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Enhancing Male HPV Vaccine Acceptance: The Role of Altruism and Awareness of Male Specific Health Benefits

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Abstract

While considerable research exists on female HPV vaccine acceptance, research is needed to clarify factors that facilitate vaccine uptake among boys and men. The benefits of male HPV vaccination exist on an individual and community level. Male HPV vaccination provides personal health protection to recipients, and can provide female health protection by minimizing transmission of HPV to sexual partners. As such, male vaccine acceptance may be enhanced by emphasizing both altruistic motives (female health protection) and personal health benefits. A sample of college-age men (N = 200; M age = 19.3; 31% Non-White) completed computer-administered surveys and were presented with one of four informational interventions that varied in the inclusion or exclusion of altruistic motives and in terms of the extent to which male specific HPV-related illnesses and vaccine benefits were stressed. HPV vaccine acceptance was assessed immediately following the intervention with items assessing vaccine interest and willingness to receive it. Consistent with predictions, those who received the intervention emphasizing both altruistic motives and male specific information endorsed the greatest vaccine acceptance (M = 3.6, SD = 1.0). Additionally, perceived HPV susceptibility and stigmatization concerns toward the vaccine emerged as significant predictors of vaccine acceptance. Findings suggest that provider-based and community level interventions that stress both altruistic motives and personal health benefits of vaccination may enhance HPV vaccine uptake among young men.

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by

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Enhancing Male HPV Vaccine Acceptance: The Role of Altruism and Awareness of Male Specific Health Benefits

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the world (Baseman & Koutsky, 2005). High risk subtypes of HPV are causally linked to cervical cancer in women and genital warts in both men and women. Papanicolau (pap) smear screening programs for women have reduced the incidence of and mortality associated with cervical cancer in industrialized nations. Nonetheless, HPV contributes to approximately 4,000 cervical cancer deaths in the United States and 250,000 worldwide each year (World Health Organization, 2010). Although cervical cancer is by far the most serious health concern linked to HPV, recent findings confirm that HPV is also associated with increased risk for oropharyngeal cancer in both men and women (Fakhry & Gillison, 2008). Collectively, HPV infections are associated with significant morbidity and account for a high level of health care expenditures. In 2000, it was estimated that the lifetime financial costs associated with HPV disease among young adults in the U.S. was $3.9 billion (Zimet, Shew & Kahn, 2008).

Efforts to reduce the incidence of cervical cancer and other HPV-related illnesses received a major boost in 2006 with the introduction of Gardasil, a vaccine shown to be effective in preventing four of the highest risk subtypes of HPV linked to cervical cancer and genital warts. Although developed initially for use only in women, Gardasil was recently approved by the Food and Drug Administration (FDA) and recommended by the Advisory Committee on Immunization Practices (ACIP) for use in boys and men. Male HPV vaccination has the potential to reduce male to female transmission of HPV and decrease men's risk for several HPV-related illnesses, including genital warts and several forms of oral, penile and anal cancers (Backes, Kurman, Pimenta & Smith, 2009; Palefsky, 2010; Smith et al., 2007). As such,

widespread uptake of Gardasil in both men and women could dramatically reduce the prevalence of HPV-related illnesses.

Despite the potential for public health benefit, current national surveys show that only 49% of adolescent girls ages 13 to 17 have received at least one dose of the HPV vaccine, while only 32% have completed the three dose regimen. Among the same age cohort, only 1% of boys have received the vaccine to date, according to Centers for Disease Control and Prevention (CDC) catchment data (CDC, 2011). Low uptake of the HPV vaccine is due in part to the fact that HPV vaccination is not mandated in the U.S. and is often not covered by health insurance policies. In fact, vaccination rates in the United Kingdom and Australia, where the vaccine is paid for through government funds but not mandated, are over 80% (Peres, 2010).

Research also suggests that psychosocial barriers contribute to low vaccine uptake. For example, research involving female adolescents and their parents confirms that low perceived risk for HPV infection and cervical cancer, low perceived vaccine effectiveness, low HPV knowledge, and vaccine safety concerns are associated with decreased interest in vaccination (Brewer & Fazekas, 2007; Jacob, Bradley & Barone, 2005). Past research on psychosocial barriers to HPV vaccination has focused primarily on vaccine uptake among young women and their parents (for reviews, see Brewer & Fazekas, 2007; Zimet, 2005). Research on male acceptance of the HPV vaccine is limited, with only 13 studies investigating male vaccine acceptance in the U.S. Moreover, no studies on male vaccine acceptance have been published since FDA approval of the HPV vaccine for men.

Accordingly, the current study was conducted to investigate factors that influence male willingness to seek vaccination. Focusing on a college sample of unvaccinated men, the study utilized an experimental design to address three primary aims: (a) to examine whether a brief

intervention can enhance altruistic motives for vaccination (i.e. reducing women's risk for cervical cancer) and subsequently influence vaccination acceptance among men, (b) to investigate the effect of highlighting male specific HPV-related health conditions and vaccine benefits on male vaccine acceptance; and (c) to expand current understanding of the influence of other psychosocial factors on HPV vaccine acceptance among men. The following sections present the global and domestic effects of HPV, the development and uptake of the HPV vaccine, as well as extant findings on vaccine acceptance among young women and their parents. The role of altruism and intervention message content in potential male vaccination is discussed and introduced as variables in the proposed experimental design.

HPV Transmission and Epidemiology

Human papillomavirus is currently the most common type of sexually transmitted infection in the world (Baseman & Koutsky, 2005; Trottier & Franco, 2006). HPV is more easily transmitted than other common STIs, requiring only skin to skin contact. In addition to vaginal intercourse, oral, anal, and digital-vaginal sex are all possible routes of transmission (Cox, 2006; Trottier & Franco, 2006). In the U.S., it is estimated that approximately 20 million Americans are infected with HPV at any given time (Cox, 2006). Modeling estimates pose that more than 80% of sexually active females will be infected by HPV prior to the age of 50 (Myers, McCrory, Nanda, Bastian, & Matchar, 2000). Representative, population-based sample studies found prevalence rates to be 27%, with the highest rates of infection in young adult women (Manhart et al., 2006; Dunn et al., 2007). HPV prevalence rates are challenging to determine because there are often no manifest symptoms and infections typically clear without treatment. Nonetheless, the best available estimates suggest that HPV is most prevalent among sexually active females under 25 years of age, and prevalence decreases with age.

Human papillomavirus exists as more than 120 different strains, of which over 40 account for genital HPV. Strains are classified as high risk (HR-HPV) and low risk (LR-HPV), with high-risk strains associated with the development of cervical cancer, other neoplasms, or squamous cell carcinomas. HPV types 16 and 18, in addition to 13 other types, are considered highest risk subtypes that are causally linked to cervical cancer (Baseman & Koutsky, 2005). Types of HPV 6 and 11 are lower risk, but nonetheless carry undesirable outcomes because they are causally linked to genital warts and low grade squamous intraepithelial lesions (LSIL) in the cervix (Trottier & Franco, 2006).

Health Impact of HPV Among Women

HPV represents a significant health care burden in the U.S. An estimated 6.2 million new cases of HPV-related illnesses linked to cervical abnormalities require diagnosis, management and follow up each year (Trottier & Franco, 2006). Among these, the most severe consequence and greatest health burden is cervical cancer. In the U.S., there are approximately 12,000 new cervical cancer cases annually and 4,000 deaths (Ferlay et al., 2010). Worldwide, cervical cancer is the second most common cancer in women, second only to breast cancer. An estimated 275,000 deaths occur each year across the globe and more than 85% of these are in developing countries where screening and treatment resources are lacking (Baseman & Koutsky, 2005; Ferlay et al., 2010; Trottier & Franco, 2006). Indeed, cervical cancer causes the highest number of female deaths due to cancer in developing countries (Pisani, Parkin, Bray & Ferlay, 1999) and accounts for the single greatest number of years lost to cancer in the developing world (Agosti & Goldie, 2007).

HPV also causes genital warts, a condition that affects an estimated 1% of sexually active individuals at any given time (Koutsky, 1997). Clinical symptoms of genital warts include

itching, burning, tenderness at site as well as bleeding or discharge. Also, studies have found genital warts to produce feelings of anxiety, embarrassment, shame and decrease in sexual enjoyment for those infected (Insinga, Dasbach, & Myers, 2003). Insinga, Dasbach and Myers (2003) conducted a study using Medstat data from 2000 which found estimates indicating an annual health and economic health care burden of 330,000 cases of genital warts and $140 million for privately insured populations. Specifically they found the cost for one episode of treatment for a female to total $404. Treatment of genital warts focuses on removal of visible lesions or plaques that cause physical or psychological distress. However, treatment methods including patient applied topical medicines and surgical removal do not necessarily eradicate HPV infectivity.

Health Impact of HPV Among Men

To date, most research on the health impact of HPV has focused on women. In addition to serving as the primary transmission vector of HPV to women, there are in fact several serious HPV-related health conditions that affect men. HPV 6 and 11 account for more than 90% of anogenital warts and laryngeal papillomatosis in men. Laryngeal papillomatosis involves the formation of warts on the laryngeal, tracheal, bronchial, or other respiratory mucosa. Difficulty breathing and swallowing as well as hoarseness and chronic coughing occur in individuals who develop these tumors (Smith et al., 2007). Prevalence studies show that for adults, the male to female prevalence ratio is approximately 4 to 1, indicating further burden on men caused by HPV (National Institute of Deafness and other Communication Disorders, 2010).

Recent findings also confirm a linkage of oral HPV to the onset of head and neck squamous cell carcinomas (HNSCC) in men. While alcohol and tobacco use are well established risk factors of HNSCC, HPV infectivity has more recently been identified as an agent in the

pathogenesis of head and neck cancers. For example, individuals positive for HPV 16 have been found to confer a 2 to 3 fold increase in risk for HNSCC, as well as a greater than 14 fold increase in risk of oropharyngeal cancer as compared to HPV negative individuals. Men are disproportionately affected by these HPV-related cancers in the U.S. Approximately 5,700 men are diagnosed with HPV associated HNSCC each year, as compared to 1,700 women (Watson et al., 2008). Case controlled studies have shown that the presence of oral HPV infection can be associated with a six fold increase in risk for oral cancer. For men, the incidence of HPV associated squamous cell carcinomas in the oropharynx and oral cavity account for 23% of all HPV associated cancers (Kreimerm, Clifford, Boyle & Franceschi, 2005). HPV has also been linked to the development of tonsil cancer (Fakhry & Gillison, 2008).

Moreover, HPV has been implicated in the development of penile cancer in men. Medical understanding of penile cancer etiology is more limited than other cancer types. Two different etiologies are hypothesized for the development of penile cancer, one linked to HPV positivity and one that requires other factors in pathogenesis (Rubin, Kleter & Zhou, 2001). In a review of the medical literature, Backes and colleagues (2009) examined 30 studies with over 1,200 cases of squamous cell carcinoma which account for 95% of penile cancers. Their goal was to determine the prevalence on HPV DNA in invasive penile cancer. They found the presence of HPV in approximately 50% of the cases reviewed. HPV types 6, 16, and 18 were the most prevalent types of HPV found in penile squamous cell carcinomas. Such findings firmly suggest that quadrivalent vaccines such as Gardasil have the potential to reduce over three-fourths of HPV positive penile squamous cell carcinomas (Backes, Kurman, Pimenta & Smith, 2009).

As research continues to demonstrate a causal link between HPV and different types of cancers that affect men, the argument for male vaccination can be supported by its importance at the individual level. As discussed, HPV 6 and 11 account for over 90% of anogenital warts and laryngeal papillomatosis in men. HPV 16 and 18 contribute to the pathogenesis of head and neck cancers. These four strains of HPV, all prevented by the HPV vaccine Gardasil, lead to considerable male suffering, although at relatively low prevalence rates. With respect to the most severe health consequences of HPV for men, diagnoses such as penile, anal and head and neck cancers are fairly infrequent in the U.S. For example, it is estimated that only 800 men are diagnosed with HPV-related penile cancer annually and penile cancers account for only 0.1% of deaths from cancer among males in the United States. HPV-related head and neck cancers are more prevalent than penile cancer (though still relatively rare), with approximately 5,700 men being diagnosed with HPV-related head and neck cancers per year in the United States (CDC, 2010).

Thus, while HPV is most commonly linked to health-related concerns in women, available data also point to potential health benefits of HPV vaccination to prevent male specific health concerns. However, given the relatively low prevalence rates for male specific health concerns and the perception that HPV is primarily a women's health issue, promoting male vaccine acceptance may require a dual emphasis on personal health benefits as well as an emphasis on the potential benefits of male vaccination for women.

The HPV Vaccine

Up until recently, the primary approach to reducing the impact of HPV-related illnesses in the U.S. has been the Papanicolau (pap) test. Routine pap smears have proven highly effective in alerting women to cervical abnormalities that, with early detection, can be successfully

treated. However, pap smears are a screening tool not readily available in developing countries where the devastation associated with cervical cancer is greatest. The resources, expertise, and the necessity of repeated screening at frequent intervals, have served as major barriers to cytology-based screening in most poor countries (Agosti & Goldie, 2007).

The landscape for the prevention of cervical cancer and other HPV-related illnesses experienced a major change with the introduction of Gardasil in 2006 for women and in 2009, with the approval of Gardasil for boys and men. The availability of an HPV vaccine provides tangible hope for a reduction in health burdens associated with HPV in the U.S. and worldwide. It has been projected that widespread uptake of HPV vaccination in conjunction with continued cervical screenings could lead to as high as a 76% lifetime reduction in cancer-related deaths attributable to HPV and a 50% reduction in cervical abnormalities (Adams, Jasani & Fiander, 2007).

In 2006, Merck & Co., Inc. received approval from the U.S. Food and Drug Administration to administer their quadrivalent human papillomavirus recombinant vaccine to females ages 9 to 26 (U.S. Food & Drug Administration, 2006). Gardasil is a quadrivalent vaccine that protects against four different strains of HPV. Strains 6 and 11 are low risk strains that cause 90% of genital warts and strains 16 and 18 are responsible for 70% of cervical cancer cases (Adams, Jasani & Fiander, 2007; Villa et al., 2005). The vaccine is administered in three doses, at 0, 2, and 6 months. Clinical trials suggest that immunity post vaccination is greater than four years, although it is not yet known whether a booster vaccination will be required (Adams et al., 2007). Mathematical modeling analyses of the three dose regimen have predicted 99% of women could have nearly life- long detectable anti-HPV 16 levels, indicating long lasting, robust immune memory and decreased chance of booster requirements (Ault, 2007).

In 2002, Merck began conducting a series of clinical trials on the quadrivalent vaccine. The Females United to Unilaterally Reduce Endo/Ectocervical Disease (FUTURE I) double blind study randomized 5,445 women between the ages of 16 and 24 to receive the vaccine or a placebo and they were followed for approximately three years. The vaccine was found to be 100% effective in preventing vaginal, vulvar, perineal and perianal intraepithelial lesions associated with HPV 16 and 18 in never before infected women. In women previously exposed to the HPV types, the vaccine was found to be 73% effective for preventing anogenital or vaginal lesions and 55% effective for preventing cervical lesions (Garland et al., 2007). The larger FUTURE II study employed the same protocol and the vaccine prevented 98% of cervical intraepithelial neoplasia in never before infected women. The clinical trials found relatively few adverse side effects with the most common being irritation at the injection site (FUTURE II, 2007; Garland et al., 2007).

HPV Vaccine Efficacy in Men

As noted, the HPV vaccine, Gardasil, was recently approved for use in men following encouraging results of phase III efficacy trials. In 2008, Merck & Co. completed a large scale study of male vaccination on 4,065 men and boys, ages 16 to 26 (Norris, 2008). The double blind study included two groups, one that received the vaccine or placebo, at day one, two months and six months and were followed for 36 months in total. No participants had any genital lesions or history of warts prior to enrollment. Results showed that only three cases of genital warts occurred in the vaccine group versus 31 cases in the placebo group. Therefore, Gardasil was found 90% effective in reducing lesions. Also, there were no serious side effects stemming from HPV vaccination among participants in the trial, other than irritation at the injection site. These findings provide evidence of vaccine efficacy among males and point to a promising approach to

reducing HPV-related health concerns in men. With widespread male uptake of the vaccine, reduced HPV infections in men would also provide indirect health benefits to women by reducing male to female HPV transmission, thereby reducing women's risk for cervical cancer and other HPV-related health concerns.

HPV Vaccine Uptake in the United States

Female uptake of the vaccine remains a focus of U.S. media and public health and thus vaccine efficacy and uptake data are focused primarily on girls and women. Data from the 2010 National Immunization Survey by the Centers for Disease Control and Prevention indicates that 49% of adolescent girls ages 13 to 17 have received at least one dose of the HPV vaccine, while only 32% have completed the three dose regimen (CDC, 2011). These rates are higher than previous years, however remain disappointing as a public health effort. The 2010 survey also conveyed the first uptake rates for boys and men, following FDA approval. Notably low HPV vaccine uptake rates indicated that only 1% of boys within the 13 to 17 year old age range had received the vaccine (CDC, 2011). An important and understudied question concerns the extent to which young men are interested and willing to take the HPV vaccine. While most HPV vaccine acceptance research has focused on females, there is now a growing literature on male vaccine acceptance. The following reviews research on both female and male vaccine acceptance and uptake.

HPV Vaccine Acceptance

While efficacy, safety, access, and costs are vital to shaping public approval and uptake of a vaccine, psychological factors also play an important role in vaccination decisions. Relative to other routine vaccinations, initial roll-out of the HPV vaccine in the U.S. was hampered by controversy (Herzog, Huh, Downs, Smith & Monk, 2008; Zimet et al., 2008). An initial push by

a number of states to include HPV as a required vaccine for school attendance was met with considerable resistance from organizations that voiced a variety of concerns, including the possibility that vaccination might promote promiscuity and tacit approval of sexual behavior among young adolescents (Haber, Marlow & Zimet, 2007). Because the HPV vaccine is not mandated, adolescents (and their parents) must request receipt of the vaccine in order to receive it. For some, the decision to vaccinate may be complicated by the fact that the vaccine prevents a sexually transmitted infection, but is recommended for children who are not yet sexually active. Therefore, parents and their children are placed in a decision making situation that may prove more difficult than other vaccination decisions. Thus, attitudes and beliefs about the HPV vaccine among parents and individuals in the target vaccination age range are likely to be primary determinants of adolescent vaccination. In the next section, the current literature on HPV vaccine acceptance is presented. Specific correlates of and barriers to vaccine uptake are discussed.

HPV Vaccine Acceptance Among Girls

Since the introduction of the HPV vaccine, the literature on vaccine acceptance and uptake has grown rapidly. A unique variable that distinguishes this area of study from past research on vaccination is that this vaccine prevents an STI and is recommended for pre-sexually active girls and boys. In both the media and realm of public health, concerns regarding promotion of a vaccine that could be perceived as promoting sexual activity have been raised (Haber et al., 2007). Parent perceptions of the vaccine have been highlighted as an important area of research, since the vaccine is recommended for young girls and boys who defer vaccination decisions to their parents. Therefore, research has utilized both parent and youth populations.

Correlates of vaccine acceptance among girls. Research on HPV vaccine acceptance has primarily been descriptive and correlational in nature. Demographics, perceptions of vaccine efficacy and safety, HPV knowledge, and attitudes towards the vaccine have been most extensively studied with respect to acceptance and uptake. Additionally, HPV vaccine delivery and perceived susceptibility to contracting HPV have emerged as variables of interest (Brewer & Fazekas, 2007; Zimet et al., 2008).

The following reviews the extant literature, highlighting female correlates of HPV vaccine acceptance, as well as barriers to vaccination that have been identified in research. First we focus on the role of HPV knowledge as well as perceived susceptibility to contracting the infection in vaccination decisions. Physician recommendation in HPV vaccination is also discussed. Next we review both structural barriers and individual concerns regarding vaccination. A discussion of vaccine safety concerns and implications for teen sexual activity follows.

HPV knowledge. Prominent health behavior models specify that knowledge or information concerning a target health outcome contributes to decisions regarding initiation of preventive behaviors (e.g., Fisher & Fisher, 1992). In the context of HPV vaccination acceptance, a number of studies confirm that (a) HPV knowledge is typically low and (b) people who are more knowledgeable about the causes and consequences of HPV infection are often more willing to consider vaccination (Black, Zimet, Short, Sturm & Rosenthal, 2009; Ferris, Waller, Owen, & Smith, 2007; Kahn, Rosenthal, Hamann, & Bernstein, 2003). In the early 1990's, studies conducted with college students showed knowledge of HPV to be as low as 15% (Vail-Smith & White, 1992). However, with the advent of the HPV vaccine and media marketing to promote vaccination, a modest improvement in HPV knowledge has been observed across

several studies (e.g., Ferris et al., 2008; Gerend & Magliore, 2008). For example, in a sample of male and female college students surveyed shortly after FDA approval of the vaccine, 78% reported having heard of HPV and 87% of participants earned a score of 4 or higher, out of 6 on a basic HPV knowledge test (Gerend & Magliore, 2008).

Several studies confirm that HPV knowledge is positively associated with HPV vaccine acceptance. Ferris and colleagues (2008) found that understanding that HPV causes cervical cancer and awareness of being at risk for HPV infection were positive correlates of vaccine acceptance among adult women. A study using a large, national sample highlighted knowledge differences between girls and women who had received the vaccine and those who had not. Findings showed that compared to unvaccinated females, those who had been vaccinated were more likely to know that the HPV vaccine protects against cervical cancer (Caskey, Lindau & Alexander, 2009). Also, vaccinated females reported receiving HPV information from primary care physicians significantly more so than unvaccinated females who endorsed school as their major source of HPV knowledge. Finally, in a sample of parents of unvaccinated daughters, Fakekas, Brewer and Smith (2008) found that higher HPV knowledge was associated with stronger intentions to vaccinate daughters.

Although most studies support an association of increased HPV knowledge and greater vaccine acceptance, a study conducted by Gerend & Magliore (2008) failed to find a significant correlation between HPV knowledge and vaccine interest among college-age women. Nonetheless, there is at least moderate support for a linkage of HPV-related knowledge to HPV vaccine acceptance. Providing education about HPV and HPV-related health concerns is likely to be an important element in efforts to increase HPV vaccination.

Perceived HPV severity and susceptibility. Another correlate of HPV vaccine acceptance that has emerged in the literature is perceived susceptibility to HPV infection (Black et al., 2009; Gerend, Lee & Shepherd, 2007; Gerend & Magliore, 2008; Burke, Smith, White, Baker & Mitchell, 2010). Consistent with other areas of vaccination research, findings confirm that vaccine acceptance and uptake is strongest among those who perceive HPV to have severe health consequences and who perceive themselves to be personally vulnerable to HPV infection. For example, Gerend and Magliore (2008) found that perceived risk for HPV infection was independently associated with HPV vaccination interest. Similarly, perceived susceptibility to HPV was associated with HPV vaccine acceptance in a sample of underserved women in community clinics in the South (Gerend et al., 2006).

Physician recommendation. Physician recommendation has also been cited as an influential motivator of HPV vaccine acceptance (Brewer & Fazekas, 2007; Caskey et al., 2009). A recent study found that 100% of parents who reported vaccinating their daughter cited receiving a physician's recommendation, compared to the 53% of parents with unvaccinated daughters (Gerend, Weibley & Bland, 2009). In a sample of rural and urban parents, doctor's recommendation was one of the strongest correlates of HPV vaccine initiation (Reiter et al., 2009). Additionally, in a cross-sectional survey of girls and young women ages 13 to 26 years, significant differences emerged between vaccinated and unvaccinated girls in that vaccinated girls more frequently reported a healthcare provider as their most common source of HPV vaccine information (Caskey et al., 2009). Similar research supports the findings that physician recommendation holds much influence over parents and adolescents alike when making a vaccination decision such as receiving the HPV vaccine (Brewer & Fazekas, 2007; Dempsey, Davis, Zimet & Koutsky, 2006; Kahn et al., 2003).

Sexual activity status. Much of the controversy that surrounds the HPV vaccine rests on the notion that encouraging a method to prevent a sexually transmitted infection may be perceived as condoning sexual activity. The concern that HPV vaccination may promote promiscuity has been described in both the popular press (Gibbs, 2006) and scientific review articles (Zimet et al., 2008). Nonetheless, empirical findings have been mixed in supporting the hypothesis that promiscuity concerns serve as a barrier to vaccination. In several studies, only 6 to 12% of parents endorsed the belief that vaccine-related promiscuity was a barrier to vaccine uptake (Brewer & Fazekas, 2007; Constentine & Jerman, 2007; Davis, Dickman, Ferris, & Dias, 2004; Zimet et al., 2005). While this is not a relevant concern for teenagers and young adults deciding to vaccinate, this line of research is important moving forward, as vaccination recommendations are for girls and boys prior to sexual debut.

Perceived vaccine safety. Vaccine safety, particularly among parents deciding to vaccinate their daughters, has also emerged as a barrier to acceptability (Brewer & Fazekas, 2007; Davis et al., 2004; Dempsey et al., 2006). Empirical evidence affirms that, apart from minor side effects, the vaccine is safe. The CDC and FDA currently utilize three systems through which to monitor any adverse effects of vaccine administration. To date, these programs report approximately 32 million doses of Gardasil administered and approximately 1,300 reported adverse events deemed serious by the Vaccine Adverse Event Reporting System (VAERS). However, it is explicitly noted that these events have no proven causal association with the vaccine. Medical experts review each case and to date no medical pattern related to the vaccine has been identified (CDC, 2010).

Despite the objective safety data that exists on the HPV vaccine, parental concerns about vaccine safety remain common. Two studies of parental attitudes toward children receiving the

HPV vaccine found that vaccine safety concerns were a significant predictor of decreased vaccine acceptance (Constantine & Jerman, 2007; Dempsey et al., 2006). In addition to parental reactions to vaccine safety, girls and young women have been found to endorse similar safety concerns. A study surveying girls and women 13 to 26 years old found that vaccine safety concerns were the second most important barrier to receiving the HPV vaccine (Caskey et al., 2009).

Summary. HPV vaccine acceptability has been a growing area of research in medical, public health, and psychology arenas. Research that seeks to identify motivators and barriers to HPV vaccination is of importance, as such knowledge can be used to inform the development of interventions to increase vaccine uptake. Findings concerning greater HPV knowledge, increased perceived susceptibility to HPV and physician recommendation have emerged as factors that facilitate vaccine acceptance (Black et al., 2009; Brewer & Fazekas, 2007). Findings also suggest that concerns about teenage promiscuity, and vaccine safety concerns may serve as barriers to acceptance. Findings considered thus far have focused primarily on data regarding female vaccination. Next, literature on male HPV vaccination is reviewed.

Male Vaccination: Emerging Literature

Despite the rapid influx of studies on female HPV vaccine acceptance and uptake, research on male vaccination acceptance has only recently begun to emerge. To some extent, the decision to receive the HPV vaccine presents a different set of issues for males compared to females. The most significant contribution of the vaccine is its potential to prevent cervical cancer, a disease only threatening to women. The health risks of HPV for males are perceived as considerably lower. The actual male health risks represent significant health concerns for men,

but are less prevalent and severe compared to cervical cancer (Barnholtz-Sloan et al., 2008; Ryerson et al., 2008).

Men are also carriers of HPV and therefore serve as vectors in the transmission of HPV to women. As such, male vaccination decisions may also be linked to the belief that HPV immunity in men can reduce women's risks for cervical cancer and other health concerns. However, little information is available concerning the extent to which men's interest in vaccination can be influenced by the belief that vaccination can help to protect women from serious health concerns.

In the U.S., there have been a limited number of published studies that focus on male HPV vaccine acceptance. Similar to the female literature, studies have utilized both parent and youth populations and have investigated factors that influence male perceptions of HPV and acceptance of the HPV vaccine. The following reviews the role of HPV knowledge, perceived HPV severity and susceptibility, as well as demographic and sexual behavior variables associated with male vaccine acceptance. Finally, several studies are reviewed that suggest that providing information about self-protection *and* female partner protection may enhance male vaccine acceptance.

HPV Knowledge. Similar to findings regarding female knowledge of HPV, recent studies confirm that male knowledge concerning HPV is generally low, though has increased somewhat since the introduction of Gardasil in the media. Prior to FDA approval of the vaccine for females, McPartland and colleagues (2005) found HPV knowledge to be generally low among a college age sample of men, with approximately 50% reporting having heard of HPV. Following Gardasil's entry to the U.S. market, Gerend and Barley (2009) surveyed college aged males and found that 83% reported having heard of HPV. However, understanding of the connection

between HPV and genital warts and anogenital cancers was low (28% and 23% respectively). HPV knowledge was found to be significantly correlated with HPV vaccine acceptability among the males in the study. Other studies investigating male HPV vaccine acceptance have yielded similar findings showing increased familiarity with HPV as well as an association between HPV knowledge and vaccination interest among men (Ferris et al., 2009; Jones & Cook, 2008; Reiter, Brewer & Smith, 2010).

Perceived HPV severity and susceptibility. As with the literature on female HPV vaccine acceptance, researchers have also examined the role of perceived severity and susceptibility to HPV as factors that may be relevant to male vaccine acceptance. Studies conducted prior to FDA approval of Gardasil indicated that college age males did not perceive HPV to be a severe disease, nor did they believe themselves to be highly susceptible to HPV infection (Boehneret al., 2003; McPartland et al., 2005). Studies conducted following vaccine approval yield similar findings, showing that males typically do not endorse HPV as a severe health concern. Nonetheless, perceptions of susceptibility to HPV have emerged as consistent correlates of vaccine acceptance in recent studies involving males (Crosby, DiClemente, Salazar, Nash & Younge, 2011; Gerend & Barley, 2009; Jones & Cook, 2008; Reiter et al., 2010).

Researchers have also assessed male perceptions regarding HPV-related risks for females. McPartland and colleagues (2005) asked male college students to indicate how severe they thought genital HPV infection was for themselves and for their female partners. On a five point scale, males endorsed an average score of 2.4 for personal severity of the STI, while they assigned their female partners a score of 3.4. They were also asked how likely infection was for themselves and their female partners. Males did not perceive women to be any more susceptible to contracting HPV relative to their own risk for infection. These findings lend insight into male

perceptions of female sexual health. Although college age males did not believe their female partners to be more susceptible to HPV, they correctly perceived that HPV-related health concerns are more severe for females, relative to males.

***Sexual behaviors and demographic data*.** Emerging research on HPV vaccine acceptance among men has focused on sexual risk behaviors as potential predictors of acceptance, though findings have been mixed. In a sample of college age men, significantly greater HPV vaccine acceptance was found among those who reported recent sexual activity as well as those who reported multiple sex partners over the past three months (Crosby, DiClemente, Salazar, Nash & Younge, 2011). Several studies have yielded similar findings, indicating higher levels of vaccine acceptance are associated with sexual activity and multiple partners (Crosby et al., 2012; Ferris et al., 2009; Gerend & Barley, 2009; Katz, Krieger & Roberto, 2011).

Research on male vaccine acceptance has been conducted outside of the scope of college students as well. A variety of potential correlates of vaccine acceptability were investigated in a study of 571 men ages 18 to 45. Participants completed a survey that included an assessment of men's reasons for wanting or not wanting to receive the HPV vaccine. Results showed that, compared to white men, African American men were more likely to oppose vaccination. In addition, men who were not currently sexually active were more likely to want the vaccine relative to those who were sexually active. Factors that were found to be most strongly associated with male intentions to receive the vaccine included physician recommendation, insurance coverage for the vaccine, and research-based evidence of vaccine safety and efficacy in (Ferris et al., 2009).

Male and female health benefits of male HPV vaccination. With men serving as the primary transmission vector of HPV to women, the potential female advantages of vaccinating men against the STI have been cited throughout the literature (Friedman et al., 2011). While vaccinating women in an effort to decrease the prevalence of cervical cancer is worthwhile, concurrent efforts to vaccinate men to decrease the transmission and incidence of the virus would provide a more rapid means of reducing the prevalence of cervical cancer (Elbasha, Dasbach & Insinga, 2007; Hughes, Garnett & Koutsky, 2002; Riedesel et al., 2005). Therefore, an important question concerns whether providing information about self-protection and female partner protection can enhance vaccine acceptability among males.

Previous research provides limited evidence to indicate that male concern for female sexual health may influence men's health behaviors. Studies demonstrate that males perceive the consequences of HPV to be significant for their female partners and have subsequently shown male concern for female sexual partners to affect their personal health behavior intentions (Boehner et al.; Jones & Cook, 2008; McPartland et al., 2005). A previously cited study conducted by McPartland and colleagues (2005) found that a majority (95%) of male college student participants reported that if they were diagnosed with HPV, they would increase their condom use. More than half also reported that they would reduce their number of sexual partners (54%) and encourage female partners to obtain routine pap tests (59%) following notice of an HPV diagnosis. Although the study did not assess men's interest in the HPV vaccine, male's willingness to endorse other protective sexual health behaviors suggests that protecting sexual partners may serve as a motivator in health behavior decision making.

A study conducted by Jones & Cook (2008) sought to investigate how emphasizing different protective health benefits of a hypothetical HPV vaccine would affect college student

ratings of vaccine acceptance. Findings revealed that vaccination intentions were higher among men when considering a fictional vaccine described as providing protection against both genital warts and cervical cancer compared to a vaccine described as preventing cervical cancer alone (78% vs. 34%). The findings suggest that college age men may be most motivated by the prospect that their immunization will result in self-protection (against genital warts) and female partner protection. However, the study did not include a scenario offering only male benefits of vaccination, leaving unanswered the question of whether stressing female health benefits provides additive value relative to simply stressing male health benefits.

Summary. Research on male vaccine acceptability confirms that many men are willing to consider vaccination and that factors such as HPV knowledge, perceived susceptibility to infection, and belief in personal health benefits of vaccination are influential in vaccine acceptance among men (Baer et al., 2002; Ferris et al., 2009; Gerend & Magloire, 2008; McPartland et al., 2005). Furthermore, one study provides indirect evidence to suggest that messages regarding female protection from HPV-related illnesses could serve as a motivator for male vaccination.

Emerging Research Priority: Altruism as a Potential Motive for Male HPV Vaccine Acceptance

As noted, concurrent vaccination of both males and females offers more rapid means of reducing the prevalence of cervical cancer in women, along with other potential health benefits for both men and women. An important and as of yet understudied question concerns the degree to which men's willingness to consider the HPV vaccine can be enhanced by emphasizing the benefits of male vaccination for women's health. Informational messages that promote altruism may bolster male interest in HPV vaccination. Although most health behaviors are adopted for

the purpose of self-protection, there are important exceptions. For example, smoking cessation programs emphasize reduced personal health risks, as well the benefits of reducing health risks to others through exposure to second hand smoke. In the context of STI prevention, condom use figures prominently as a means of both self-protection and partner protection. Although the potential health benefits to women of male HPV vaccination are more remote relative to condom use, men's decision to vaccinate against an STI might well be influenced by awareness that vaccination provides an opportunity for both self-protection and partner protection. The following reviews a limited literature regarding the potential role of altruism as a motive for vaccination.

Altruism can be considered a state of personal agency in which regard for another is the primary motivation, despite relatively little expectation of reciprocity or personal gain foreseen (Post, 2007). Though not widely studied, it is a concept that is implicitly invoked by many immunization programs worldwide (e.g., mumps, measles & rubella (MMR), purtussis, influenza). Applying ideals of altruism for some vaccines, such as tetanus, would have little benefit (Vernon, 2003). However, altruistic motives may be quite relevant in the context of vaccination decisions for prevention of STIs. By vaccinating against any disease that is spread by human contact, an individual decreases the chances that those around him will contract the disease, thereby providing both self-protection, partner protection, and, potentially, community-wide benefit.

The concept of altruism. Altruism has proven a challenging construct for researchers to understand since such behaviors defy the long held understanding of evolution and egoism which indicates that individuals will only act in ways that benefit the common good when the action or outcome is in their best interest. However, researchers confirm that individuals act in purely

altruistic ways in both controlled research scenarios and in everyday life (Batson, 2011; Hoffman, 1981; Krebs, 1970). The empathy-altruism hypothesis has emerged out of social dilemma and game theories to provide a model of why and when individuals act in a way that serves the greater good in the absence of self-reward.

The empathy-altruism hypothesis poses that altruistic motivation occurs in situations that engender empathic reactions to another persons' or groups' circumstance. Empathy, from this perspective, is viewed as the emotional response to the perceived welfare of another. Studies have found support for this theory by manipulating empathic concern in participants and placing them in social dilemmas. Findings have consistently shown individuals to be altruistically motivated in their actions when they experience empathy for another (Batson, 2011). An important distinction in this conceptualization of altruistic motivation is the focus on another person or group's welfare. Consideration of individual and group welfare is especially evoked in the realm of health. Therefore, it is likely that altruistic motivation may occur particularly in consideration of individual and group health.

Altruism as a motive for vaccination. The role of altruism has not been widely applied to health fields through research but particular areas call for such study. Vaccination is a topic that is highly relevant to the concept of altruistic motivation. Immunization programs serve to promote health at not only an individual level, but a population level. Herd immunity is the concept in which unimmunized members of a population acquire greater immunity to infection based on the immunization of other members of the population (Hershey et al., 1994). Essentially, the more members immunized, the less the infection is able to transmit through the population. The concept of herd immunity evokes the question of altruistic motivation serving to

encourage individual receipt of vaccination. However, as highlighted in what follows, there is very limited research investigating the role of altruism in vaccination.

Prior research regarding altruism and vaccination has revolved around the altruistic nature of participating in vaccine trials and health promotion research (Colfax et al., 2005; Nyamathi, Suhadev, Swaminathan & Fahey, 2007; Strauss et al., 2001; Suhadev et al., 2006; Williams, Entwistle, Haddow & Wells, 2008). This line of research has confirmed that altruism can serve as a motivating factor for individuals when deciding to participate in human immunodeficiency virus (HIV) vaccine trials. For example, Colfax et al. (2005) assessed motives for participation in a vaccine trial in a sample of men who have sex with men (MSM) and heterosexual women reporting high risk sexual and drug use behaviors. A large majority of participants cited altruistic reasons for trial participation. Ninety eight percent agreed that they enrolled "to help their community" (Colfax et al., 2005). Other cohort studies confirm the importance of altruism as a motive for participating in HIV vaccine trials (Bartholow et al., 1997; Hays & Kegeles, 1999; Jenkinset al., 1998; Nyamanthi, Suhadev, Swaminathan & Fahey, 2007).

While HIV vaccine research suggests that altruistic motives may enhance people's willingness to participate in vaccine research, these studies involve assessment of hypothetical willingness to vaccinate (since there is no HIV vaccine). Moreover, these studies have been descriptive in nature, only providing data on the percentage of individuals who endorse altruism as a motive for participation. Nonetheless, such research points to the potential relevance of altruism in the context of HPV vaccination choices.

Altruism and HPV vaccination. To date, only two studies have applied principles of altruism to the question of male acceptance of the HPV vaccine. In Gerend and Barley's (2009)

experiment, the authors sought to clarify differences in vaccine acceptability by comparing responses among participants who reviewed information that emphasized the self-protective benefits of the HPV vaccine versus participants who reviewed information that emphasized both self-protection and partner protection as benefits of vaccination. While not explicitly addressed as altruism, in the context of HPV and STIs in general, the concept of partner protection is related to that of altruism. Male college students were presented with one of two informational messages. The self protection message described HPV symptoms and consequences specific to men's health, including: genital warts, penile and anal cancer. The self- protection and partner protection message included the consequences of HPV for men's health, in addition to the potential consequences of HPV for their female partner's health, including cervical cancer and genital warts. All participants, regardless of condition, received other basic information about HPV, including HPV prevalence, risk factors, symptoms and diagnosis, treatment and risk reduction methods. The self-protective message included the fact that receipt of the vaccine would protect men against genital warts and anogenital cancers. The self and partner protective message included the same information plus a description of how male receipt of the vaccine could indirectly affect their female partner's health by reducing her risk of genital warts, abnormal Pap tests, and cervical cancer (Gerend & Barley, 2009).

After viewing the informational passage, participants completed a post test survey that assessed HPV awareness and knowledge, HPV vaccine acceptability and predictors of HPV vaccine acceptability. Findings showed that vaccine acceptability was generally high. Correlates of vaccine acceptance included higher rates of sexual activity, greater perceived susceptibility to HPV, greater perceived benefits of the vaccine, higher self-efficacy for vaccination, and greater perceived norms for vaccination. However, vaccine acceptability did not differ as a function of

whether the message condition included benefits of vaccination for females. Further, no differences emerged by condition when the analysis focused exclusively on men who were in a committed relationship at the time (Gerend & Barley, 2009).

Following FDA approval of the vaccine for boys and men, DiClemente and colleagues (2011) conducted a similar study, presenting college age men with one of three intervention messages regarding HPV and the vaccine. The three intervention conditions were classified as: altruism, personal sexual protection, and personal cancer protection. In the altruism condition, participants were presented with basic information about the cause, prevalence and prevention of cervical cancer. The personal sexual protection condition focused on preventing genital warts in men and informed participants of their high prevalence and low treatment success rates. Lastly, in the personal cancer protection condition, the causal link between HPV and head and neck cancers was highlighted. A pre-test, post-test design was implemented and results showed that male HPV vaccine acceptance increased significantly following receipt of the intervention. However, acceptance did not significantly vary by intervention condition received.

Several limitations can be identified in both studies. First, while Gerend and Barley (2009) conducted their study with reference to hypothetical interest in vaccination, DiClemente and colleagues were able to present an FDA approved vaccine to male college students in assessing their interest in receiving it. Given the currently low male uptake rates in the U.S. and recent ACIP recommendation for boys, further research is needed to provide information regarding male acceptance of the now available vaccine. Second, in the Gerend and Barley (2009) study, information that male participants received concerning self and partner protection was likely insufficient to activate altruistic motives. By only presenting males with a description of female consequences of HPV infection, altruistic motives for vaccination may not have been

adequately emphasized. Also, by referring only to partner protection, the information likely appeared to participants as only relevant to protecting their own sexual partners, rather than additionally appealing to broader health benefits such as decreasing the prevalence of cervical cancer worldwide. DiClemente and colleagues overcame this limitation by placing greater emphasis on the broader health concern of cervical cancer in women. However, a notable limitation of the intervention conditions assigned in their study was that the combined effects of both broader female health benefits and personal sexual health and cancer protection were not tested. While their findings indicated that providing any aspect of information may likely increase male motivation to receive the vaccine, there is potential that providing males with all aspects of information may enhance acceptance even more.

The current investigation sought to overcome these limitations and isolate the effect of altruism in male HPV vaccination by testing the effects of a brief intervention to promote altruistic motives as well as male specific health benefits for vaccination among men. Similar to DiClemente and colleagues (2011), the intervention stressed the fact that male HPV vaccination confers potential protection to the recipient's sexual partners, as well as broader (population level) benefits to women's health. In particular, males were presented with the concept of herd immunity and with an explanation of how individual vaccination can promote community wide health benefits by reducing the spread of the disease to others. The intervention also included information on the severity and prevalence of female health consequences of HPV and the role of men as transmission vectors to females. The connection between male HPV vaccination and the elimination of cervical cancer globally was also highlighted.

Overview of the Present Study

Past research on HIV vaccine trial participation (Colfax et al., 2005; Hays & Kegeles, 1999; Nyamanthi et al., 2007), as well as studies of hypothetical and actual vaccination decisions (DiClemente, Crosby, Salazar, Nash & Younge, 2011; Gerend & Barley, 2009; Hershey et al., 1994), suggest that altruism may help to motivate willingness to vaccinate, particularly in the context of a vaccine to prevent an STI. As a sexually transmitted virus, HPV carries health risks for both men and women, although female risks are more prevalent and potentially severe. Therefore, providing motivational information about both the personal health benefits of vaccination, along with information about partner and societal benefits (stressing altruistic motives) may enhance male willingness to pursue vaccination.

Therefore, the current study addressed this gap in the literature by examining whether a brief intervention designed to increase altruistic motivation for vaccination can enhance men's intentions to receive the HPV vaccine. In the previously described studies (DiClemente et al., 2011; Gerend & Barley, 2009), the message manipulations were very brief and in one, did not emphasize the wide-spread health benefits to women and in the other, did not include a combination message with both male specific and global female health benefits of vaccination. Encouraging altruistic motives in male HPV vaccination may require a more extensive and persuasive message that emphasizes the male role in the spread of the disease and consequently, the effect that male vaccination can have on widespread reduction of the infection and associated health burdens.

Additionally, informational messaging about HPV related health consequences has typically emphasized female health risks (e.g. cervical cancer). In the few studies including males, genital warts has been the primary consequence of HPV presented when citing male

health risks (Ferris et al., 2009; Jones & Cook, 2008). Given newly emerging evidence for a wide variety of male-specific HPV health risks, research is needed to clarify the extent to which messages stressing male specific health protection motivates male vaccine acceptance, as indicated by the work of DiClemente and colleagues (2011). With the even more recent ACIP recommendation of the vaccine for boys and continually advancing findings on the health consequences of HPV infection, further investigation on the role of disseminating this information to boys and men is critical.

To address the goal of further informing male HPV vaccine interest and uptake, participants in the current study were randomized to receive one of four informational interventions that varied in the inclusion or exclusion of altruistic motives and in terms of the extent to which male specific HPV-related illnesses and vaccine benefits were stressed. This between subjects design utilized computer administered interventions, in which information was presented both visually and with audio voiceover. The informational interventions were presented to a college age sample of unvaccinated men. Male college students fall within the recommended vaccination age range. Also, increased rates of sexual activity within this age group, compared to younger cohorts, make the intervention particularly relevant to this sample, given that HPV is a sexually transmitted infection.

Intervention content for all participants included basic information about HPV and the HPV vaccine, including HPV prevalence, modes of transmission and common consequences for men and women (genital warts and cervical cancer), as well as facts about the availability and efficacy of the vaccine. Participants were randomized to one of four conditions including a basic condition, an altruism only condition, a male specific HPV-related health consequences only condition and an altruism plus male specific HPV-related health consequences condition. It was

predicted that participants who received interventions including only altruistic motives or only male-specific information would endorse greater vaccine acceptance than those who received only basic HPV and HPV vaccine information. Additionally, it was predicted that participants who received an intervention message that stressed altruistic motives as well as enhanced male-specific health consequences of HPV and benefits of vaccination would endorse the greatest acceptance of the vaccine among all intervention groups.

Although not central to the primary hypotheses of the study, participants were also randomly assigned to either a male or female interventionist voiceover. Prior research indicates that group members respond more positively to information communicated by in-group members than to the same information provided by out-group members (MacKie, Gastardo-Conaco & Skelly, 1992). Therefore, it was predicted that males might be more influenced to consider the vaccine after listening to a male interventionist as compared to a female interventionist. Given the overarching goal of understanding factors that encourage male acceptance of the vaccine, elucidating any gender effects of message delivery is valuable.

A secondary aim of the present study was to explore correlates of male willingness to receive the HPV vaccine. The current study extends the literature on male HPV vaccine acceptance by seeking to replicate the findings of past research indicating that HPV knowledge, perceived HPV susceptibility and severity, and past risky sexual behavior are associated with increased vaccine acceptance (e.g., Baer et al., 2002; Crosby et al., 2012; Ferris et al., 2009; Gerend & Magloire, 2008; Katz et al., 2011). Guided by recent findings from a study of African American teens (Vanable et al., 2011), exploratory analyses also tested the hypotheses that concerns about vaccine safety and stigmatization would be associated with decreased vaccine acceptance, and that past exposure to information about Gardasil would be associated with

increased vaccine acceptance. Finally, the present study included a measure of dispositional altruism to test the hypothesis that greater dispositional altruism would be associated with increased vaccine acceptance, particularly among those who received the intervention designed to activate altruistic motives. Analyses also sought to clarify whether the influence of hypothesized correlates of vaccine acceptance varied as a function of intervention condition.

Methods

Participants

Male undergraduate participants (N = 200), all over the age of 18, were recruited from the introductory psychology course (PSY 205) at Syracuse University. Adequate sample size was determined through a power calculation performed using G*Power 3, a statistical analysis software program that is available in the public domain (Faul, Erdfelder, Lang, & Buchner, 2007). The sample size, using a medium approximate effect size (e.g., f = .25), with an alpha of .05 and four experimental conditions, was sufficient to obtain a power level of .90 for the primary analysis of variance (ANOVA) analyses.

Male undergraduate students enrolled in an introductory psychology course at Syracuse University were recruited through Sona-systems, an online human subject pool management system. Students first answered a single screener item asking whether they had ever received the HPV vaccine, Gardasil. Participants who answered “no” were deemed eligible for study participation. Potential participants viewed a brief description of the study, which described participation as involving completion of a series of questionnaires concerning attitudes, knowledge, and behaviors related to personal health. Upon completion of the study, participants were granted one research credit as part of a class requirement.

The demographic characteristics of the sample are summarized in Table 1. Two hundred male undergraduates participated in the study (*M* age = 19.3, *SD* = 2.2). Among whom, 69% were Caucasian, 17% were Asian or Pacific Islanders, 11% were African Americans, 4% were Latino, and 1% self-identified their ethnicity as "other." The majority of participants were underclassmen, with the sample consisting of 49% freshmen, 35% sophomores, 9% juniors, and 8% seniors. Overall, participants reported a B average (M_{GPA} = 3.1, *SD* =.64). Eighty-one percent reported that they live on campus and 12% play a varsity sport. Fifteen percent of participants reported membership in a social fraternity. When asked to best describe sexual orientation, 97% reported being heterosexual, 3% homosexual, and 1% reported being bisexual or uncertain of sexual orientation.

Procedure

Randomization. Prior to arrival, participants were randomly assigned to one of eight study conditions that varied in terms of intervention message content and gender of audio delivery. Randomization was done using a table of random numbers (1-8) generated by GraphPad QuickCalcs, a random number generator available in the public domain (GraphPad Software Inc., San Diego, CA).

Data collection. Data collection occurred during the Fall of 2011. Participants signed up for hour-long time slots through SONA. Each study slot allowed for up to 5 participants. Throughout the course of data collection, survey administration typically included three or fewer participants per session. Participants were provided privacy by completing surveys in different rooms or at separate ends of a conference table if in the same room. Noise canceling headphones were used to ensure that the audio component of the survey could not be heard by other participants. Upon arrival, the principal investigator or trained research assistant distributed

consent forms and provided a brief overview of study requirements. Individuals who consented were then oriented to the computerized survey instructions. Participants were situated at an individual laptop through which they were administered the audio computer assisted survey interview (ACASI). They were directed to follow the instructions provided for them on the computer and to ask the researcher any questions.

A series of questionnaires was administered through audio computer- assisted self interviewing (ACASI) which was designed and programmed using MediaLab software (Jarvis, 2005). Research findings suggest that ACASI methods are equal to or better at eliciting participant openness in reporting health behaviors than other self-report measures (e.g., Robinson & West, 1992; Schroder, Carey, & Vanable, 2003; Turner et al., 1998). Therefore, ACASI was chosen for the present study due to its usefulness in encouraging honest disclosure pertaining to sexual beliefs and behaviors as well as its utility in maintaining controlled experimental conditions among participants.

Participants completed the demographics, sexual history and risk behaviors, HPV knowledge, the Self Report Altruism Scale, and exposure to Gardasil questionnaires. Following these, participants were presented with an audio accompanied PowerPoint presentation highlighting the information relevant to their assigned condition. The informational intervention messages were balanced for equal length of content and presentation time (see Appendix J). Following the informational intervention, participants completed the HPV Vaccination Acceptance questionnaire assessing their likelihood of receiving the HPV vaccine (Appendix E). They also completed the motives for vaccination, perceived HPV susceptibility and severity and HPV vaccine attitudes questionnaires. These post-test only measures were chosen to eliminate any priming effects that could occur if participants viewed the items prior to intervention.

Following completion of the survey, participants were debriefed and thanked for their time. They were also provided with a list of resources regarding additional information on HPV and the HPV vaccine, including where they can obtain the vaccine, and resources for other questions or concerns related to sexual health.

Measures

Demographics and background characteristics. Participants completed a demographics questionnaire inquiring about age, race/ethnicity, class standing, major, GPA, fraternity membership, sexual orientation and relationship status (see Appendix A).

Sexual history and risk behaviors. Lifetime sexual and risk behaviors were assessed using items adapted from a previously developed measure (Vanable et al., 2009). Sexual activity status was dichotomized to indicate whether the participant had ever engaged in sexual intercourse across their lifetime. For the current study, risky sexual behavior was assessed using summary variables of lifetime and recent (past 3 months) instances of unprotected vaginal or anal sex, and lifetime number of sexual partners. The lifetime unprotected sex variable was created based on participants' response to items asking if they had ever engaged in anal or vaginal sex without a condom. The recent unprotected sex variable was created based on participants' report of the number of times they had engaged in vaginal or anal sex without a condom over the past three months (see Appendix B).

HPV knowledge. HPV knowledge was assessed using items adapted from previous research conducted by Gerend and Barley (2009) and Reiter, Brewer, McRee, Gilbert and Smith (2010). Participants were asked true or false questions that were coded 0 or 1 for correctness (e.g. "HPV can cause cancer of the penis or anus in men."). A composite score was calculated by summing the correct number of responses to the ten item questionnaire (see Appendix C).

Self-Report Altruism Scale. The Self Report Altruism Scale (Rushton, Chrisjohn, & Fekken, 1981) has been frequently used in research to measure the "altruistic personality" in individuals (e.g. Johnson et al., 1989, Phillips, 2008, Takashi, 2012). The scale, which prompts participants to rate the frequency with which they have performed 20 altruistic acts (i.e. never, once, more than once, often, very often) had high reliability in the present study (α= .85).A composite variable was calculated to provide an average score for each participant (See Appendix D).

Gardasil exposure. Gardasil exposure was measured using 6 dichotomous items regarding whether or not one had heard about the HPV vaccine prior to participating in the study (e.g., "I have heard about the HPV vaccine from my primary care provider.") (See Appendix E). Composite variables were created by summing the dichotomized responses for three different types of exposure: in person (e.g. from a health care provider), in print (e.g. from a news article in a magazine), or in media (e.g. from an ad on TV or radio).

Perceived HPV susceptibility and severity. Perceived susceptibility to contracting HPV was assessed with an eight item measure adapted from previous research (Reiter, Brewer & Smith, 2010; Zimet et al., 2005). Items developed by Reiter and colleagues (2010) assessed participants' perceived vulnerability to contracting the following HPV related diseases: genital warts, anal, oral and penile cancer. Responses were on a 5-point Likert scale. Reliability of these four items has been found to be .91 (Reiter et al., 2010). In the present sample, the coefficient alpha for the full scale was .84. A composite score was calculated by averaging the scores of the eight perceived HPV susceptibility items.

Perceptions of HPV infection severity were assessed with six items that focused on the perceived severity of specific HPV-related illnesses. The measure included three items used in

previous research to assess the perceived severity of contracting specific HPV-related health conditions (i.e., genital warts, oral cancer and anal cancer; Reiter et al., 2010), as well as three new items that assessed the perceived severity of contracting HPV in general (e.g., "How serious would it be if you got HPV?") and the extent to which cervical cancer is perceived as severely affecting the lives of women (e.g., " How serious would it be if a female got cervical cancer caused by HPV?"). Severity items were rated using a four point Likert scale, with response options ranging from "not at all" to "extremely" (see Appendix F). A perceived severity composite score was calculated by averaging the six item responses. The reliability of the scale in the present sample was similar to previous research (Reiter et al., 2010), $\alpha = .72$.

HPV vaccine attitudes. An HPV vaccine attitudes scale consisted of 15 items adapted from previous research (Vanable et al., 2011). Items assessed concerns about the safety of the HPV vaccine (e.g. "I am confident that the HPV vaccine is safe."), trust in HPV vaccine efficacy (e.g. "I trust what is being reported about the HPV vaccine as a way to prevent cervical cancer."), concerns about stigmatization associated with taking the vaccine (e.g., "I would be embarrassed if my parents urged me to get the HPV vaccine."), and general access to vaccination concerns (e.g. "I am concerned about the cost of the HPV vaccine."). The items were measured on a 6-point Likert scale ranging from strongly disagree to strongly agree (See Appendix G).

Principal components analysis with promax rotation was conducted on the scale to determine if the described a priori factors emerged. Analyses yielded three factors that accounted for 54% of the variance. Factor 1, which accounted for 30% of the variance, consisted of seven items that endorsed HPV confidence in vaccine safety and efficacy. The second factor, which accounted for 15% of the variance, was made up of four items assessing concerns regarding

stigmatization associated with taking the vaccine. Only one item loaded onto the third factor and it was subsequently dropped.

Composite scores were calculated for the two factors by averaging scores of the associated items. Scales assessing vaccine safety and efficacy (α = .84) and concerns regarding vaccine stigmatization (α = .74) had good reliability.

Motives for vaccination. To ensure that the two distinct intervention messages were successful in enhancing (a) male-specific information about the health consequences of HPV and benefits of vaccination and (b) altruistic motives for vaccination, eight items were developed to serve as manipulation checks. Face valid items were constructed asking participants to rate on a 5-point Likert scale the degree to which they agreed with a series of reasons for seeking vaccination (See Appendix H). These questions were administered following participant receipt of the informational intervention. Five items specifically sought to assess whether altruistic motives for vaccination were activated as a result of viewing the intervention (e.g., "For men, getting the HPV vaccine is important because it helps reduce the threat of cervical cancer in women."). A composite score (α = .81) was computed using the average of the responses to the five items. Two other items sought to examine the effect of male-specific information (e.g., "It is important for men to get the HPV vaccine because it reduces their chance of developing certain kinds of oral cancers). The composite for male-specific motives also had strong reliability (*r* = .79).

HPV vaccination acceptance. The HPV vaccine acceptance served as the primary dependent variable in the present study. Following receipt of the informational intervention messages, four items developed and used in previous research inquired about participant's interest in receiving the HPV vaccine (Gerend, Lee & Shepherd, 2007). Items asked participants

to rate the likelihood that they would seek out more information about the HPV vaccine, that they would consider receiving the HPV vaccine, and that they would actually get the vaccine. A fourth item asked participants how likely it is that they will get the vaccine if it is offered to them by a healthcare provider within the next year. Three additional items were developed for the present study to assess the likelihood that participants would tell male and female friends about the HPV vaccine as well as the likelihood that they would ask their doctor about the vaccine at their next visit. For each item, participants provided a likelihood rating on a five point Likert scale, with response options ranging from ”very unlikely” to “very likely”. A composite score for vaccine acceptance was calculated by averaging participants’ responses across the seven items. The scale items yielded a high degree of reliability ($\alpha = .91$) in the current sample. Scale items are shown in Appendix I.

Principal components analysis with promax rotation was conducted to determine if separate constructs emerged within the HPV vaccination acceptance scale. The analysis yielded a single factor model that accounted for 64% of the variance.

Intervention Messages

All four intervention conditions included essential information about HPV and the HPV vaccine based on information provided through the CDC (CDC, 2010). This basic level of information (BASIC) included the fact that HPV is the most highly prevalent STI in the U.S. and that infections often pass without any symptoms. Participants were told that genital warts in both men and women are the most common consequence of HPV and that the most serious threat posed by HPV is cervical cancer in women. Participants were then informed about the HPV vaccine, known as Gardasil, and told that it is FDA approved for both men and women in the

U.S. Participants were told that the vaccine prevents against the four highest risk strains of HPV that cause most cases of cervical cancer and genital warts.

Intervention message content across the four conditions varied in terms of whether the intervention included or excluded information designed to activate altruistic motives for vaccination, and in terms of the extent to which male specific HPV-related illnesses and vaccination benefits were stressed. In order to achieve this, participants were randomized to one of four informational interventions.

The conditions emphasizing male-specific health conditions related to HPV and benefits of vaccination (MALE-INFO) informed participants of medical advancements in the study of head and neck cancers associated with HPV in males. A reminder that males are disproportionately affected by these types of cancers as compared to females was included in addition to prevalence rates. Additionally, the debilitating effects of laryngeal papillomatosis were described and its causal link to HPV was noted. Finally, the established association between HPV and penile and anal cancers was highlighted. Specification of the strains most prevalent in these cancers was provided, especially given that they are those prevented by the HPV vaccine. The MALE-INFO intervention included an explanation that the HPV vaccine offers protection against the prevalent STI associated with all of the described illnesses, offering much promise for improved health prospect.

The conditions activating altruistic motives in vaccination (ALTRUISM) included female specific health risks associated with HPV (primarily cervical cancer), the fact that HPV is easily transmitted through sexual activity, and the idea that male vaccination can provide significant health benefits for women. The ALTRUISM condition specifically emphasized the tragic health burden caused by cervical cancer worldwide. Participants were informed of the prevalence and

high morbidity of cervical cancer. The direct causal link between HPV infection and cervical cancer was highlighted in order to underscore the effect the virus has on the global prevalence cancer. ALTRUISM participants were reminded that HPV is easily transmitted through genital contact even when symptoms are undetectable and infection is unknown. The condition stressed the potential health benefits of male vaccination for women and emphasized two related points. First, partner specific benefits were noted in that male vaccination can provide direct protection for sexual partners. Second, ALTRUISM participants were educated on the concept of herd immunity and instructed that, ultimately, their vaccination could lead to lower rates of HPV within an entire community. On a global level, lower rates of HPV could lead to decreased worldwide cervical cancer. ALTRUISM participants were motivated through the message that their decision to take the vaccine can save female lives in the long run.

Initial intervention message content across the four conditions varied in length due to the varying inclusion of either MALE INFO, ALTRUISM, both (MALE-INFO + ALTURISM) or neither (BASIC). Therefore, filler information on the history of vaccination was added to appropriate interventions to achieve comparable delivery time across conditions. Full intervention scripts can be found in Appendix J.

Results

Descriptive Findings

In the complete sample, 81% of participants reported having had vaginal sex in their lifetime. On average, participants reported having 4 lifetime sexual partners and 2 sexual partners in the past 3 months. Also, 54% of participants had engaged in unprotected vaginal sex in their lifetime. Participants reported an average of five occasions of unprotected sex in the past three months. Participants were only moderately knowledgeable about the causes and

consequences of HPV (*M* HPV knowledge score = 6.7 out of a possible 10, *SD*= 1.5). Two-thirds of the sample (67%) reported that they had ever heard of the HPV vaccine prior to study participation, with 52% reporting exposure to TV or radio ads, 42% through print ads such as magazine or newspaper articles, and only 22% reported having heard about the vaccine from a medical provider.

Post intervention, participants across intervention conditions reported moderate interest in vaccination (*M*= 3.2 on a 5 point scale, *SD*= 1.0), with 43% endorsing that they were very likely to seek vaccination, 36% indicating that they were uncertain about whether they would seek vaccination, and only 21% reporting that they were unlikely to seek vaccination.

Primary Data Analyses

Equivalency across conditions. Prior to testing primary study hypotheses, a series of analyses was conducted to confirm the group equivalency among participants randomized to the four primary study conditions. No significant differences emerged between groups on categorical variables of: year in college, $\chi^2(9, N = 200) = 0.36$, *ns*, ethnicity, $\chi^2(3, N = 200) = 0.94$, *ns*, religious affiliation, $\chi^2(3, N = 200) = 0.35$, Greek membership, $\chi^2(3, N = 200) = 1.7$, *ns*, sexual orientation, $\chi^2(9, N = 200) = 8.4$, *ns*, having ever been in a committed relationship, $\chi^2(3, N = 200) = 4.3$, *ns*, and current relationship status, $\chi^2(3, N = 200) = 4.9$, *ns*. No significant differences emerged among continuous variables across groups: age, $F(3, 195)= 1.53$, *ns*, GPA, $F(3, 171)= .59$, *ns*, number of committed relationships, $F(3, 146)= 1.11$, *ns*, and lifetime number of sexual partners, $F(3,196) = .88$, *ns*.

Effect of intervention condition on altruistic and male specific vaccination motives. The first set of analyses were conducted to test the hypothesis that the experimental interventions, created to either provide male-specific HPV information or activate altruistic

motives in vaccination, would activate the intended vaccination motives. Results from independent samples t tests revealed significant effects for both altruism, $t(198) = -3.5$, p = .001,on the altruistic motives for vaccination measure and for male-specific information, $t(198) = -5.7$, $p < .001$, on the male-specific motives for vaccination measure. Consistent with the hypothesis, those who received the intervention that included information designed to activate altruistic motives scored higher on the altruistic vaccination motives scale ($M = 4.4$, $SD = .67$) than did those who did not, ($M = 4.1$, $SD = .74$). Likewise, those who received the male-specific information messages endorsed male-specific vaccination motives significantly more than those who did not receive such intervention content, $M = 4.4$, $SD = .76$ vs. $M = 3.5$, $SD = 1.3$. Tables 2 and 3 display mean differences for the motives for vaccination scales as a function of intervention condition received.

Intervention impact on vaccine acceptance. To address the primary aim of the study, a one-way ANOVA was conducted to identify group differences on HPV vaccine acceptance among participants in the four experimental conditions. It was hypothesized that participants who received interventions that included both male specific information and altruistic motives would endorse the highest level of vaccine acceptance.

The dependent variable, vaccine acceptance, was normally distributed as assessed by a one sample Kolmogorov-Smirnov test (Z= 1.24, $p = .09$) and visual inspection of histogram and p-p plots. There was homogeneity of variance between groups as assessed by Levene's test for equality ($p > .05$), as well as independence of observations as indicated by Durbin Watson statistic (d= 2.21).

The analysis yielded a significant overall effect, $F(3, 196) = 3.54$, $p = .02$ indicating significant differences in vaccine acceptance based on type of intervention received. Scheffe's

test elucidated the pattern of group differences. Indeed, among the four groups, the only significant difference emerged between the BASIC intervention condition and the MALE-INFO + ALTRUISM intervention condition (p = .02). Those who received the BASIC intervention endorsed the lowest interest in the HPV vaccine (M = 3.0, SD = .94). Those who received MALE-INFO (M = 3.1, SD = 1.0) and ALTRUISM (M = 3.1, SD = 1.0) endorsed equal interest in the vaccine. While participants who received MALE-INFO+ALTRUISM reported the greatest HPV vaccine interest (M = 3.6, SD = 1.0). Means and standard deviations for participants in each of the four study cells, along with marginal means are shown in Table 4. In addition, mean differences in vaccine acceptance across the four conditions are depicted in Figure 1. The results supported the initial prediction that participants receiving both aspects of information would be the most accepting and interested in the vaccine.

Effects of interventionist gender. Although not central to the primary hypotheses, gender of interventionist voice over was examined to determine if vaccine acceptance among males differed by gender of intervention delivery and as a function of intervention condition. An independent samples t-test was conducted to examine overall effect of interventionist gender on HPV vaccine acceptance among the sample. No significant difference emerged on vaccine acceptance among those who received their intervention from a male versus female voiceover, $t(198)= .03$, *ns*. To determine if interventionist gender had an effect on vaccine acceptance as a function of intervention condition, a 4 (intervention condition) x 2 (interventionist gender) ANOVA was conducted. Results indicated a marginally significant effect of intervention condition, $F(3, 192)= 2.57$, p = .06, and a non-significant effect of interventionist gender, $F(1, 192)= .03$, p = .87. The interaction of condition by gender was also non-significant.

Psychosocial Correlates of Vaccine Acceptance

To clarify the influence of other psychosocial factors on HPV vaccine acceptance among study participants, analyses proceeded in two stages. First, a series of partial correlations between each predictor variable and the dependent variable (HPV vaccination acceptance) was conducted, controlling for experimental condition. Second, significant correlates were entered into a hierarchical linear regression controlling for intervention condition.

The proposed predictor variables of HPV knowledge, sexual activity and risk behaviors, perceived HPV susceptibility and severity, dispositional altruism, HPV vaccine attitudes, and exposure to Gardasil were inspected for assumptions of linearity, independence, homoscedasicity, and normality and characterized overall and by intervention group. A summary of these variables for each intervention group as well as overall sample can be found in Table 5.

Of the predictor variables, only perceived HPV susceptibility (r = .23, p = .002) and stigmatization concerns toward the HPV vaccine (r = -.15, p = .04) were significantly correlated with vaccine acceptance. Partial correlations are found in Table 6.

Hierarchical linear regression was used to examine the predictive effects of perceived HPV susceptibility and stigmatization concerns on vaccine acceptance. Dichotomous indices of intervention condition (altruism and male-specific information) were entered at Step 1, followed by the psychosocial variables in Step 2. As expected, main effects for intervention condition emerged at Step 1, $F(2, 197)= 4.54$, p = .01, with altruism (β = .15, $t(197)$ = 2.15, p = .03) and male-specific information (β = .15, $t(197)$ = 2.11, p = .04) contributing significantly to the model. Perceived HPV susceptibility and stigmatization concerns, entered in Step 2, also added significantly to the overall model, $F(4, 195)= 5.76$, $p < .001$, and accounted for 11% of the variance. Both variables were significant predictors of HPV vaccine acceptance (β =.19, p = .01

for perceived susceptibility; β = -.15, p = .03 for stigmatization concerns). Results indicated that higher perceived vulnerability to contracting HPV was associated with greater vaccine acceptance. Also, lower perceived stigmatization of vaccination was associated with greater vaccine acceptance. Including the two predictors resulted in a significant increase in variance explained, F change (2, 195) = 7.39, p = .001. None of the psychosocial variables interacted with intervention condition to predict vaccine acceptance.

Discussion

Overall, the major study hypotheses were supported. Findings confirmed that participants assigned to the intervention that included both altruistic motives and male-specific information reported the highest level of HPV vaccine acceptance across all four intervention conditions. Thus, while intervention content stressing either altruistic motives or male specific health benefits was observed to enhance interest in vaccination, findings suggest that the additive effects of including content from both informational domains maximizes vaccine acceptance.

This study addresses several limitations of previous research and helps to advance the understanding of how to increase male interest and motivation in HPV vaccination. Previous research consists primarily of cross-sectional studies that examine correlates of male acceptance. The two intervention studies that have been reported (DiClemente et al., 2011; Gerend & Barley, 2009) did not find significant effects of intervention content on male HPV vaccine acceptance. In Gerend and Barley's (2009) study, the condition that included self and partner protection was likely insufficient in activating altruistic motives because it lacked information regarding the widespread effects of male vaccination, such as decreased transmission of the virus and ultimately, decreased global rates of cervical cancer. A similar study conducted by DiClemente and colleagues (2011) compared the impact of an intervention that did frame the benefits of

vaccination in terms of altruistic motives (reducing cervical cancer risks); however, the altruism intervention was limited in that it did not describe the means through which female health protection is spread. Moreover, no participants were exposed to interventions that combined information about personal protection and altruistic motives. While the results indicated that participants were similarly motivated by each of the three intervention messages, vaccine interest did not differ by intervention condition.

The current study built upon Gerend and Barley (2009) and DiClemente and colleagues' (2011) work by implementing an intervention that promoted altruistic motives for vaccination in a concise and comprehensive manner. The current altruistic intervention included global considerations of cervical cancer as well as a brief description of herd immunity, informing participants of the causal mechanism through which women can be protected through male vaccination. The current study also included an intervention condition that incorporated both altruistic motives and male-specific health benefits in order to address an essential question regarding the additive effects of both informational dimensions.

Additionally, although the described studies (DiClemente et al; Gerend & Barley, 2009) presented men with male-specific information about HPV and vaccine benefits, they did not include a complete description of the most up to date scientific research. In the intervention developed for the present study, participants who received information on male-specific health consequences of HPV and benefits of the vaccine were provided with a detailed overview of relevant health information as derived from recent medical research. Interventions that included male-specific information emphasized the discovered causal link between HPV and penile and anal cancers, as well as with head and neck cancers and laryngeal papillomatosis. Further, prevalence rates and the fact that men are disproportionately affected by these types of cancers

were highlighted. Thus, past research may have been less successful in motivating vaccine acceptance through such messages because the interventions only described the more common effects of HPV such as genital warts. Explaining the full spectrum of possible HPV infection consequences may be worthwhile in promoting the vaccine to men.

A secondary goal of the present study was to examine psychosocial correlates of male HPV vaccine acceptance. It was hypothesized that greater HPV knowledge, greater perceived HPV susceptibility and severity, and past sexual activity would be associated with greater vaccine acceptance. Additionally, higher dispositional altruism, previous exposure to Gardasil information, and decreased safety and stigmatization concerns regarding the vaccine were predicted to be associated with greater vaccine acceptance. Of these, only perceived HPV susceptibility and vaccine stigmatization concerns emerged as significant correlates. This is somewhat consistent with the literature, as findings on HPV knowledge and sexual activity have been mixed (Jones & Cook, 2008; McPartland et al., 2005), while perceived susceptibility to HPV infection has reliably been found to be associated with greater vaccine interest (Crosby et al., 2011; Gerend & Barley, 2009; Jones & Cook, 2008; Reiter et al., 2010). In the current study, greater perceived susceptibility to contracting HPV significantly predicted greater HPV vaccine acceptance. Integrating the current findings with previous research, males who perceive themselves as vulnerable to HPV seem to consistently show interest in HPV vaccination. Therefore, interventions that increase male awareness of the consequences of sexual behaviors, namely increased vulnerability to contracting STIs, may serve to increase male uptake of the HPV vaccine while also promoting safer sexual behaviors.

Vaccine attitudes have more recently emerged as an important aspect in HPV vaccine acceptance throughout the literature (Gilbert et al., 2010; Hernandez et al., 2010; Reiter et al.,

2011; Vanable et al., 2011). In the present study, concerns about stigmatization associated with taking the vaccine were associated with decreased vaccine acceptance. Thus, interventions to promote vaccination may be most effective if they include messages minimizing stigmatizing beliefs about vaccination and normalizing the experience of HPV vaccination as a routine measure in personal health. Additional research is also needed to clarify specific features of the vaccine that men may perceive as stigmatizing.

Major study strengths include (a) the use of an experimental design to investigate the dual effects of two intervention domains on male interest in the HPV vaccine; (b) the implementation of concise and comprehensive interventions activating altruistic motives in male HPV vaccination; and (c) the incorporation of a thorough overview of male-specific health consequences of HPV derived from the most recent medical research.

Study findings should also be viewed in light of several study limitations. First, the present study recruited male participants from a university undergraduate participant pool and thus participants were somewhat older than the recommended age range for vaccination. While Gardasil is FDA approved for boys and men ages 9 through 26, the vaccine was recently recommended by the Advisory Committee on Immunization Practices (ACIP) for 11 and 12 year old boys. The recommendation also indicated that boys aged 13 through 21 should be given a "catch-up" dose of the vaccine if never before vaccinated (CDC, 2011). Second, study findings should be replicated with men from underrepresented groups who are at elevated risk for HPV-related health consequences (e.g. men who have sex with men, individuals who have weakened immune systems including HIV/AIDS infected persons). In the current study, nearly three-fourths of the sample self- identified as Caucasian. Thus, findings should be replicated in community settings with a more economically and ethnically diverse sample. Finally, the current

study utilized self-report measures of HPV vaccine acceptance rather than behavioral measures of vaccine uptake. Future investigations should implement experimental designs that provide access to both vaccine acceptance measures and actual vaccine uptake. Subsequently, an important direction for future research would be to test the independent and combined effects of male specific information and altruistic motives in pediatric health care settings that serve diverse patient populations.

The HPV vaccine holds great promise for decreasing the prevalence of the world's most common STI and protecting women from developing cervical cancer. Findings from the present study suggest that brief interventions that provide information about male specific benefits of vaccination, as well as the benefits to women and society at large may be effective in motivating the decision to vaccinate. Given the very low rates of male vaccination currently observed in the United States and the potential value of vaccination in reducing both male and female health problems, it is important that research and practice move efficiently towards implementing effective interventions to increase vaccine uptake among boys.

Table 1. Demographic Characteristics

Characteristic (*N* = 200)	**%**	**M**	**SD**
Age		19.3	2.2
Ethnicity			
Caucasian	69		
African American	11		
Asian	17		
Latino	4		
Other	1		
Year in school			
Freshman	49		
Sophomore	35		
Junior	9		
Senior	8		
Living Situation			
Dorm	65		
On-campus apartment	16		
Off-campus apartment	15		
Fraternity house	3		
Parents' house	2		
GPA		3.10	.64
Social Fraternity Membership	15		
Varsity athlete	12		
Religious Affiliation	45		
Sexual Orientation			
Heterosexual	97		
Homosexual	3		
Bisexual	.5		
Uncertain	.5		
Ever being in a Committed Relationship	75		
Number of committed relationships		2.49	1.6
Current Romantic Relationship Status			
Single	67		
Dating	34		

Table 2. Altruistic Motives for Vaccination Means (Standard Deviations) Between Groups

	Altruism	
Motives for Vaccination	**Yes (*n*=100)**	**No (*n*=100)**
Altruistic Vaccination Motives	4.4 (.67)	4.1 (.74)
Male-specific Vaccination Motives	3.9 (1.3)	4.0 (1.0)

Table 3. Male-specific Motives for Vaccination Means (Standard Deviations) Between Groups

	Male- specific Information	
Motives for Vaccination	**Yes (*n*= 100)**	**No (*n*= 100)**
Altruistic Vaccination Motives	4.2 (.76)	4.2 (.69)
Male-specific Vaccination Motives	4.4 (.76)	3.5 (1.3)

Table 4. HPV Vaccine Acceptance Means (Standard Deviations) by Intervention Condition

		Altruism		
		No	***Yes***	***Marginal***
Male- specific Information	***No***	3.0 (.94) (*n*=50)	3.1 (1.0) (*n*=50)	3.1 (.97)
	Yes	3.1 (1.0) (*n*=50)	3.6 (1.0) (*n*=50)	3.4 (1.1)
	Marginal	3.1 (1.0)	3.4 (1.1)	3.2 (1.0)

Table 5. Descriptive Data for Predictor Variables by Condition and Overall

Variable (Scale)	**Basic (*n* = 50)**	**Male-Info (*n* = 50)**	**Altruism (*n* = 50)**	**Male-Info + Altruism (*n* =50)**	***p***	**Total Sample (*N* = 200)**
HPV Knowledge (1-10)	6.7 (1.3)	6.4 (1.4)	6.9 (1.7)	6.5 (1.3)	*ns*	6.6 (1.5)
Sexually Active (%)	76	76	90	80	*ns*	81
Lifetime Unprotected Sex (0-2)	.70 (.70)	.62 (.70)	.80 (.64)	.62 (.70)	*ns*	.70 (.68)
Recent Unprotected Sex	4.1 (12.1)	5.3 (12.8)	5.4 (11.4)	6.4 (13.7)	*ns*	5.3 (12.5)
Lifetime Number Sexual Partners	3.7 (5.0)	4.0 (4.9)	5.6 (11.5)	4.9 (8.3)	*ns*	4.5 (7.9)
Dispositional Altruism (1-5)	2.5 (.5)	2.6 (.5)	2.7 (.5)	2.6 (.5)	*ns*	2.6 (.5)
Gardasil Exposure In person (%)	16	20	26	24	*ns*	22
Gardasil Exposure Print (%)	40	42	44	40	*ns*	42
Gardasil Exposure Media (%)	64	52	52	48	*ns*	54
Perceived HPV Susceptibility (1-5)	2.4 (.5)	2.4 (.6)	2.3 (.6)	2.5 (.6)	*ns*	2.4 (.6)
Perceived HPV Severity (1-4)	3.7 (.4)	3.6 (.4)	3.7 (.4)	3.8 (.3)	*ns*	3.7 (.4)
HPVV Attitudes: Safety & Efficacy Concern (1-6)	3.2 (1.0)	3.3 (.8)	3.2 (.9)	3.2 (.9)	*ns*	3.2 (.9)
HPVV Attitudes: Stigmatization Concern (1-6)	2.4 (.1.0)	2.4 (.9)	2.2 (.8)	2.4 (1.0)	*ns*	2.4 (.5)

Table 6. Partial Correlations of Predictor Variables with HPV Vaccine Acceptance

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. HPV Vaccine Acceptance	--													
2. HPV Knowledge	-.02	--												
3. Sexual Activity Status	.03	.06	--											
4. Lifetime Unprotected Sex	.02	.19**	.49**	--										
5. Recent Unprotected Sex	-.04	.15**	.22**	.48**	--									
6. Lifetime Number Sexual Partners	.05	.04	.27**	.45**	.43**	--								
7. Perceived HPV Susceptibility	.22**	-.02	.04	.09	.07	.10	--							
8. Perceived HPV Severity	.11	.01	.14*	.07	.03	-.01	.07	--						
9. Dispositional Altruism	.07	.08	.05	.07	.04	.05	-.04	-.05	--					
10. HPVV Attitudes Safety & Efficacy	-.08	-.04	.04	-.08	<.001	-.01	-.08	-.15*	.07	--				
11. HPVV Attitudes Stigmatization	-.15*	-.19**	.02	.07	-.003	.03	-.12	-.10	.07	.30**	--			
12. Gardasil Exposure In Person	-.01	.08	.09	.08	.09	.02	.09	.03	.17*	-.16*	-.10	--.		
13. Gardasil Exposure Print	.10	.12	.03	.08	.11	.10	.03	.04	.16*	.01	-.001	.26**	--	
14. Gardasil Exposure Media	-.02	.12	.08	.05	-.01	-.03	-.03	.14*	.08	-.01	-.03	.27**	.59**	--

*p< .05
**p < .01

Note. HPV Vaccine Acceptance & Intent measured on 5-point Likert scale (1= Very unlikely, 5= Very likely); HPV Knowledge: total of correct responses to 10 questions; Sexual Activity Status: 0= No, 1= Yes; Lifetime Unprotected Sex:0= Never, 1= vaginal or anal sex without a condom ever, 2= vaginal and anal sex without a condom ever; Recent Unprotected Sex: number of occurrences of vaginal and anal sex without a condom in past 3 months; Perceived HPV susceptibility measured on a 5-point Likert scale (1= Almost no chance, 5= Almost certain chance; Perceived HPV severity measured on a 4-point Likert scale (1= Not at all, 4= Extremely); Dispositional Altruism measured on 5-point scale (1= Never, 5= Very often); HPVV Attitudes Concerns & Stigma measured on 6-point Likert scale (1=Strong Disagree, 6= Strongly Agree); Gardasil Exposure in Person single dichotomized item (0= No, 1= Yes); Gardasil Exposure Print: sum of 2 dichotomized (0= No, 1= Yes) items; Gardasil Exposure Media: sum of 3 dichotomized (0= No, 1= Yes) items.

Table 7. Hierarchical Regression Analyses

		HPV Vaccine Acceptance & Intent				
	Predictor	**R^2**	**ΔR^2**	**F Change**	**β**	***p***
Step 1		.04	.04	4.5		.01
	Male-Info				.15	.04
	Altruism				.15	.03
Step 2		.13	.08	6.6		< .001
	HPV Susceptibility				.19	.01
	HPVV Attitudes				-.15	.03
	Stigmatization					

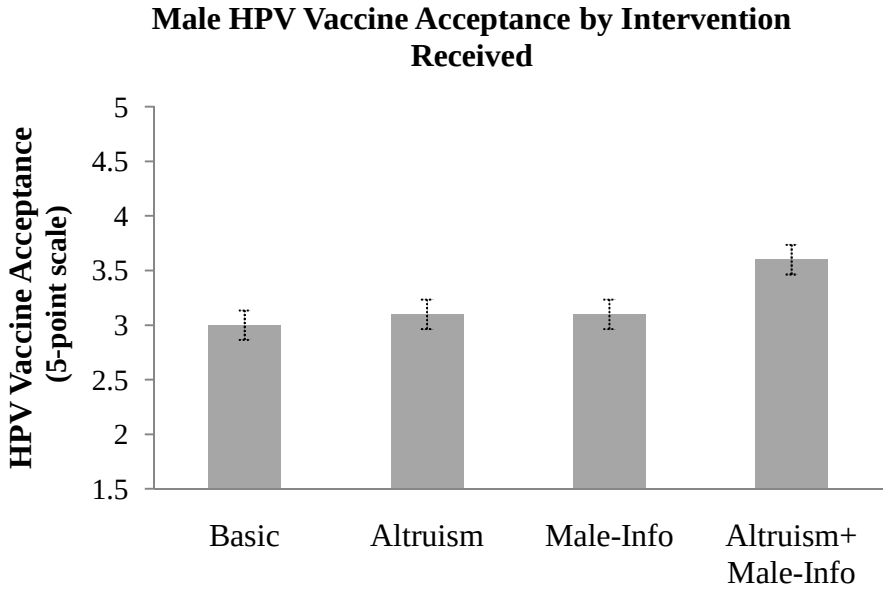

Figure 1. HPV vaccine acceptance means by intervention condition. Standard errors are represented by error bars attached to each column.

List of Appendices

Appendix A

Demographics & Background Characteristics

Demographics

1. **What is your gender?**

   ☐ Male □ Female
   1 2

2. **What is your age**? _____

3. **What is your ethnic background?**

   ☐ 1 African American □ 3 Latino □ 5 Asian/Pacific Islander
   ☐ 2 White/Caucasian □ 4 Native American □ 6 Other:
   _____

4. **What year are you at SU?**

   ☐ 1 Freshman □ 2 Sophomore □ 3 Junior □ 4 Senior

5. **What is your current GPA?** _____

6. **What is your major?** _____

7. **Do you belong to a social sorority or fraternity?**

   No Yes
   □ 0 □ 1

8. **Where do you live?**

   ☐ 1 Dorm □ 3 On-campus apartment □ 5 Off-campus apartment/house
   ☐ 2 Parents' Home □ 4 Sorority/Fraternity house □ 6 Other:_____

9. **Do you play a varsity sport at SU?**

   No Yes
   □ 0 □ 1

10. Do you have a religious affiliation?

No	Yes
□ 0	□ 1 ⟶

10a. What is your religious affiliation? _____

11. How many sisters do you have? _____

12. How many brothers do you have? _____

11. Which of the following statements applies best to you?

1□ I self -identify as heterosexual (attracted to women only).
2□ I self- identify as homosexual (attracted to men only).
3□ I self- identify as bisexual (attracted to men and women).
4□ I am uncertain of my sexual identity.

12. Have you ever been in a committed romantic relationship?

No Yes

13. If 'Yes', how many?

14. What is your current romantic relationship status?

(1) single, not interested in dating
(2) single, interested in dating
(3) dating casually
(4) dating one person, but not exclusively
(5) in a committed romantic relationship

Appendix B

Sexual History & Behaviors

Lifetime Sexual Behaviors

***Directions*:** This section will ask you about your relationship and sexual history. Please check *Yes* for any of the following behaviors that you have ever engaged in and check *No* for those that you have never engaged in.

Have you ever, IN YOUR LIFE…

	NO (0)	YES (1)
1. Had vaginal sex WITHOUT a condom?		
2. Had vaginal sex WITH a condom?		
3. Given oral sex WITHOUT a condom?		
4. Given oral sex WITH a condom?		
5. Received oral sex WITHOUT a condom?		
6. Received oral sex WITH a condom?		
7. Had anal sex WITHOUT a condom?		
8. Had anal sex WITH a condom?		
9. Have you been tested for an STD or HIV?		
10. Have you been diagnosed with an STD or HIV?		

10a. IF YES, check all that apply:

→

☐ Chlamydia 1 ☐HPV (genital warts) 2 ☐ Gonorrhea 3 ☐ Genital herpes 4

☐ Syphilis 5 ☐ Hepatitis A 6 ☐ Hepatitis B 7 ☐ Hepatitis C 8

☐ Trichomonas 9 ☐ HIV 10 ☐ other: please specify 11 _____

11. How many *men* have you had sexual intercourse with in your life? #_____ men

12. How many *women* have you had sexual intercourse with in your life? #_____women

13. At about what age did you first have sexual intercourse (vaginal or anal sex)? ____ years old

→ ☐ I've never had sex.

Sexual Behavior, Last Three Months

***Directions*:** This section concerns experiences you might have had in the *last three months.* Please indicate, to the best of your ability, how many times you have engaged in each behavior in the last three months. If you have not engaged in the behavior during the last three months, please write 0 rather than leaving the question blank.

Please estimate, over the last three months, how often you engaged each of the following behaviors:

In the *past three months,* how many times have you….

14. Had vaginal sex WITHOUT a condom? _____ Times

15. Had vaginal sex WITH a condom? _____ Times

16. Received oral sex WITHOUT a condom? _____ Times

17. Received oral sex WITH a condom? _____ Times

18. Given oral sex WITHOUT a condom? _____ Times

19. Given oral sex WITH a condom? _____ Times

20. Had anal sex WITHOUT a condom? _____ Times

21. Had anal sex WITH a condom? _____ Times

22. Been tested for an STD or HIV? _____ Times

23. Been diagnosed with an STD or HIV? _____ Times

24. How many *female* sexual partners have you had in the last three months?

#_____

25. How many *male* sexual partners have you had in the last three months?

#_____

Appendix C

HPV Knowledge

Directions: The following includes a series of statements regarding human papillomavirus (HPV). Please indicate whether you believe the statement is *True* or *False* based on your current knowledge.

	True (1)	False (0)
1. HPV causes health problems for males.		
2. You can get HPV from having sex.		
3. HPV can cause genital herpes.		
4. HPV infection is rare.		
5. HPV can cause genital warts.		
6. HPV can cause oral cancer.		
7. Most people with genital HPV have no visible signs or symptoms.		
8. HPV can cause anal cancer.		
9. People can transmit HPV to their partner(s) even if they have no symptoms of HPV.		
10. Having multiple sexual partners increases a person's risk of getting HPV.		

Appendix D

The Self Report Altruism Scale

***Directions*:** Check the category on the right that conforms to the frequency with which you have carried out the following acts.

	Never 1	Once 2	More than once 3	Often 4	Very often 5
1. I have helped push a stranger's car out of the snow.					
2. I have given directions to a stranger.					
3. I have made change for a stranger.					
4. I have given money to a charity.					
5. I have given money to a stranger who needed it (or asked me for it).					
6. I have donated goods or clothes to a charity.					
7. I have done volunteer work for a charity.					
8. I have donated blood.					
9. I have helped carry a stranger's belongings (books, parcels, etc.).					
10. I have delayed an elevator and held the door open for a stranger.					
11. I have allowed someone to go ahead of me in a lineup (at photocopy machine, in the supermarket).					
12. I have given a stranger a lift in my car.					
13. I have pointed out a clerk's error (in a bank, at the supermarket) in undercharging me for an item.					
14. I have let a neighbor whom I didn't know too well borrow an item of some value to me (e.g., a dish, tools, etc.)					
15. I have bought 'charity" Christmas cards deliberately because I knew it was a good cause.					
16. I have helped a classmate who I did not know that well with a homework assignment when my knowledge was greater than his or hers.					
17. I have before being asked, voluntarily looked after a neighbor's pet without being paid for it.					
18. I have offered to help a handicapped or elderly stranger across a street.					
19. I have offered my seat on a bus or train to a stranger who was standing.					
20. I have helped an acquaintance to move households.					

Appendix E

Gardasil Exposure

Directions: *"Now, some information about HPV and a new vaccine that is available to prevent HPV. As you may know, HPV is a common sexually transmitted infection that can lead to a variety a health concerns including genital warts in both men and women and cervical cancer in women. An HPV vaccine is now available that protects against most genital warts and cervical cancer. The HPV vaccine is often referred to by its brand name, Gardasil."*

1. How much do you know about Human Papillomavirus, often referred to as HPV?
   Never heard of it before (1) Very little (2) Some (3) A lot (4)

2. Before today, have you ever heard of the HPV vaccine or Gardasil? .
   No (0) Yes (1)

3. To the best of you knowledge, has the HPV vaccine, Gardasil, been approved for use in men?

   No (0) Yes (1) Not sure (0)

4. Have you heard about the HPV vaccine, Gardasil, from an ad on TV or the radio?
   No (0) Yes (1)

5. Have you heard about the HPV vaccine, Gardasil, from a health care provider?
   No (0) Yes (1)

6. Have you heard about the HPV vaccine, Gardasil, from a written news article in a magazine or newspaper?
   No (0) Yes (1)

7. Have you heard about the HPV vaccine, Gardasil, from a TV news program or talk show?
   No (0) Yes (1)

8. Have you heard about the HPV vaccine, Gardasil, from a radio news program or talk show?
   No (0) Yes (1)

9. Have you read about the HPV vaccine, Gardasil, from an internet website?
   No (0) Yes (1)

Appendix F

Perceived HPV Susceptibility & Severity

Perceived HPV Susceptibility

***Directions*:** The following includes a series of questions regarding the effect of STDs and HPV. Please indicate the likelihood that you believe each might happen.

	Almost no chance (1)	Low chance (2)	Moderate chance (3)	High chance (4)	Almost certain chance (5)
1. What is the chance that you will get a sexually transmitted disease in the next 5 years?					
2. What is the chance that most people in your community will get at least one STD in their lifetime?					
3. Without the HPV vaccine, what is the chance that you will contract Human Papillomavirus (HPV) in the next 5 years?					
4. Without the HPV vaccine, what is the chance that most people in your community will contract Human Papillomavirus (HPV) in their lifetime?					
5. Without the HPV vaccine, what do you think is the chance that you will get genital warts in the future?					
6. Without the HPV vaccine, what do you think is the chance that you will get anal cancer in the future?					
7. Without the HPV vaccine, what do you think is the chance that you will get oral cancer in the future?					
8. Without the HPV vaccine, what do you think is the chance that you will get penile cancer in the future?					

Perceived Severity of HPV

***Directions*:** The following includes a series of questions regarding the effect of STDs. Please indicate how much your life might be impacted.

	Not at all (1)	A little (2)	Moderately (3)	Extremely (4)
1. How much do you think having genital warts would affect your life?				
2. How much do you think having oral cancer would affect your life?				
3. How much do you think having anal cancer would affect your life?				
4. How serious would it be if you got HPV?				
5. How serious would it be if you got oral cancer caused by HPV?				
6. How serious would it be if a female got cervical cancer caused by HPV?				

Appendix G

HPV Vaccine Attitudes

Directions: Please indicate to what extent you agree or disagree with the following statements about the HPV vaccine.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

	1	2	3	4	5	6
1) I would hesitate to get the HPV vaccine because I've heard that the vaccine may not be safe.						
2) I am concerned about potential side effects of the HPV vaccine.						
3) Concern about side effects would prevent me from getting the HPV vaccine.						
4) There are dangers that we don't know about in taking the HPV vaccine.						
5) I am confident that the HPV vaccine is safe.						
6) The HPV vaccine is being pushed to make money for drug companies.						
7) I trust what is being reported about the HPV vaccine as a way to prevent cervical cancer.						
8) I don't trust the information I've heard about the HPV vaccine.						
9) I would not talk to my doctor or healthcare provider about the HPV vaccine because he or she might think poorly of me.						
10) I would be embarrassed if my parent(s) urged me to get the HPV vaccine.						
11) Receiving the HPV vaccine would be embarrassing for me because it is a vaccine to prevent a sexually transmitted disease.						
12) I don't have enough information about the HPV vaccine to decide whether it's a good idea.						
13) I am concerned that getting the HPV vaccine would be stigmatizing.						
14) I am concerned about the cost of the HPV vaccine.						
15) If I got the HPV vaccine, I might use condoms less often.						

Appendix H

Motives for HPV Vaccination

Directions: Based on what you just learned, please indicate how much you agree or disagree with each of the following statements.

	Extremely disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Extremely agree (5)
1. For men, getting the HPV vaccine is important because it helps reduce the threat of cervical cancer in women.					
2. For men, getting the HPV vaccine is important because it reduces women's risk of contracting HPV.					
3. For men, getting the HPV vaccine is important because it will help spread immunity to HPV throughout communities and globally.					
4. For men, an important reason to get the HPV vaccine is that it will prevent the spread of HPV to sexual partners.					
5. It is important for men to get the HPV vaccine because the more people vaccinated, the less women will suffer from cervical cancer worldwide.					
6. It is important for men to get the HPV vaccine because it reduces their chance of contracting penile and anal cancers.					
7. For men, it is important to get the HPV vaccine because it decreases their likelihood of contracting HPV which could lead to genital warts.					
8. It is important for men to get the HPV vaccine because it reduces their chance of developing certain kinds of oral cancers.					

Appendix I

HPV Vaccination Acceptance

Directions: The following asks about the HPV vaccine. Please indicate the likelihood of each of the following. Based on what you just learned…

How likely is it that you will…

	Very Unlikely (1)	Somewhat unlikely (2)	Neither unlikely nor likely (3)	Somewhat likely (4)	Very likely (5)
1. try to get more information about the HPV vaccine?					
2. tell your male friends and family about this vaccine.					
3. tell your female friends and family about this vaccine.					
4. ask your doctor about this vaccine at your next visit.					
5. consider getting the HPV vaccine?					
6. actually get the HPV vaccine?					
7. get the HPV vaccine if a health care provider offers it to you within the next year?					

Appendix J

Intervention Message Scripts

Minimal male specific content & No Altruism (BASIC)

"Human papillomavirus, or HPV, is the most common sexually transmitted disease in the World. It affects both men and women and about one out of every two people will contract HPV in their lifetime. Very often, people do not know that they have HPV, since there are frequently no signs or symptoms. Also, transmission doesn't even require intercourse, only skin to skin genital contact. Therefore, even condoms cannot fully protect you against HPV. Because of this, men and women can get HPV very easily and pass it on without even realizing it. The most common consequences of HPV are genital warts in both men and women and cervical cancer in women.

Fortunately, there is a new vaccine available to prevent HPV in both men and women. Gardasil was FDA approved in 2006 for girls and women ages 9 through 26, and approved for boys and men in 2009. Gardasil is a vaccine that prevents four strains of HPV, two that cause 70% of cervical cancer cases and two that cause 90% of genital warts. The vaccine is covered by some, but not all insurance companies. The HPV vaccine has been found to be safe and effective in large scale clinical trials.

Vaccination for a variety of health conditions has a long history both worldwide and in the United States. The history of vaccination dates back to the eighteenth century. A physician named Edward Jenner noticed that milkmaids in his town did not generally get smallpox, a common disease. He hypothesized that the pus in blisters, which milkmaids got from cowpox (a disease similar to smallpox), protected the milkmaids from getting smallpox because of the protective agents provided. He tested his hypothesis by taking pus from a cowpox lesion and injecting it into an eight year old boy. The boy was then exposed to smallpox multiple times and found unaffected by it. Jenner's experimentation and publications truly laid the groundwork for vaccinations to come.

A major player in the field following the accomplishments of Jenner, was Louis Pasteur. Pasteur adopted and applied the word vaccine to his work and defined it as "a suspension of live or inactivated microorganisms or fractions thereof administered to induce immunity and prevent infectious disease." He proceeded to produce the first rabies vaccine by growing the virus in rabbits, and then weakened the virus by drying the affected nerve tissue. Vaccination for anthrax affecting livestock was also studied and developed by Pasteur.

The early framework laid by Jenner and Pasteur resulted in a medical and cultural shift in public health. In the United States, vaccination has become a customary part of societal expectations. Children are recommended to receive immunizations for Diphtheria, Tetanus, Pertussis, Hepatitis B, Pneumonia, Polio, Measles, Mumps and Rubella, Varicella, and Hepatitis A all before the age of six. For those 7 to 18 years old, HPV, Meningitis, and yearly Influenza vaccinations are recommended."

Enhanced male specific content & No Altruism (MALE-INFO)

"Human papillomavirus, or HPV, is the most common sexually transmitted disease in the World. It affects both men and women and about one out of every two people will contract HPV in their lifetime. Very often, people do not know that they have HPV, since there are frequently no signs or symptoms. Also, transmission doesn't even require intercourse, only skin to skin genital contact. Therefore, even condoms cannot fully protect you against HPV. Because of this, men and women can get HPV very easily and pass it on without even realizing it. The most common consequences of HPV are genital warts in both men and women and cervical cancer in women.

Fortunately, there is a new vaccine available to prevent HPV in both men and women. Gardasil was FDA approved in 2006 for girls and women and in 2009 for boys and men. Gardasil is a vaccine that prevents four strains of HPV, two that cause 70% of cervical cancer cases and two that cause 90% of genital warts. The vaccine has been found to be safe and effective in large scale clinical trials.

Even though HPV is most thought about in terms of female cervical cancer risk, it is important for you to know that HPV is linked to serious health consequences for men too. For example, HPV causes some types of penile and anal cancers. Recent research indicates that HPV may cause over 50% of penile cancer cases and over 90% of anal cancer cases among men. Fortunately the strains of HPV linked to these male cancers are prevented by the HPV vaccine.

There are several other health risks for men associated with HPV and thus protected by the vaccine, Gardasil. Recent medical research has found a strong association between HPV and head and neck cancers in men. In fact, men are most affected by these HPV -related cancers compared to women and approximately 5,700 men are diagnosed with these cancers each year in the U.S. Research shows that HPV infection can lead to a 6 fold increase in risk for oral cancer, a type of head and neck cancer. Laryngeal papillomatosis is also caused by HPV infection. It can lead to warts in the throat and respiratory areas that cause difficulty breathing and swallowing. This condition happens four times more in men than it does in women. Fortunately, if taken prior to HPV infection, the HPV vaccine can greatly reduce the chances of these types of cancers.

To reiterate, the HPV vaccine, Gardasil, is currently available for boys and men who fall within the recommended age range of 9 to 26 years old. It is covered by some, but not all insurance companies. Getting the vaccine does not just protect you from HPV but holds great promise for preventing a number of serious male health consequences that are caused by HPV."

"Vaccination, for a variety of health conditions, has a long history both worldwide and in the United States. The history of vaccines dates back to the eighteenth century. A physician named Edward Jenner hypothesized that cowpox pus in blisters on the hands of milkmaids, (cowpox being a disease similar to smallpox), protected the milkmaids from getting smallpox. He tested his hypothesis by taking pus from a cowpox lesion and injecting it into a young boy and exposing him to smallpox. Jenner's hypothesis was correct and his experimentation and publications truly laid the groundwork for vaccinations to come. Later on, Louis Pasteur adopted and applied the word vaccine from Jenner's work. He proceeded to produce the first rabies vaccine by growing the virus in rabbits, and then weakened the virus by drying the affected nerve tissue. Vaccination for anthrax affecting livestock was also studied and developed by Pasteur. In the history of vaccination these two men truly paved the way."

Minimal male specific content & Altruism (ALTRUISM)

"Human papillomavirus, or HPV, is the most common sexually transmitted disease in the World. It affects both men and women and about one out of every two people will contract HPV in their lifetime. Very often, people do not know that they have HPV, since there are frequently no signs or symptoms. Also, transmission doesn't even require intercourse, only skin to skin genital contact. Therefore, even condoms cannot fully protect you against HPV. Because of this, men and women can get HPV very easily and pass it on without even realizing it. The most common consequences of HPV are genital warts in both men and women and cervical cancer in women.

Fortunately, there is a new vaccine available to prevent HPV in both men and women. Gardasil was FDA approved in 2006 for girls and women and in 2009 for boys and men. Gardasil is a vaccine that prevents four strains of HPV, two that cause 70% of cervical cancer cases and two that cause 90% of genital warts. The vaccine has been found to be safe and effective in large scale clinical trials.

By far the greatest health burden of HPV is cervical cancer in women. HPV contributes to approximately 12,000 new cervical cancer cases and 4,000 cervical cancer deaths in the United States and 275,000 cervical cancer deaths worldwide. In fact, cervical cancer is the second most common cancer in women in the world. In the U.S., cervical cancer is often prevented because of widespread and affordable screening programs that detect HPV infection in women. However, this screening is not available in most parts of the world. Over 85% of cervical cancer deaths are in developing countries where cervical cancer causes the greatest number of female deaths due to cancer. Keep in mind that HPV is sexually transmitted and easily passed from partner to partner. Male infection can easily spread to female partners which can result in serious female health consequences.

The HPV vaccine is currently available for boys and men who fall within the recommended age range of 9 to 26 years old. It is covered by some, but not all insurance companies. This vaccine is exciting because it prevents the types of HPV that cause cervical cancer in women. Knowing this is not only important for women, but it is important for men too. Because the HPV vaccine offers something referred to as "Herd Immunity," you, as a man, can play a significant role in reducing women's risk for cervical cancer.

Herd immunity is a concept that explains vaccinations and when they work best. Basically, an entire community acquires greater immunity to infection if more and more people get vaccinated. As the number of people receiving the vaccine increases, fewer people spread the infection and therefore the rate of infection decreases overall. This concept is important for men considering the HPV vaccine, because if you and other men get vaccinated, immunity will spread faster and women will have better protection from getting cervical cancer. Ultimately, by taking the HPV vaccine, men like you can contribute to decreasing community and worldwide HPV rates, thus reducing cervical cancer worldwide. Consider how your HPV vaccination can help to save female lives in the long run."

Enhanced male specific content & Altruism (MALE INFO + ALTRUISM)

"Human papillomavirus, or HPV, is the most common sexually transmitted disease in the World. It affects both men and women and about one out of every two people will contract HPV in their lifetime. Very often, people do not know that they have HPV, since there are frequently no signs or symptoms. Also, transmission doesn't even require intercourse, only skin to skin genital contact. Therefore, even condoms cannot fully protect you against HPV. Because of this, men and women can get HPV very easily and pass it on without even realizing it. The most common consequences of HPV are genital warts in both men and women and cervical cancer in women.

Fortunately, there is a new vaccine available to prevent HPV in both men and women. Gardasil was FDA approved in 2006 for girls and women and in 2009 for boys and men. Gardasil is a vaccine that prevents four strains of HPV, two that cause 70% of cervical cancer cases and two that cause 90% of genital warts. The vaccine has been found to be safe and effective in large scale clinical trials.

Even though HPV is most thought about in terms of female cervical cancer risk, it is important for you to know that HPV is linked to serious health consequences for men too. For example, HPV causes some types of penile and anal cancers. Recent research indicates that HPV may cause over 50% of penile cancer cases and over 90% of anal cancer cases among men. Fortunately the HPV types that are linked to these male cancers are prevented by the HPV vaccine.

There are several other health risks for men associated with HPV and thus protected by the vaccine, Gardasil. Recent medical research has found a strong association between HPV and head and neck cancers in men. In fact, men are most affected by these HPV -related cancers compared to women and approximately 5,700 men are diagnosed with these cancers each year in the U.S. Research shows that HPV infection can lead to a 6 fold increase in risk for oral cancer, a type of HNSCC. Laryngeal papillomatosis is also caused by HPV infection. It can lead to warts in the throat and respiratory areas that cause difficulty breathing and swallowing. This condition happens four times more in men than it does in women. Fortunately, if taken prior to HPV infection, the HPV vaccine can greatly reduce the chances of these types of cancers.

HPV definitely causes health consequences for males, as those described, but by far the greatest health burden is cervical cancer in women. HPV contributes to approximately 12,000 new cervical cancer cases and 4,000 cervical cancer deaths in the United States and 275,000 cervical cancer deaths worldwide. In fact, cervical cancer is the second most common cancer in women in the world. In the U.S., cervical cancer is often prevented because of widespread and affordable screening programs that detect HPV infection in women. However, this screening is not available in most parts of the world. Over 85% of cervical cancer deaths are in developing countries where cervical cancer causes the greatest number of female deaths due to cancer. Keep in mind that HPV is sexually transmitted and easily passed from partner to partner. Male infection can easily spread to female partners which may result in serious female health consequences.

The HPV vaccine is currently available for boys and men who fall within the recommended age range of 9 to 26 years old. It is covered by some, but not all insurance companies. This vaccine is exciting because it not only protects you from HPV, but holds great promise for preventing a number of serious male health consequences caused by HPV. The vaccine is also exciting because it prevents the types of HPV that cause cervical cancer in women. Knowing this is not only important for women, but it is important for men too. Because

the HPV vaccine offers something referred to as “Herd Immunity,” you, as a man, can play a significant role in reducing women’s risk for cervical cancer.

Herd immunity is a concept that explains vaccinations and when they work best. Basically, an entire community acquires greater immunity to infection if more and more people get vaccinated. As the number of people receiving the vaccine increases, fewer people spread the infection and therefore the rate of infection decreases overall. This concept is important for men considering the HPV vaccine, because if you and other men get vaccinated, immunity will spread faster and women will have better protection from getting cervical cancer. Ultimately, by taking the HPV vaccine, men like you can contribute to decreasing community and worldwide HPV rates, thus reducing cervical cancer worldwide. Also, you can protect yourself from a number of male specific health consequences. Consider how your HPV vaccination can protect you from HPV-related illness and help to save female lives in the long run.”

Appendix K

COLLEGE OF ARTS & SCIENCES
DEPARTMENT OF PSYCHOLOGY

Health-Related Decision Making Among Male College Students

Consent Form

You are invited to participate in a research study called Health-Related Decision Making Among Male College Students. This study is being conducted by Katie Bonafide, a clinical psychology graduate student at Syracuse University, and Dr. Peter Vanable, a professor in the Psychology Department. Involvement in this study is voluntary, so you may choose to participate or not. This sheet explains the study requirements and the purpose of the study. Please feel free to ask questions about the research if you have any. I will be happy to explain anything in greater detail if you wish.

We are interested in understanding male students' knowledge, attitudes, and behaviors as they relate to health-related decision making. You will be asked to complete a computer-administered questionnaire that will include items about past sexual experiences, knowledge of and attitudes toward sexually transmitted diseases, vaccinations and other health concerns. You will also be asked to view a brief health education program on the topic of vaccinations. This study will take approximately 1 hour of your time and you will receive 1 hour of research credit in exchange for participation. If you choose to withdraw from the study, you will receive partial research credit. All information will be kept confidential. In fact, your name will not be linked to your survey responses and your participation in the study will be kept confidential.

The benefit of this research is that you may enhance your awareness of your own attitudes and behaviors, and learn valuable information about personal health decisions and options. You will also be contributing to research that may ultimately benefit public health efforts across the country. The minimal risks associated with study participation include the possibility of experiencing embarrassment related to answering questions about sexual health. These risks will be minimized by providing you with confidentiality and allowing you to not respond to questions you feel uncomfortable answering. In the event that you do experience distress and would like to talk to a counselor or health-care provider, an appropriate referral will be provided. If at any point you no longer wish to continue with the study, you may withdraw from the study without penalty or prejudice, and your questionnaire will be discarded.

If you have any questions about the research or any related concerns, please feel free to contact Katie Bonafide at (315) 443-1052 or Dr. Vanable at (315) 443-1210. If you have

additional questions regarding this study or your rights as a research participant, please contact the SU Institutional Review Board committee at (315) 443-3013.

All of my questions have been answered and I have received a copy of this consent form for my own records. I am 18 years or older and I wish to participate in this research study.

_____ _____

Signature of Participant Date

_____

Printed name of Participant

_____ _____

Signature of Investigator Date

_____

Printed name of Investigator

Appendix L

Research Assistant Protocol Script

Study Protocol Script

TO PARTICIPANTS: "Thank you for participating in this research project. You will receive 1 research credit hour for your participation. Before we begin, please read the study's consent form. If you have any questions feel free to ask me. If you don't have any questions, please sign and print your name at the bottom. I will sign where it indicates name of investigator."

→ Give participant the consent form and answer any questions
→ Using the random assignment table, determine the participant's assigned condition
→ Assign and record participant's ID number and the start date and time of the survey administration on the study administration log.

"You will be answering a series of questionnaires and be shown a short PowerPoint presentation using a computerized program on this laptop. Since the program uses written and audio presentation, you will need to wear headphones as well. The survey should take about 45 minutes to complete. If at any point during the survey you have any questions or concerns, please ring this bell and I will be right in to assist you. To familiarize yourself with the computer program, please complete the following practice exercise."

→ Have participant complete practice CASI questions
→ When prompted to do so on computer, enter the appropriate ID number, survey completion date, and RA initials

"Remember that if any questions arise please ring the bell. When you have finished the survey, which will be indicated on the computer screen, please ring the bell to signal your completion."

→ Participant completes survey

"Thank you very much for your participation today. Before you leave I would like to explain the goals of this study. The goal of this study was to examine the effects of different types of informational messages on male college students' interest in receiving the HPV vaccine. The informational presentation you received provided certain facts that might influence HPV vaccination decisions. While there was no deception used in this study, some of the questions may have been uncomfortable to answer. If you are feeling any distress related to participating in this study, this form includes a list of resources available to you for addressing such concerns. This form also includes information regarding the HPV vaccine if you would like to learn more. Do you have any questions or concerns about the study?"

→ Give participant debriefing handout
→ Record participant's survey completion on study administration log

Appendix M

Debriefing Handout

Health Related Decision Making Among Male College Students

Thank you for participating in this research project! We appreciate your time and effort in participating today! This project was conducted by Katie Bonafide, a clinical psychology graduate student, under the supervision of Dr. Peter Vanable, a clinical psychology faculty member. The goal of this study was to examine the effects of different types of informational messages on HPV vaccine interest among male college students. You were randomly assigned to receive a specific presentation that contained information that highlighted different benefits of receiving the HPV vaccine. Your participation enables researchers to examine what types of information are most effective in encouraging men to consider HPV vaccination. To protect the integrity of the study, we request that you not discuss the purpose of this study with other students. If further questions or concerns arise due to your participation in this study, feel free to contact Katie Bonafide at (315) 443-1052, Dr. Vanable at (315) 443-1210 or the Syracuse University Institutional Review Board at (315) 443-3013. Thank you again for your participation!

Helpful Resources

Syracuse University Health Services
111 Waverly Avenue
Syracuse NY 13244
315-443-9005

Syracuse University Counseling Center
200 Walnut Place
Syracuse, NY 13244
315-443-4715

Psychological Services Center
804 University Avenue
Syracuse NY 13244
315-443-3595

Interested in more information about receiving the HPV vaccine?

Learn more about HPV and the vaccine at:

- The Centers for Disease Control & Prevention (CDC)- HPV and Men Fact Sheet
http://www.cdc.gov/std/hpv/stdfact-hpv-and-men.htm

- CDC- HPV Vaccines: Questions & Answers
http://www.cdc.gov/vaccines/vpd-vac/hpv/vac-faqs.htm

- Gardasil- Get the Facts About HPV
http://www.gardasil.com

To find out more about where you can get the vaccine, consult your ***primary care physician, Syracuse University Health Services or the Onondaga County Health Department*** (*website*: http://www.ongov.net/health/generalclinics.html *phone*: 315-435-2000)

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Publications & Presentations

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Bonafide, K. & Vanable, P. (2012, April). *Male HPV vaccine acceptance is enhanced by a brief intervention that emphasizes both male specific vaccine benefits and altruistic motives*. Poster presented at the 33rd Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine, New Orleans, Louisiana

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