or not.

Time required to complete interview: 20-30 minutes, but individual times will vary based on student responses.

Only the interviewer will know the identity of interviewees. No identifying information will be linked to student responses. Consent forms will be kept by the

interviewer in a secure place and will not be shared with anyone outside the study researchers.

Online Survey Questions

Consent (required)

Year at Emory: (required)
- Freshman
- Sophomore
- Junior
- Senior
- Other

Race/Ethnicity
- White
- Hispanic
- Asian/Pacific Islander
- Black
- Native American
- Other

I have already taken the PE 101 health requirement. (required)
- Yes
- No

Which best describes you?
- Currently sexually active
- Not currently sexually active
- Never sexually active

What is your current relationship status?
- In a monogamous relationship
- In a relationship, non-monogamous
- Not in a relationship
- Other (please specify)

Have you ever heard of HPV (Human Papillomavirus)? (required)
- Yes
- No

Have you ever heard of the HPV vaccine? (required)
- Yes
- No

Agree/ Disagree/ Don't Know:
- Certain strains of HPV can cause cancer.
- Certain strains of HPV can cause genital warts.
- HPV can cause genital herpes.

HPV can cause cancer of the penis or anus in men.
People cannot transmit HPV to their partner(s) if they have no symptoms of HPV.
HPV infection is relatively uncommon.
A person may be infected with HPV and not know it.
Condoms prevent all transmission of HPV.
HPV is the most common sexually transmitted disease in the US.
HPV can be transmitted via skin contact.

Agree/ Disagree/ Don't Know:
Compared to other sexually transmitted diseases, such as HIV, genital herpes, syphilis, or gonorrhea, HPV infection is not as severe.
Compared to other students like myself, I am at a lower risk of contracting HPV.
HPV vaccination may encourage risky sexual behavior in adolescents who receive the vaccine.
My friends are generally more sexually experienced than me.
Other students at Emory are generally more sexually experienced than me.
If most of my friends were vaccinated against HPV, it would mean they were sexually active.
Getting vaccinated would encourage a man or a woman to lose his/her virginity.
If I dated a man/woman who got the vaccine, it would signal to me that he/she wants to have sex.
Most people my age who get the vaccine are sexually active.
Getting vaccinated would make people less likely to use condoms during sexual intercourse.
Getting vaccinated would encourage other risky sexual behaviors besides intercourse.
Getting vaccinated makes it safer to have multiple sexual partners.
Receiving the HPV vaccine would not alter my sexual behaviors at all.

Sex: (required)
Male
Female

MEN ONLY:

You would want to be vaccinated against HPV.
*The FDA recently approved the HPV vaccine for use in men aged 9-26 in addition to women.
Agree
Disagree
Don't Know

All women eligible for the vaccine should receive it.
Agree
Disagree
Don't Know

I would be more willing to get the vaccine… (Agree/ Disagree/ Don't Know)

…if my doctor recommended it.
…if it was free.
…if it was covered by my insurance.

Optional Follow-Up Interview

WOMEN ONLY:

Agree/ Disagree/ Don't Know:
*The FDA recently approved the HPV vaccine for use in men as well as women.

Vaccinated women no longer need Pap tests.
An abnormal Pap test result may indicate an HPV infection.
The HPV vaccine has been approved for girls and women aged 9-26 years.
The vaccine is most effective if administered before sexual debut.
There is a small risk of contracting HPV from the vaccine.
If I chose to be vaccinated, it would be relatively easy to do so.
I would be able to get the vaccine at Emory's student health clinic if I wanted to.
All men eligible for the vaccine should receive it.

Which best describes you?

Unaware of HPV and/or the vaccine.
Planning to be vaccinated in near future.
Already vaccinated with all three doses (or have gotten 1 or 2 doses and plan to finish).
Undecided whether to receive vaccine or not.
Decided not to receive the vaccine.

Optional Follow-Up Interview

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