1-2-3! CATCH-UP FOR HPV: A THEORETICALLY INFORMED PSYCHOSOCIAL INTERVENTION TO INCREASE HPV VACCINE UPTAKE AMONG YOUNG ADULTS

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ABSTRACT

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The Human Papillomavirus (HPV) is the most common sexually transmitted infection in the United States causing a range of sequelae from genital warts to cancer. In the past 10 years, the Food and Drug Administration (FDA) licensed three vaccines that target the most common and severe strains of HPV. Current guidelines recommend the HPV vaccine be given prophylactically during adolescence; however, vaccination rates remain suboptimal. Thus, there are increased efforts to increase vaccination among the catch-up group, or individuals between 18 and 26 years of age, due to increased autonomy in healthcare decisions.

Previous research has utilized the Theory of Planned Behavior (TPB) to understand factors that impact HPV vaccination uptake. The TPB posits that attitudes, subjective norms, and perceived behavioral control contribute to one's intent and subsequent engagement in a behavior. Recently, an affective component, anticipatory

regret, was added to the model to increase utility. Despite research suggesting the TPB variables are directly related to vaccine uptake, interventions have primarily focused on education only with minimal success. Thus, the current study aimed to enhance an education-based intervention to directly target the TPB variables for increased HPV vaccination among the catch-up group.

The study was a randomized control design that compared a TPB-informed psychosocial intervention with both an education-only intervention and a no intervention control group. Results indicated that TPB variables explained 45.6% of the variance in intent to vaccinate, while increased knowledge about HPV/HPV vaccine contributed only 3.5%. Factors unique to the psychosocial intervention (attitudes, subjective norms, and anticipatory regret) were significant predictors of intent to vaccinate. The intervention model also effectively differentiated between those who did and did not endorse vaccination uptake at 6 months, explaining between 42% and 67% of the variance in vaccination status.

In conclusion, the current study demonstrated that the TPB-informed intervention was more effective than an education-only intervention in increasing both intent and vaccination uptake among the catch-up group. The current study provides support for dissemination of TPB-informed interventions across college campuses to increase uptake and reduce HPV-related sequelae among the catch-up group.

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INTRODUCTION

Human Papillomavirus (HPV)

The Human Papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States, with an estimated 79 million individuals currently infected, and 14 million new cases per year (Satterwhite et al., 2013; Viens et al., 2016). Additionally, HPV is now recognized as the most prevalent STI worldwide with an estimated 50% - 80% of sexually active individuals acquiring an HPV infection in their lifetime (Liu et al., 2015; Winer & Koutsky, 2004).

HPV is a member of the Papillomaviridae family which consists of double stranded DNA viruses that infect epithelial cells of the skin, oral, and genital mucosa (Araldi et al., 2018). Papillomavirus obtained its name from the papillomas, or warts, it causes on epithelium of the body. HPV is transmitted through direct skin-to-skin contact with an HPV infected individual and is associated with sexual intercourse and non-penetrative sexual activity (Stokley et al., 2013). HPV transmission may also spread from mother to infant during the intrapartum period (Markowitz et al., 2014), and HPV DNA sequences have been found in women's breast milk (Araldi et al., 2018). Risk factors for HPV infection include younger age at sexual debut, multiple sexual partners, lack of condom use, non-monogamous sexual relationships, and prior infection (Chelimo et al., 2013; Rettig et al., 2015). However, acquisition of HPV typically occurs shortly after the onset of sexual activity (Baseman & Koutsky, 2005; Moore et al., 2009; Sellors et al., 2003). In fact, among college-aged women in the United States, HPV infection following initial sexual experience with a male partner has a 1-year incidence rate of 28.5% and a 3-year incidence rate of 50% (Winer et al., 2008).

Over 200 serotypes of HPV have been identified and are dichotomously classified as high or low risk viruses (Araldi et al., 2018; Viens et al., 2016). Individuals can be infected with multiple serotypes of HPV and HPV can be reactivated after being in a dormant state for several years (Valentino & Poronsky, 2016). Approximately 90% of HPV-related infections spontaneously resolve within two years due to an immune response against the HPV DNA and the individual frequently remains asymptomatic, unaware of having the virus (Koshiol et al., 2006; World Health Organization, 2016).

Low risk HPV strains (e.g., HPV 6 and 11) cause genital warts, laryngeal papillomas, recurrent respiratory papillomatosis (RRP; a rare condition in which tumors grow in the airways), and benign changes in cervical cells (Attia et al., 2018). In the United States, an estimated 1% of sexually active individuals have genital warts related to HPV (CDC, 2014a), with 90% of cases attributed to HPV types 6 and 11 (Stokley et al., 2013). Genital warts are highly infectious and when symptomatic, cause pain, bleeding, genital or urethral obstruction, and complications during pregnancy (Valentino et al., 2016).

High risk HPV types are oncogenic and are known to cause cancer of the cervix, anus, penis, vagina, vulva and oropharynx (Dunne et al., 2014). There are at least 13 serotypes associated with cancer development, and research indicates as many as 40 high risk serotypes (Laurent et al., 2018; Viens et al., 2016). The more commonly known HPV high risk subtypes are 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 69, 73, and 82 (Laurent et al., 2018). HPV infections are responsible for an estimated 31,500 new incidences of cancer each year in the United States (CDC, 2017). HPV types 16 and 18 are responsible for approximately 70% of cervical cancer cases, and globally, there are an estimated 530,000 new cases of cervical cancer each year, resulting in 7.5% of female cancer-related deaths (Clifford et al., 2003; Munoz et al., 2003; WHO, 2015).

Although HPV is regularly associated with cervical cancer in women, approximately 40% of all HPV-related cancers occur in males (Viens et al., 2016). Specifically, 33% of penile cancers and 90% of anal cancers are attributed to HPV and are primarily caused by HPV type 16 (Alemany et al., 2016; Steinau et al., 2013). HPV is also responsible for a significant portion of cancers of the oral cavity (22.4%), oropharynx (4.4%) and larynx (3.5%) (Castellsague et al., 2016).

In summary, HPV is a common, highly contagious virus with severe consequences, including chronic medical conditions and even death. Fortunately, over the last 10 years, three prophylactic vaccines for protection against HPV have been available and licensed by the Food and Drug Administration (FDA) in the United States. The initial vaccine was the quadrivalent HPV vaccine (HPV4; Gardasil, Merck & Co, Inc.) licensed in 2006 to target HPV types 6, 11, 16, 18. The bivalent HPV (HPV2; Cervarix, GlaxoSmithKline) vaccine, licensed in 2009, targeted HPV types 16 and 18. Most recently in 2014, the nonavalent HPV (9vHPV) vaccine was approved by the FDA, which provides protections from nine HPV types of HPV. Specifically, 9HPV helps with the prevention of cervical, vulvar, vaginal, and anal cancers caused by HPV Types 16, 18, 31, 33, 45, 52, and 58; precancerous or dysplastic lesions caused by HPV Types 6, 11, 16, 18, 31, 33, 45, 52, and 58; and genital warts caused by HPV Types 6 and 11.

The vaccine deemed safe by the FDA, undergoes post-licensure safety monitoring by several entities, including the Vaccine Adverse Event Reporting System (VAERS) and Vaccine Safety Datalink (VSD). An estimated 67 million Gardasil vaccines were administered between June 2006 and March 2014. During this period, VAERS received 25,063 adverse event reports related to the vaccine, of which 92% were classified as non-serious. Commonly reported negative events include redness and swelling at the injection-site, dizziness, syncope, nausea, and headache (CDC, 2014; Markowitz et al.,

2014). International research supports these safety findings. For example, Miranda and colleagues (2017) found no significant increase in autoimmune diseases subsequent to HPV vaccine uptake among a cohort of 2 million females registered on France's nationwide healthcare database.

The Advisory Committee on Immunization Practices (ACIP), a group of medical and public health experts who develop vaccine recommendations within the United States, recommends routine HPV vaccination at 11 or 12 years of age, with the flexibility to start vaccination as early as age 9 years. ACIP also recommends vaccination for females through age 26 years and for males through age 21 years who have not obtained adequate vaccination. Males aged 22 through 26 years may also be vaccinated and is especially recommended for men in high-risk populations (Meites et al., 2016).

All three vaccines were originally delivered as a 3-dose series over a six-month period. Following the initial dose, the second dose is given 1 to 2 months later, and the third dose administered at 6 months (0, 1-2, 6-month schedule). In October 2016, the FDA approved the 9vHPV to be administered in two doses to individuals initiating vaccination before their 15th birthday with the second dose administered 6-12 months after the initial dose (0, 6-12-month schedule) (Meites et al., 2016). For individuals initiating vaccination on or after their 15th birthday, the recommended immunization for the 9vHPV remains the 3-dose schedule. While the vaccine should not be given over a shortened interval, the second and third doses can be resumed if the vaccination schedule is interrupted (Meites et al., 2016; Stokley et al., 2013).

Despite the vaccine being approved and available for over 10 years, uptake has remained suboptimal and below the Healthy People 2020 goal of achieving 80% HPV vaccine uptake among 13 to 15-year-olds (U.S. Department of Health and Human Services, 2016). Historically, efforts to increase vaccination have focused on the

adolescent period because the vaccination is most effective when administered prophylactically prior to sexual debut. However, as of 2015, an estimated 62.8% of adolescent girls ages 13 to 17 years had received one dose of the HPV vaccine, 52.2% received at least two doses, and 41.9% completed the vaccination series (Reagan-Steiner et al., 2016). Vaccination rates among women in the "catch-up" age range (19-26 years) also remain low, with an estimated 35% of eligible women receiving the initial dose (Schmidt & Parsons, 2014; Williams et al., 2017). National data on males suggest they are the least likely to seek out vaccination with completion rates for the HPV vaccine at an estimated 31.5% for males ages 13-17 years and 6% - 10.1% among males 19-26 years (Walker et al., 2017; Williams et al., 2017).

Evidence suggests that even at less than desired rates, vaccination is making a meaningful difference on HPV infection rates and is associated with decreased prevalence of HPV infections, lowered incidence of genital warts, and reductions in cervical precancers among women (Drolet et al., 2015). Initial data from the National Health and Nutrition Examination Surveys indicate a significant decline in HPV prevalence from pre- to post-vaccination era. Specifically, among females between 14 and 19 years, the prevalence of HPV serotypes targeted by vaccine decreased from 11.5% (2003 to 2006) to 5.1% (2007 to 2010) (Markowitz et al., 2013). However, epidemiological data suggests potential for further gains, with estimates that 85–90% of all cervical cancer cases could be prevented with the nonavalent 9vHPV vaccine if administered to females before their sexual debut (Serrano et al., 2014).

While vaccination is optimal before sexual debut, there are several indicators that administering the vaccine at the age of personal consent to the catch-up group is advantageous. Approximately 75% of new HPV infection cases occur during this period (Dunne et al., 2007) and HPV prevalence is significantly elevated (59.8%) among women

in this age range, with high-risk strains (16 and 18) commonly present (Markowitz et al., 2016; Schwarz, 2011). Furthermore, a significant majority of females in the catch-up group do not have antibodies to the high-risk HPV types that are included in the vaccine (Introcaso et al., 2014; Liu et al., 2016). Meta-analyses suggest that the vaccine is effective for individuals in this age range even among those who are sexually active (Couto et al., 2014; Lu et al., 2011) and it is unlikely the individual will have contracted all nine HPV serotypes covered by the vaccine (Eckert & Moscicki, 2017). It is expected that increasing vaccine uptake among the catch-up group will increase herd-immunity and improve overall public health (Brisson et al., 2016).

The catch-up group also provides opportunity for autonomous decision-making regarding health behavior (Harris et al., 2017). Unvaccinated women in the catch-up group endorse positive attitudes toward the HPV vaccine (i.e., good, beneficial, desirable, useful, effective) and express interest in HPV vaccine uptake (Fernandes et al., 2018; Schmidt & Parsons, 2014). In fact, 65% to 75% of college women (Allen et al., 2009; Gerend & Magloire, 2008; Hopfer & Clippard, 2011) and 75% of college men report willingness to receive the HPV vaccine (Daley et al., 2010; Liddon et al., 2010). However, only an estimated 12% of females and 3% of males initiate HPV vaccination after the age of 19 years (Williams et al., 2017).

Given that HPV vaccination among the catch-up group would reduce the burden of HPV infection and individuals in this group have reached age of medical consent, it seems intuitive to develop targeted interventions to increase uptake. Furthermore, the catch-up group overwhelmingly endorses willingness to receive uptake and the college campus offers an ideal setting for dissemination of vaccine interventions. Thus, it is imperative to understand facilitators and barriers to uptake among the catch-up group and use this information to inform effective interventions. One way to examine these factors

is through the lens of a behavioral change model, such as the Theory of Planned Behavior, which has historically helped identify and address factors that influence behavior.

Theory of Planned Behavior

The Theory of Planned Behavior (TPB), introduced by Ajzen (1985; 1991) is an extension of the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975) as a model to understand and predict behavior. The TPB proposes that the most proximal antecedent of performing a behavior is intention to engage in the behavior (Ajzen, 2002). Intention is an indication of a person's readiness and conscious plan to perform a given behavior. This premise is supported by research which has shown that medium-to-large changes in intention result in small-to-medium change in behavior (Webb & Sheeran, 2008). According to the TPB, three factors influence intention, including: personal attitudes, subjective norms, and perceived behavior control. *Personal attitudes* are positive or negative appraisals of the health behavior and includes consideration of the outcomes of performing the behavior. One develops an attitude based on the consequences and or the expected costs incurred by performing the behavior. *Subjective norms* are an individual's perception of the likelihood that significant referent others will approve or disapprove of the individual engaging in the behavior. This encompasses perceived social pressure by individuals or groups to perform or abstain from the behavior. P*erceived behavioral control* (PBC) encompasses both the extent to which an individual believes the desired health behavior is within one's control and one's confidence in performing the behavior. PBC includes both internal (e.g., skills) and environmental factors (e.g., cost, travel) that inhibit or facilitate implementation of the behavior. PBC is based on personal experience with the behavior, experiences of referent others, available resources, and opportunities to engage with the behavior. Ajzen (2002) proposed that PBC had two distinct measurable

components: self-efficacy (perceived self confidence in performing the behavior) and controllability (perceived degree of control over the behavior). Ajzen suggested that depending on the purpose of the investigation, PBC can be measured as a single construct or two unique factors.

The TPB has been applied to a range of health-related behaviors including smoking (e.g., Conner et al., 2006), exercise (e.g., Abraham & Sheeran, 2004), condom use (e.g., Yzer et al., 2001), and risky sexual behaviors (e.g., Armitage & Conner, 2001; Peyman & Oakley, 2009). Meta-analytic reviews of the TPB provide consistent support for its predicative ability for behavioral intentions (Armitage & Conner, 2001; McEachan, et al., 2011). Armitage and Conner (2001) reviewed 185 studies that utilized the TPB and found the model accounted for 39% of the variance in intention and 27% of the variance in behavior. McEachan and colleagues (2011) found that the predictive ability of the TPB was discrepant based on the type of behavior studied. Specifically, the TPB demonstrates enhanced predictive ability for behaviors such as physical activity and diet behaviors (23.9% and 21.2% variance explained, respectively) than behaviors like safer sex practices and drug use abstinence (approximately 15% of variance explained). The most recent meta-analysis (Sheeran et al., 2016), indicated that experimental changes in attitudes, subjective norms, and PBC led to medium-size effects in *intention* ($d+ = .48$, .49, and .51, respectively). Additionally, interventions that increased positive attitudes and subjective norms had an overall small-to-medium sized effect on behavior ($d+ = .38$ and .36, respectively), and increasing PBC had a medium size effect on behavior ($d+ = .47$). Together, these studies provide extensive support for the predictive ability of the TPB and suggest that interventions that target the TPB variables can impact both intent and behavior change.

Given the TPB's promise in understanding behavior change, researchers are exploring enhanced models to increase its predictive power and reduce variance that remains unexplained. Some have argued that the model is too dependent on rational reasoning (Sniehotta et al., 2014) and suggested that the theory's utility could be increased by the addition of an affective component such as anticipated regret (AR) (Conner et al., 2006; Conner et al., 2015). Regret is a negative emotion experienced when one imagines or realizes an alternate outcome could have occurred if one behaved differently (Zeelengerg & Pieters, 2007). Anticipated regret can motivate one's behavioral decisions to prevent an expected negative outcome (Rivis et al., 2009; Sandberg & Conner, 2008). One can experience anticipated regret of *action* which discourages behavior (e.g., anticipated regret of having unprotected sex discourages sexual activity) or anticipated regret of *inaction* which encourages behavior (e.g., anticipated regret of not obtaining HPV vaccination and developing cancer encourages HPV vaccine uptake). Anticipated *inaction* regret is more reliably associated with behavioral intention than *action* regret (Brewer et al., 2016).

Anticipatory regret (AR) has been integrated into interventions that targeted behaviors such as risky sexual practices (e.g., Richard et al., 1996), condom use (Bakker et al., 1997), cancer prevention (e.g., de Nooijer et al., 2004), and exercise (Abraham & Sheeran, 2004). In a meta-analysis of studies that examined the role of AR on health outcomes, Brewer and colleagues (2016) found that AR was associated with both increased intention and engagement in desired health behavior. Furthermore, Sandberg and Conner (2008) found that AR added an additional 7% to the variance of intent beyond the traditional TPB variables. Based on these findings, AR is recommended as a standard variable in health behavior change models.

Theory of Planned Behavior and HPV Vaccine among the Catch-up Group

Knowledge and Attitudes

There is a growing body of literature that has applied the TPB to HPV vaccine behavior. Ferrer and colleagues (2015) identified thirty-one studies that reported using at least one health behavior model or framework to specifically examine HPV vaccine uptake. They found that the two most common models, the TPB (Ajzen, 1985, 1991) and the Health Belief Model (HBM) (Rosenstock, 1974, 2005; Hochbaum, 1958) were utilized in approximately 85% of studies. There is evidence that the TPB predicts a significant amount of variance (54%) in intent for HPV vaccination (e.g., Juraskova et al., 2012) and is superior at predicting vaccination uptake than the HBM (Gerend & Shepherd, 2012). The following is a review of extant research on HPV vaccine beliefs and uptake among the catch-up group within the TPB framework.

Attitudes about HPV vaccination are informed by one's current awareness and knowledge of HPV and the impact of uptake. Increased education about HPV and the HPV vaccination results in increased positive attitudes and willingness to engage in uptake (Roussos-Ross et al., 2017). Unfortunately, based on a review of 28 studies assessing HPV and HPV vaccine knowledge among the catch-up group, young adults lack critical knowledge necessary to make behavior change (Brewer & Fazekas, 2007). Specifically, the catch-up group does not have accurate knowledge about rate of infection, mode of transmission, susceptibility, and long-term sequelae (Bendik & Mayo, 2011; Krawczyk et al., 2012). Unfortunately, lack of knowledge about HPV and the vaccine has persisted despite continued efforts to increase uptake. Thompson and colleagues (2018) examined HPV knowledge among two cohorts of females in the catch-up group (2007and 2015) and found that while knowledge about HPV had a statistically significant increase, the difference in mean correct answers was only 1.2 points (14.6 vs.

15.8). Thus, on average, individuals in the latter cohort lacked accurate knowledge on approximately 8 of 23 questions. The second cohort was more likely to correctly identify that there is a vaccine for women that prevents certain types of HPV, HPV can cause genital warts and cervical cancer, and males can also contract HPV. Continued misperceptions about HPV among the catch-up group is concerning because vaccine intent and uptake are consistently correlated with HPV-related knowledge (e.g., Allen et al., 2009; Bendik & Mayo, 2001; Ratanasiripong, 2012).

Lack of HPV knowledge and vaccine awareness is particularly pronounced among college males and is a critical barrier to HPV vaccination (Hunter & Weinstein, 2016). This is understandable since early marketing campaigns for vaccination were geared towards women and cervical cancer prevention (Fontenot et al., 2014; Staggers et al., 2012). At a southeastern university in the United States, 68% of a mixed gender sample did not know that males were eligible to receive HPV vaccination and only 40% knew that HPV caused cancer in males (Richman et al., 2012). Similarly, Tatar and colleagues (2017) found that a large proportion of their male college sample did not know basic information about HPV, such as there were many types of HPV, that it causes genital warts, and that most individuals will get HPV at some point in their life. Regarding vaccination, most males did not know a vaccine was available for males or that it protects against cancers other than cervical and genital warts (Tatar et al., 2017). Males in the catch-up group also report inaccurate beliefs about the vaccine such as vaccine is not available for men and vaccination would be stigmatizing (Pitts et al., 2017). However, brief education about the HPV vaccine resulted in males in the catch-up group endorsing that HPV vaccine uptake could lead to beneficial outcomes, such as protecting others and alleviating anticipated regret (Pitts et al., 2017).

A common theme among the catch-up group is an inaccurate assessment of one's susceptibility to acquiring HPV. Research suggests that 50%-84% of the catch-up group do not feel susceptible to acquiring HPV and that the severity of HPV infection does not warrant vaccination (Licht et al., 2010; Lopez & McMahan, 2007; Rambout et al., 2014). Because HPV is an STI, it is often incorrectly associated with risky sexual behaviors. In fact, being in a monogamous relationship or not currently sexually active are often reported as the main reasons for not getting vaccinated (Burke et al., 2010; Wilson et al., 2016; Zimet et al., 2010). The catch-up group indicated a preference to pursue vaccine uptake once they are sexually active, which is not in-line with recommended practices (Thompson et al., 2016). Unfortunately, research suggests that women who have only one sexual partner have an average lifetime risk of 85% for HPV infection (Chesson et al., 2014).

In summary, both males and females in the catch-up group lack correct understanding of HPV and have limited awareness of the vaccine. Furthermore, much of the catch-up group's knowledge is incorrect and based on misperceptions. Without accurate education one cannot form an attitude in-line with vaccination uptake; thus, this remains a barrier to increasing uptake among this population.

Subjective Norms and Stigma

At a time when those in the catch-up group have increasing autonomy and consent to manage their own healthcare, it is important to understand who they are looking to for normative health behavior. Prior research has suggested that among the catch-up group, subjective norms is the factor across both the TPB and HBM most strongly associated with intent to vaccinate (Allen et al., 2009; Krawczyk et al., 2012). Furthermore, subjective norms consistently predict *intent* to vaccinate (e.g., Fisher et al., 2013; Juraskova et al., 2012; Marchand et al., 2012) and *uptake* (Conroy et al., 2009;

Gerend & Sherpherd, 2012). Among the catch-up group, perceived social support to get the HPV vaccine increases vaccine acceptability and willingness for uptake (Ratanasiripong et al., 2013; Tatar et al., 2017).

Unfortunately, a significant portion of the catch-up group report minimal perceived support for vaccination uptake (Fisher et al., 2013). First, individuals in the catch-up group regularly identify stigma associated with HPV among peers (e.g., vaccination uptake indicates promiscuity) as a barrier to vaccination (Hopfer & Clippard, 2011; Reiter et al., 2011, 2014). Specific qualitative feedback suggested that women abstained from vaccination because their partners expressed messages such as “only promiscuous girls get HPV”; “people with STIs are careless and dirty”; “only those not smart about sex get HPV” (Hopfer & Clippard, 2011). Concerns about stigma can result in avoidance of communication with parents and medical providers about vaccination (Hopfer & Clippard, 2011). Furthermore, those who are infected with HPV experience negative affective responses from significant others, which inhibits them from speaking to their peers about HPV, further perpetuating stigma. HPV infected women report that they hide the fact they have HPV, are ashamed of having HPV, blame themselves for contracting HPV, and find their body disgusting due to HPV (Daley et al., 2010).

Women in the catch-up group identified health care provider recommendation ("*when my doctor pushed the vaccine it made me realize it was important*"); supportive family messages ("*my father offered to pay*"); and peer behavior ("*all my friends have gotten it*") as the main reasons for supporting vaccination (Hopfer & Clippard, 2011). Males regularly endorse peer social norms as a critical component of HPV vaccine acceptance and intent for uptake (Gerend & Barley, 2009; Hopfer & Clippard, 2011; Liddon et al., 2010; Mehta et al., 2014; Rambout et al., 2014; Reiter et al., 2014).

Among the catch-up group, most who received vaccination indicated medical provider recommendation, with as few as 3% initiating HPV vaccine uptake without direct provider support (Kester et al., 2014; Patel et al., 2012). Marchand and colleagues (2012) found that having a health care provider's recommendation was the variable most strongly associated with vaccine uptake in among women 18-26 years of age. Additionally, women in the catch-up group who reported gynecologic care in the past year were more likely to endorse HPV vaccination (Jelastopulu et al., 2016).

Perceived Behavioral Control and HPV Vaccine Uptake

Extensive research has shown that young adults in the catch-up group identify external factors as barriers that undermine feelings that one can get the vaccine if wanted. Overwhelmingly, the catch-up group perceives that vaccine cost, time constraints, transportation, and not knowing where to get the HPV vaccine all reduce a sense of self-efficacy (Conroy et al., 2009; Fernandes et al., 2018; Fontenot et al., 2014; Gerend, Shepherd, & Shepherd, 2013; Hirth et al., 2018; Reiter et al., 2014; Staggers et al., 2012).

Additionally, young adults endorse a major concern about the cost of the vaccination and insurance coverage (Conroy et al., 2009; Patel et al., 2012) and only about 40% would be willing to pay the approximate $400 cost of the vaccine. Similarly, Patel and colleagues (2012) found that for those individuals who did not intend to vaccinate, 42% endorsed cost as a major factor in their decision. It is unclear how this perception may have changed given the Affordable Care Act (ACA) that ensured young adults could remain on their parent's health insurance until the age of 26 years (Healthcare.gov). Additionally, since the earlier research on HPV vaccine, the ACA now requires that private health insurance companies cover preventative services, including immunizations recommended by ACIP without charging a deductible or copayment (Kaiser Family Foundation, 2015). Finally, Merck & Co., Inc., the manufacturer of

Gardasil, offers the Merck Vaccine Patient Assistance Program which is purported to provide the vaccine free of charge to women 19 to 26 years old who do not have health insurance or cannot afford to pay for the vaccine based on annual income (Merck Sharp & Dohme Corporation, 2014).

In a systematic review of studies on vaccination uptake, women in the catch-up group reported that the inconvenience of making health care appointments reduced PBC for vaccine uptake (Rambout et al., 2014). Having consistent contact with a healthcare provider within the past 6 months is significantly associated with the receipt of the HPV vaccine (Caskey et al., 2009), but many in the catch-up group report a reduction in routine health care visits (Willet et al., 2012). This limits access to medical providers, who are endorsed as a preferred source of information about the HPV vaccine (Mullins et al., 2013).

Interventions for Vaccination Uptake among the Catch-up Group

There have been efforts to integrate the TPB research into interventions to increase either intent to vaccinate as a proximal indicator or vaccine uptake among the catch-up population. Much of the earliest research looked as brief educational interventions and included brief HPV educational videos (Brabin et al., 2010; Krawczyk et al., 2012; Vanderpool et al., 2013), written HPV fact sheets (Krawczyk et al., 2012; Lloyd et al., 2009; Patel et al., 2012), and online information with a question-and-answer section (Doherty & Low, 2008). Brief educational interventions have been shown to be effective in increasing college students' HPV-related knowledge, improving results on test-like assessments (e.g., Kester et al., 2014; Staples et al., 2018; Suarez et al., 2018). This is notable because increased knowledge has been correlated with increased intent to vaccinate (Kester et al., 2014; Staples et al., 2018; Suarez et al., 2018).

For example, Staples and colleagues (2018) conducted a 1-hour educational intervention that resulted in improved knowledge scores on 15 of the 16 assessment questions, and 87% of participants endorsed plans to get vaccinated. Suarez and colleagues (2018) had similar results after they asked women at a medical clinic to watch an educational video. Knowledge significantly increased pre- to post-survey and acceptability of the HPV vaccination was endorsed by 76% of participants after intervention, compared to 47.1% pre-intervention.

While there are initial promising findings with education-based interventions, most have not proven to be effective beyond increasing knowledge, especially when considering actual uptake. Most educational interventions have shown little to moderate success, with uptake levels between 6% and 15% (Gerend & Shepherd, 2012; Hopfer, 2012). For example, Patel and colleagues (2012) presented an educational presentation about HPV, distributed an HPV fact sheet, and mailed a reminder for uptake. The intervention did not significantly increase HPV uptake, with only 6% of college participants receiving 1 dose of the vaccine post-intervention (Patel et al., 2012). Similarly, an online educational session tailored based on pre-intervention knowledge demonstrated an increase in HPV/HPV knowledge, but no significant change in intent to be vaccinated or uptake (Bennett et al., 2015). Recent systematic reviews on educational interventions for HPV vaccination uptake have shown that this approach to intervention is limited in its effectiveness to increase intent or actual uptake; thus, suggesting that education is not a sufficient target by itself (Fu et al., 2014; Walling et al., 2016).

These early interventions have also been criticized for lacking proper control and comparison groups. For example, a study demonstrated that a brief educational intervention delivered to college students at a health fair resulted in significant increase in knowledge and intent to vaccinate. However, the reported data was not collected

longitudinally from pre- to post-intervention, but rather looked at two unique participant groups with or without education (Kester et al., 2014).

There have been a handful of studies that have compared educational interventions to a proper control group. For example, Perez and colleagues (2016) randomized participants to either an educational intervention or an attentional control group. The education group had significant improvement in HPV/HPV vaccination knowledge and greater intent to get vaccinated than the control group (Perez et al., 2016). In another study, all participants were provided the initial dose of HPV vaccine and then randomized to the intervention group to watch a 13-minute education video plus CDC fact sheet or to the control group who only received a CDC fact sheet (Vanderpool et al., 2013). The three-dose vaccine was completed by 11% more participants in the intervention group than the control group. Finally, Bennett and colleagues (2015) compared an online, individually tailored educational intervention that automatically adjusted based upon participant baseline knowledge to another intervention group who reviewed the CDC Vaccine Information Statement on the quadrivalent HPV vaccine. At three months post-intervention, knowledge was significantly increased in both groups.

There has been one study, 1-2-3 Pap (Vanderpool et al., 2013), that attempted to include both an affective and educational component to enhance intervention. All participants in the catch-up group were given the first dose of HPV vaccine free of charge and then randomized to either the control standard of care (follow-up reminder calls for dose 2 and 3) or the intervention. The intervention included standard of care plus viewing a DVD which included both didactic information (e.g., susceptibility, vaccine schedule, barriers) and emotive factors (e.g., grandmother narrative about cervical cancer, stigma). Almost half of the women (43.3%) randomized to the DVD intervention completed the 3-dose series, which was 2.44 times more likely than the control group. These findings

support that adding an affective component to TBP and education-based intervention could increase potency.

The Current Study

Given that HPV vaccination uptake remains low and that young adults have increased autonomy in health behavior decisions, those between 18-26 years represent an important population to target for intervention programs. Further, university campuses are promising environments to disseminate information and easily increase uptake among the catch-up group. Turner and Keller (2015) found that among 23 universities, more than 800,000 students used on-campus health centers for more than 4 million encounters. Thus, providing HPV vaccinations on campus would reduce many of the barriers (e.g., transportation, time, not knowing where to obtain uptake). A study on the feasibility of a college-based intervention found that 71% of students endorsed willingness to participate, with 87% citing benefits of convenience and 28% thought getting vaccinated with peers would be helpful.

Thus, the current study aimed to implement a theoretically driven psychosocial intervention to increase HPV uptake among the catch-up group in the context of a college campus. The intervention included an educational component because increased knowledge and awareness is associated with a reduction in negative beliefs about HPV vaccination and an increase in vaccination acceptability (Suarez et al., 2018). However, mere exposure to HPV education, such as CDC brochures distributed to participants, has not been shown to be effective in the long-term and does not necessarily result in increased vaccine uptake (Fernandez et al., 2015). Thus, the current intervention focused on extending an education-based intervention to directly target the TPB variables. Since the catch-up group regularly identifies social support as a facilitator of uptake, the session was designed to provide a social atmosphere (e.g., refreshment, interactive, ability to

invite peers) with an overarching theme to *make a date to vaccinate*. Additionally, the psychosocial intervention targeted means to increase self-efficacy and evoke affective responses (e.g., videos depicting women who wished they had been vaccinated and living with HPV related cancers). The aim was to facilitate peer group endorsement, increase anticipatory regret, and reduce stigma associated with HPV.

Additionally, the intervention provided HPV uptake reminders during the post-intervention follow-up period. Research has demonstrated that vaccination reminder systems (e.g., calls, postcards) are effective for increasing vaccination uptake by as much as 20% (see Jacobson & Szilagyi, 2005 for a review). Further, technological advances include short messages services (SMS; text messages), which allow for cost effective, rapid communication and are largely popular among young adults. Text messaging has already been utilized as a tool in sexual health for reminders, health promotion, adolescent vaccination (Kharbanda et al., 2011; Lim et al., 2008).

Finally, the aim was to compare a psychosocial intervention with both an education only intervention and a control group. Previous research has compared to either an intervention or a control group, but to the researcher's knowledge no previous research has compared two interventions (psychosocial vs. education) to a control group. This will hopefully illuminate factors that make an intervention for the catch-up group most effective.

Hypotheses

Broadly speaking, the current study hypothesized that the Psychosocial Intervention Group (PSIG) would be superior compared to both the Informational Intervention Group (IIG) and No Intervention Control Group (NICG) in terms of increasing intent to vaccinate and actual uptake of HPV vaccine. The specific hypotheses are outlined below.

Hypothesis 1: Within Group Changes in Knowledge and TPB Variables from Pre- to 1-week Test Follow-up

Hypothesis 1a: HPV and HPV vaccine knowledge would significantly increase from pretest to 1-week follow-up for both the PSIG and IIG, but not for the NICG.

Hypothesis 1b: Average scores in all of the TPB variables would significantly increase from baseline to 1-week follow-up for the PSIG. Thus, after the psychosocial intervention, participants would report increased attitudes, subjective norms, self-efficacy, anticipatory regret, and intent to vaccinate.

Hypothesis 1c: Average scores in attitudes would significantly increase among participants in the IIG from baseline to 1-week follow-up. However, this intervention group would not report significant change in the other TPB variables.

Hypothesis 1d: There would be no significant change in TPB variables from baseline to 1-week follow-up for the NICG.

Hypothesis 2: Between Group Differences on Knowledge and the TPB Variables at 1-week Follow-up

Hypothesis 2a: PSIG would have significantly more knowledge in HPV and the HPV vaccination than either the IIG or NICG.

Hypothesis 2b: The PSIG group would report significantly more positive attitudes about the vaccine as well as increased subjective norms, PBC, anticipatory regret, and intent than either the IIG or the NOCG.

Hypothesis 2c: The IIG would have a significantly larger increase in HPV and HPV vaccine knowledge than the NICG.

Hypothesis 3: Mixed Between-Within Differences on the Knowledge and TPB Variables

Hypothesis 3a: There would be a significant interaction effect between type of intervention and time from pre- to post-intervention on knowledge and the TPB variables. In particular, it was predicted that the Psychosocial Intervention would create a greater significant increase in knowledge than the No Intervention and a greater significant increase in the TPB variables in comparison to both the Informational Intervention and the No Intervention.

Hypothesis 4: Vaccination Uptake at 6-month Follow-up

Hypothesis 4a: Participants in the PSIG would endorse vaccination uptake at a significantly higher rate than either the IIG or the NOCG. No vaccination uptake is expected for the NOCG.

Hypothesis 5: Acceptability of the Psychosocial Intervention

Hypothesis 5a: Participants in the PSIG would report greater acceptability of the intervention session and greater willingness to recommend the intervention to a friend.

Hypothesis 6: Predictors of Variance in Intent to Vaccinate at 1-week Post-Intervention

Hypothesis 6a: HPV/HPV vaccine knowledge and the TPB variables would significantly contribute to the variance in intent to vaccinate at 1-week. Those factors unique to the PSIG (i.e., subjective norms, PBC, anticipatory regret) would be unique contributors.

Hypothesis 7: Predictors of HPV Vaccination at 6-month Follow-Up

Hypothesis 7a: The model consisting of HPV/HPV vaccine knowledge and TPB variables at 1-week follow-up would be able to accurately differentiate between those participants who did/did not choose to obtain HPV vaccine uptake at 6-month follow-up.

CHAPTER II:

METHODS

Participants

After the initial pre-screening questions, 178 eligible participants were contacted to participate in the study. Forty-nine of these individuals never responded to initial contact and 18 participants completed the randomization process, but dropped out prior to the 1-week follow-up. Of these 18 participants, 12 were randomized to the PSIG, 2 to the IIG, and 4 to the NICG. Among the 12 randomized to the PSIG, 5 contacted the researcher after pretest to indicate they could not commit to the time and travel to campus required for the PSIG; 3 participants realized they were older then the age requirement (>26 years), and 4 participants completed pretest but never scheduled for an intervention session. The two participants in the IIG completed randomization but did not complete the Informational Intervention. Finally, the four who were randomized to the NICG, completed the pre-test but did not respond to complete the 1-week follow-up.

Thus, the final sample (N = 111) included 95 (85.6%) female and 16 (14.4%) male students between the ages of 18 – 26 years (M = 23.08, SD = 2.63). Participants were primarily Caucasian (n = 67; 60.36%), with other students identifying as multiracial (n = 10), Asian (n = 8), African American (n = 6), or other (n = 20). Forty-four (39.6%) students identified as being of Hispanic/Latino descent. Most students were enrolled in undergraduate courses (n = 102, 91.9%) while the remaining nine were graduate students. Participants were randomly assigned to one of the three intervention conditions which included 36.9% (n = 41) in the Psychosocial Intervention Group (PSIG) and 31.5% (n = 35) in both the Informational Intervention Group (IIG) and No Intervention Control Group (NICG). A series of chi-square tests for independence (Pearson chi-square value) indicated no significant difference among the three group on proportions of gender,

χ^2 (2, n = 111) = .49, p = .78; Hispanic ethnicity, χ^2 (2, n = 111) = 1.28, p = .53; or race, χ^2 (8, n = 111) = .10.42, p = .24. Of note, in the race calculation, 9 cells violated the minimum expected frequency. See Table 1 for demographic makeup of the three intervention groups.

Procedure

Participants were recruited from the University of Houston-Clear Lake Psychology Department participant pool. Students enrolled in psychology courses signed-up for the participant pool to obtain research credit for the semester. Initially, students completed the Psychology Research Pool Mass Testing Pre-screen which is a series of questions designed to match students with appropriate studies. Students between 18-26 years and who denied HPV vaccination uptake were identified as potential participants and then contacted by the researcher for further instruction. The participant population included all eligible males and females of all ethnic backgrounds. Exclusion criteria included being under legal age of consent, over the age of 26 years, or having already received the HPV vaccine. If the potential participant expressed interest in signing up for the study, they were sent a link to access the study through a secure website (www.surveymonkey.com).

Once logged into Survey Monkey, participants were provided an explanation of the randomization process and asked to select "Option A, Option B, or Option C." Initially, Option A randomized to the PSIG, Option B to the IIG, and Option C randomized to the NICG (see Appendix A). Randomization order was changed throughout the semester to discourage self-selection into a specific condition. Upon picking an option, the participant was presented with the appropriate consent form and subsequently directed to the survey on the secure website (see Appendices B-D for

consent forms). Survey Monkey utilized a logic feature, which connected each option with the correct consent form. For participants in the NICG, the informed consent

Table 1

Descriptive Statistics by Intervention Group

	Psychosocial Intervention (n = 41)	Informational Intervention (n = 35)	No Intervention (n = 35)
Gender			
Male	7 (17.1%)	4 (11.4%)	5 (14.3%)
Female	34 (82.9%)	31 (88.6%)	30 (85.7%)
Mean Age (SD)	22.83 (2.94)	23.34 (2.26)	23.11 (2.75)
Race			
African American	1 (2.44%)	3 (8.57%)	2 (5.71%)
Asian	5 (12.20 %)	5 (14.29%)	2 (5.71%)
Caucasian	22 (53.66%)	21 (60.0%)	24 (68.57%)
Multiracial	3 (7.32%)	5 (14.29%)	2 (5.71%)
Other	10 (24.39%)	3 (8.57%)	5 (15.29%)
Ethnicity			
Hispanic	19 (46.3%)	12 (34.3%)	13 (37.1%)
Non-Hispanic	22 (53.7%)	23 (65.7%)	22 (62.9%)

included consent for the pretest, 1-week post-test, and 3-and-6-month follow-up surveys. The IIG consented for the pretest, 1-week post-test, 3-month, and 6-month surveys. The PSIG, consented for the pretest, psychosocial session, 1-week post-test, 3-month and 6-month follow-up surveys, and vaccination message reminders. See Figure 1 below for flow chart of research study.

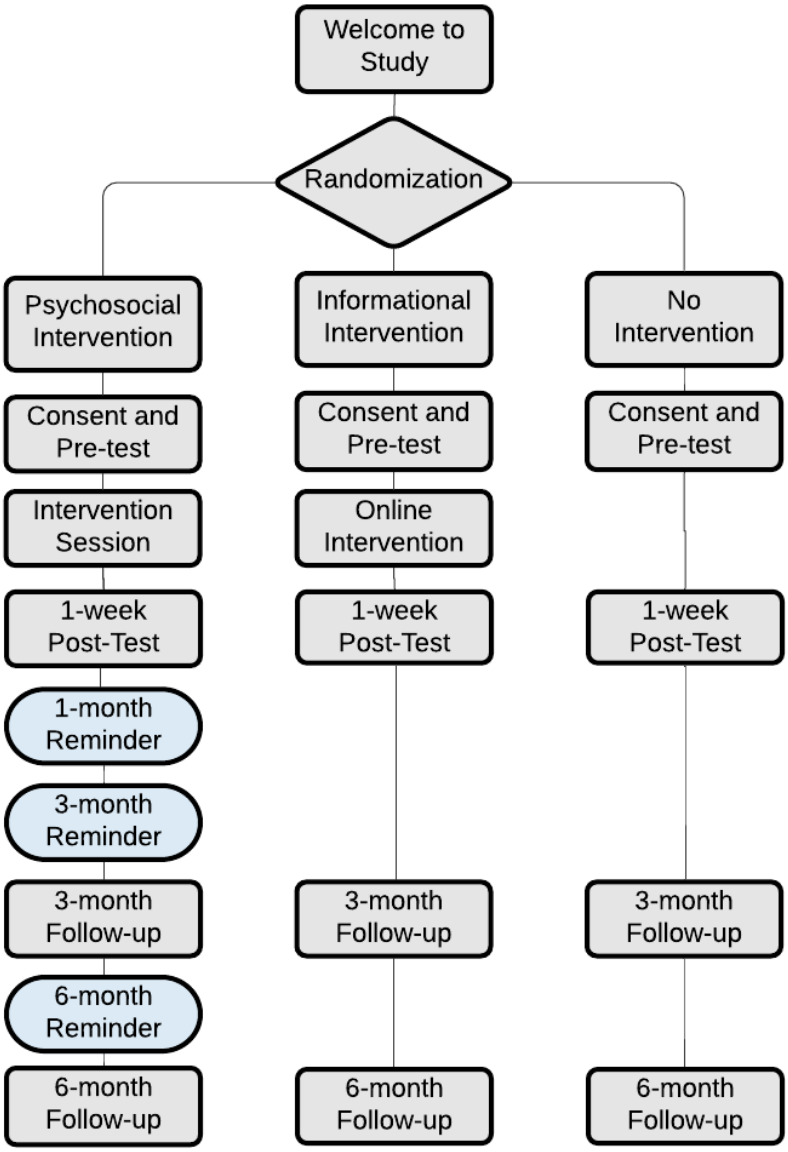
After reading the consent form, participants were asked to click on a box indicating that they read and understood the information within the consent. Next, all

participants were asked to develop an identification code that would connect their survey data. To create the 6-digit code, participants were prompted to utilize the last three numbers of their phone number and the last three letters of their guardian's name (see Appendix E). Following this, all participants were presented with the same pretest questionnaire which included demographics, sexual history, knowledge about HPV and the HPV vaccine, and TBP variables (see Appendix F). After completing the pretest, participants were directed to clink on a separate survey. Once at the new webpage, participants entered their name, email, and a 6-digit code utilized as identification at each subsequent follow-up survey (see Appendix G). The participant identification remained separate from data collection and was only used for the purpose of allotting extra credit, notification if participant received a gift card in the raffle, and for the purpose of sending a link to follow-up surveys.

Participants had the opportunity to earn extra credit for study participation. Participants in the NICG were allotted 1 hour of credit immediately following completion of the 1-week post-test. The IIG earned 2.5 hours of research credit after completion of the pretest, intervention, and 1-week post-test. The PSIG was allotted 3.0 hours of research credit after the completion of the pretest, psychosocial intervention, and 1week post-test. Further, participants who completed assessment at the 6-month time point were entered into a raffle for a chance to win 1 of 10 ($25.00) gift cards. Participants that began the study but withdrew prior to finishing were credited commensurate with amount of study completed. After the pretest assessment, procedures for each condition differed, which is described below.

Figure 1

Flow Chart of Research Study



No Intervention Control Group

After the pretest assessment, participants in the NICG were contacted by email to complete a 1-week post-test. Participants were provided a link to the survey, which was

posted on Survey Monkey. Participants entered their unique 6-digit code and were instructed to complete the survey without utilizing resources. Next, participants answered the same questionnaires from the pretest assessing HPV knowledge, HPV vaccine knowledge, and the TBP variables (attitudes, subjective norms, PBC, AR, intent). A validity check at the end of the survey asked participants if they followed instructions and completed the question without using resources for information (see Appendix H). Next, the participants completed two brief (<10 minutes) follow-up questionnaires at 3- and 6-months via an emailed link which directed them to www.surveymonkey.com. The researcher made three attempts at each time point to contact the participant to complete the survey. The 3- and 6-month follow-up surveys included the same TPB questions as pretest, questions related to communication with significant others about the HPV vaccine, and asked to indicate HPV vaccination uptake. If the participant initiated uptake, they were asked to specify how many shots received and intent to complete uptake. If the participant denied vaccine uptake, they were asked intent to initiate within the next 6 months (see Appendix I).

Informational Intervention Group

After the pretest assessment, participants in the Informational Intervention Group (IIG) were immediately directed to the Survey Monkey study. Participants were asked to read three online educational brochures regarding HPV and the HPV vaccine. Participants were informed that the task would take no longer than 45 minutes (see Appendix J). Participants were provided a link to a two-page brochure developed by The United States Department of Health and Human Services Center for Disease Control and Prevention (2017), which provided a summary of information regarding HPV vaccination Next, Participants clicked on a link to access The Centers for Disease Control (CDC, 2017) fact sheet on HPV genital infection. The three-page document provided education

on HPV, infection rates, associated medical consequences, eligibility for vaccination, and the ACIP vaccination schedule. Finally, participants read a brochure developed by the Immunization Action Coalition (IAC, 2017) and reviewed by the CDC. The document included 30 commonly asked questions about HPV and the HPV vaccine).

One week following the informational intervention, participants were emailed a link for the 1-week post-test to reassess knowledge about HPV and the HPV vaccine. Participants answered identical questions to pretest about HPV knowledge, HPV vaccine knowledge, and the TBP variables (attitudes, subjective norms, PBC, AR, intent). At the end of the survey, participants were asked if they followed the directions and completed the task without help from internet resources, and then clicked on "Yes" to verify their response (see Appendix H).

At the 3-month follow-up, participants were emailed a link to complete a brief survey hosted on Survey Monday. The survey asked participants to indicate if they had spoken with significant others about HPV or the HPV vaccine and if they initiated HPV vaccination uptake. If the participant indicated vaccination uptake, they were asked to specify how many shots received thus far and intent to finish the series. Participants who denied HPV vaccination uptake were asked about intent to initiate the vaccine within the next 6 months. Participants were also asked to indicate reasons for not initiating the HPV vaccination series (see Appendix K). Finally, at the 6-month follow-up, participants were emailed a link to the final survey, which assessed the same questions given at the 3-month time point (see Appendix L).

Psychosocial Intervention Group

After completing the pretest, the researcher contacted the individual to schedule date of attendance for the psychosocial intervention session. Participants were emailed confirmation of the date and time and informed that they could bring up to two other

UHCL student peers to the psychosocial session. The participant received an email reminder two days prior to the psychosocial session. If a participant arrived at the session with a UHCL student peer, the researcher offered the peer the opportunity to participate in the study. If the student elected to participate, the researcher provided a paper version of the consent and pretest to the student to complete prior to the psychosocial session beginning. Student peers could attend the session regardless of study participation.

The participant attended the one-time, 45-minute psychosocial intervention session located in a reserved classroom on the UHCL campus. The researcher planned for each session to have a maximum of 15 students to allow for a social, yet personalized interaction; however, no session had more than 6 participants. Participants were provided with a beverage and small snack at the start of the session. Each psychosocial session was conducted by the student researcher and consisted of five components: HPV education, HPV vaccination education, discussion about barriers to HPV vaccination, affective response to obtaining or abstaining from vaccination uptake, and developing a plan to get vaccinated (see below for session curriculum). At the end of the session, participants indicated their preference for either text or email message reminders to be sent at 1-month, 3-month, and 6-month time points to align with the HPV vaccination schedule (see Appendix M for sample reminders).

One week following the psychosocial intervention, the researcher emailed the participant a link to Survey Monkey to complete the 1-week post-test survey (see Appendix N). Participants were asked the same questions as on the pretest regarding HPV/HPV vaccination knowledge and TBP variables. Additionally, the participant answered questions about the acceptability and effectiveness of the psychosocial intervention (e.g., would student recommend the session to a friend, did the student increase knowledge about HPV/HPV vaccination) and allowed space to provide

qualitative feedback on ways to improve the psychosocial intervention. At the 3-month follow-up, participants were asked if they had spoken to significant others about HPV or the HPV vaccine and if they had initiated HPV vaccination uptake. If the participant endorsed uptake, they were asked to specify number of shots received and intent to finish the series. If the participant denied HPV vaccination uptake, they were asked about intent to initiate uptake within the next 6 months. Additionally, participants indicated reasons for not initiating uptake (see Appendix K). At the 6-month follow-up, participants were emailed a hyperlink to the final survey, which was comprised of the same questions as the 3-month time point (see Appendix L).

Psychosocial Session Curriculum

Objective 1: HPV Knowledge

The goal of this objective was to provide the participant with pertinent information about HPV. The participants were informed that HPV is the most common STI in the United States, infecting more than 50% of sexually active men and women throughout their life span. Specific statistics on incidence and prevalence were provided. Participants were taught about HPV transmission, risk factors for acquiring HPV (e.g., early sexual debut, multiple partners), and behaviors to mitigate risk (e.g., condom use). The researcher described differences between low and high-risk strains of HPV and associated sequelae. Specifically, participants were instructed that low risk HPV is typically cleared naturally, causing mild abnormalities on pap tests or genital warts; while high risk strains are associated with cancer of the cervix, vulva, vagina, anus, penis, and throat/mouth. The researcher discussed that HPV is largely asymptomatic unless detected in a pap smear, visible as genital warts, or develops into cancer. Participants were provided with statistics on HPV-associated cancers, including prevalence and incidence. Participants were informed about genital wart growth areas, emotional distress from

managing warts, and impact warts have on sexual activity. The researcher clarified that HPV is not associated with HIV or genital herpes.

Objective 2: HPV Vaccination Knowledge

Participants were informed about FDA-approved HPV vaccines (Gardasil nonavalent, Gardasil quadravalaent, and Cervarix) and details about HPV serotypes covered by each vaccine. Participants were informed of CDC and ACIP recommendations for vaccination among the catch-up group and provided with the vaccination schedule. The researcher discussed the expense of vaccination uptake and safety systems. Specifically, participants were informed that the HPV vaccines are approved by the FDA and deemed safe and effective by the CDC. Additionally, the researcher explained the three safety systems of licensed vaccines monitored by the CDC, including the Vaccine Adverse Event Reporting System (VAERS), the Vaccine Safety Datalink, and Clinical Immunization Safety Assessment. The intervention focused on VAERS outcome data, including total number of adverse event reports compared to total doses of vaccine distributed, the differences between adverse event classifications, and a hyperlink for additional information. Participants were encouraged to discuss safety concerns and relevant individual factors with a medical provider.

Objective 3: Let's Talk About It – Barriers and Skills Building

In this section, the researcher facilitated a discussion on perceived barriers to HPV vaccination uptake. The discussion covered financial factors, vaccine scheduling, and perceived stigma around the vaccination. Emphasis was placed on de-stigmatizing HPV and vaccine uptake by challenging beliefs frequently associated with people who acquire HPV infections (e.g., promiscuous, dirty, unsafe sex practices, infidelity) with evidenced-based information. Participants were encouraged to make interested, informed, and individual (three I's) decisions for their own health. Next, the researcher helped

participants develop effective and assertive communication for discussing HPV vaccination uptake with parents, medical provider, or partner. The researcher encouraged the following: (1) discuss the vaccine as a form of cancer prevention, (2) compare HPV vaccine uptake to a vaccine for breast or prostate cancer, (3) normalize vaccination by educating that more than 50% of sexually active individuals have HPV, (4) HPV vaccination is most effective when given prophylactically, (5) consider the financial cost for vaccination series vs. the cost (emotional, physical, financial) of developing an HPV-related cancer, and (6) vaccination uptake protects future partners and reduces community spread.

Objective 4: I've Got a Feeling

During this section, participants viewed two brief documentary videos. The first video, titled *Living with Gynecological Cancer Women's Stories - Claire's Story of Cervical Cancer* (https://www.youtube.com/watch?v=MRAm8T5wic0), conveyed the story of a young woman in her twenties who is diagnosed with cervical cancer related to HPV. The video outlines her treatment and sentiments by her male partner. The second video portrays a woman from Florida who sought treatment at MD Anderson Cancer Center for cervical cancer (https://www.youtube.com/watch?v=XxizSTU_nzo). The video shows her seated with her sons while she discusses the "losses" she experienced while fighting cancer (e.g., chemotherapy, time away from family, missed experiences with kids and life). She reviews her decision to vaccinate both of her sons and emphasizes that "three HPV shots now is worth it to prevent cancer later." The videos depicted individuals who suffered the consequences of HPV-related cancer with the intent to evoke emotional responding and cognitions related to anticipatory regret.

Objective 5: Let's Make a Plan

In this portion of the session, the researcher helped participants develop a plan to obtain vaccination. Participants were provided with a list of locations where HPV vaccination was offered, including the campus health clinic. The overarching message was "make a date to vaccinate." The researcher suggested participants share their newly learned knowledge with peers and invite them to vaccinate. Finally, participants were encouraged to schedule calendar reminders consistent with the vaccine schedule for 2nd and 3rd doses.

At the end of the session, participants were provided with handouts outlining the Psychosocial Intervention Session's five objectives, including:

- Two CDC fact sheets on HPV and HPV vaccination. The first targeted a gender-neutral audience (see appendix O), and the second one is specifically for males (see Appendix P).
- *Let's Talk About It (HPV 1-2-3!)* included a bulleted list of ideas for effective communication with peers, family, and medical professionals about the HPV vaccine (see Appendix Q).
- The third handout, *Make a Plan (HPV 1-2-3!),* provided step-by-step suggestions for obtaining the vaccine. The steps included: (1) research further to make informed choice for your healthcare and future, (2) talk with parents, partners, and medical providers about individual factors, (3) call insurance company for information about coverage, (4) choose a location, and (5) make a date to vaccinate (see Appendix R).
- The fourth handout, *Make a Plan - Find a Location*, listed locations with telephone numbers and addresses of nearby clinics that offered HPV vaccination (see Appendix S).

Measures and Materials

Demographics and Sexual/Gynecological Health History

The survey contained demographic questions (i.e., age, gender, race/ethnicity, health insurance coverage, relationship status, and sexual orientation) and sexual history questions (i.e., age of first sexual experience, current sexual practices, number of lifetime sexual partners, and STI history). Participants were asked about gynecological care and contact with individuals previously diagnosed with HPV and/or associated medical sequalae (see pretest in Appendix F).

HPV and HPV Vaccine Knowledge

To assess knowledge, the current study utilized a previously validated scale (Waller et al., 2012.) The scale has 23 items total, with a 16-item subscale assessing HPV knowledge and a 7-item subscale measuring HPV vaccine knowledge. Each item has a statement prompt (e.g., "HPV is very rare"; "The HPV vaccine requires three doses"), and the response options are *True, False,* or *I don't know*. Both the total scale and the HPV knowledge subscale have shown good reliability ($\alpha = .84$ and $\alpha = .85$, respectively). The HPV vaccination items have had moderate internal consistency $\alpha = .56$, but consistent test-retest reliability $r_{test\text{-}retest} = .69$). Cronbach's alpha in the current sample was similar, $\alpha = .80$ for HPV knowledge and $\alpha = .58$ for HPV vaccine knowledge.

Theory of Planned Behavior Variables

All scales utilized to measure TPB variables were developed in accordance with Fishbein and Ajzen (2010) recommendations that four to seven items be formulated to assess each of the theory's major constructs: attitude, subjective norms, PBC, and intention. In the current study, anticipatory regret was an additional TPB, so it was assessed as such. Each question is measured on a semantic differential scale with polar

adjectives on a seven-point scale. TPB measurement items from the HPV literature were used whenever possible. A total score for each construct was calculated.

Attitudes. The attitude variable assessed the participant's own current judgment towards receiving the HPV vaccine. Participants answered 6 items based on questions from previous research (Fisher et al., 2013). Participants responded to the stem, "For me, getting the Human Papillomavirus vaccine would be. . .” with response choices listed as semantic differentials on a 7-point Likert scale. The adjective pairings were good/bad, foolish/wise, unpleasant/pleasant, unnecessary/necessary, painful/painless, effective/ineffective. Cronbach’s alpha in the current sample demonstrated good reliability, $\alpha = .87$.

Subjective Norms. Subjective norms were measured using a 9-item questionnaire based on previously developed items (Fisher et al., 2013). These questions assessed perceived approval by others of the HPV vaccine. The first five items had the participant respond to the stem, ". . . thinks I should get the human papillomavirus (HPV) vaccine.” The beginning of the statement varied by different referent others including: my parents, my friends, my medical provider, most people who are important to me, my significant other. Other items included, “My friends think the vaccine is important”; “My friends have received the HPV vaccine”; “I would be much more likely to get the HPV vaccine if a friend or significant other went with me”; “It is important for me to have my parent/guardian’s approval before I get the HPV vaccine.” Items were evaluated on a 7-point semantic differential scale ranging from *Not at All* to *Very Much* ($\alpha = .86$ in current sample).

Perceived Behavioral Control. Perceived behavioral control (PBC) measured the participant’s perceived ability to obtain HPV vaccine uptake. PBC was measured with 4 items based on previous research (Fisher et al., 2013; Gagné, & Godin, 2007; Kahn et

al., 2008). The first item stem read, “I am confident that if I wanted to, I could get the human papillomavirus vaccine” with item responses ranging from 1-*Not at all* to 7-*Very much.* The next two items stated, “Whether or not I get the HPV vaccine is completely up to me” and “I feel I would be capable of getting the HPV vaccine.” Participants responded on a semantic differential with opposing adjectives *Definitely True* and *Definitely False.* The last item read, “For me to get the HPV vaccination series is. . .” and the response adjectives were *Extremely Easy* and *Extremely Difficult.* In the current sample, the Cronbach’s alpha was adequate, α = .77. Due to the minimal number of items in the scale, the inter-item correlation was also calculated and equaled 0.45, ranging from 0.25 to 0.66.

Anticipatory Regret. Three items assessed participants’ anticipatory regret (AR) if the HPV vaccine series was not obtained. The items suggested potential negative consequences of inaction, including HPV infection, HPV-related cancers, and partner transmission. The item stem statements were “If I do not get the HPV vaccine and later develop the human papillomavirus infection, I will regret my decision”; “If I do not get the HPV vaccine and later develop cervical or other HPV-related cancers, I will regret my decision”; “If I do not get the HPV vaccine and later transmit HPV to my partner, I will regret my decision.” The items were adapted from previous research (Cox et al., 2014; Hofman et al., 2014). All response scales ranged from 1-*Not at all* to 7-*Very much.* (Cronbach’s alpha was strong in the current sample, α = .86).

Intent. Intent was assessed using three questions, including: “I intend to initiate the Human Papillomavirus (HPV) vaccination series within the next 6 months”; “I intend to get the HPV vaccine within the next 6 months”; “I intend to get all three shots to complete the HPV vaccination series.” All response scales ranged from 1-*Not at All* to 7-*Very Much.* Alpha Cronbach in the current sample indicated good reliability, *α* = .95.

Statistical Analyses

All statistical analyses were conducted on IBM Statistical Package for the Social Sciences (SPSS) Statistics Grad Pack 26.0 STANDARD. First, descriptive statistics including mean age, percent proportions of gender, race/ethnicity frequencies, and sexual health information were calculated to better understand sample characteristics. Subscale scores were calculated for HPV/HPV vaccine knowledge based on total number answered correctly and total scores were calculated for all TPB variables (i.e., attitudes, subjective norms, PBC, AR, and intent).

Next, paired samples t-tests examined the differences from baseline to 1-week follow-up on HPV/ HPV vaccine knowledge and TPB variables for the three intervention groups (Hypothesis 1). To compare possible between group differences (Hypothesis 2), a one-way between-groups multivariate analysis of variance was run, and follow-up univariate analyses conducted on the significant dependent variables. Next, a mixed between-within repeated measures ANOVA was used to test for group differences across time among the three intervention groups (Hypothesis 3). To determine if the PSIG was more successful than the IIG and NICG at increasing vaccine uptake, it was expected that a chi-square test of homogeneity would be used to compare proportion of people who obtained uptake between the three intervention groups. However, in the absence of group sample sizes sufficient to compare through statistical difference testing, frequency and proportions were visually inspected to compare differences in uptake among the three intervention groups (Hypothesis 4). To understand acceptability of the psychosocial intervention, mean scores and standard deviations were calculated for each of the question items (Hypothesis 5). A standard multiple regression analysis was calculated to identify variance and unique predictors of intent to obtain vaccination uptake at 1-week

follow up (Hypothesis 6). Finally, a logistic standard regression assessed the model's ability to predict and differentiate those who did/did not obtain vaccine uptake.

CHAPTER III:

RESULTS

Participant Health Characteristics

Eighty-seven students (88.3%) endorsed health insurance coverage (see Table 2 for details). Over half of the female participants (n = 50; 53%) endorsed having a regular gynecologist and having undergone at least one pap test in their lifetime (n = 56; 58.94%). Of those female students who had a historical pap test, 37 students endorsed having one within the past year, and 19 students within the last 2 years. Six female students endorsed having a history of an abnormal pap test.

At the pretest, 19% (n = 21) of students indicated that they had never engaged in sexual intercourse. Of those that had engaged in sexual intercourse (n = 90), 52% were 18 years old or older at age of sexual debut. Students reported between 0 – 20 lifetime sexual partners (M = 3.57, SD = 4.62) with the majority (82.9%) reporting ≤ 5 lifetime sexual partners and 56% (n = 62) reported 2 or less lifetime sexual partners. Sixty-five students (58.6%) endorsed being *currently* sexually active and 91% reported ≤ 1 sexual partner in the past year. In terms of sexually transmitted infections (STI), only five students (4.5%) indicated a history of being diagnosed with an STI, no students had a history of HPV diagnosis, one student had a diagnosis of genital warts, and none endorsed current treatment for an STI.

Pretest HPV and HPV Vaccination Awareness

Nearly all participants indicated that they had heard of HPV (n = 102; 91.9%) and the HPV vaccine (n = 98; 88.3%); however, most had never spoken with a doctor (n = 82; 73.9%) or parent (n = 75; 67.6%) about the vaccine. Furthermore, students overwhelmingly denied speaking with a friend (n = 76; 68.5%) or significant other (n = 97; 87.4%) about the HPV vaccine.

Table 2

Health Insurance Coverage

Insurance Coverage Type	Frequency	Percent
Parent Insurance	57	51.4
Affordable Care Act	15	13.5
Employer	13	11.8
Partner	11	9.9
School	2	1.8
No Insurance	13	11.7

Findings from Tested Hypotheses

Hypothesis 1: Within Group Changes in Knowledge and TPB Variables from Pre- to 1-week Test Follow-up

Psychosocial Intervention. The psychosocial intervention impacted the TPB variables as expected, demonstrated by a series of paired-samples t-tests (see Table 3 for range, mean, and standard deviation). There was a statistically significant increase in HPV knowledge from pre- to 1-week post-test $t(40) = -10.38$, $p < .001$ with a mean increase of 5.73 correctly answered questions ($\eta^2 = .73$). Furthermore, students significantly increased HPV vaccine knowledge from pre- to 1-week post-test, $t(40) = -5.08$, $p < .001$ with a mean increase of 2.17 correct answers ($\eta^2 = .39$). Students endorsed a more positive attitude towards vaccination uptake, $t(40) = -3.39$, $p = .002$, $\eta^2 = .22$, increased perception that others would approve of vaccination uptake, $t(40) = -6.24$, $p = .001$, $\eta^2 = .21$, and increased PBC about obtaining the vaccine, $t(40) = -2.38$, $p = .02$, $\eta^2 = .12$. The psychosocial intervention increased feelings of AR, but only approached significance, $t(40) = -1.92$, $p = .06$, $\eta^2 = .08$. Finally, the students endorsed significantly more intent to initiate the HPV vaccination series, $t(40) = -2.93$, $p = .01$, $\eta^2 = .17$.

Table 3

Psychosocial Intervention TBP Variables

		Pre-Test		1-Week Post-Test	
Variable	Range	*M*	*SD*	*M*	*SD*
HPV Knowledge	0-13	6.41	3.58	12.15***	0.57
HPV Vaccine Knowledge	0-7	4.27	2.83	6.44***	0.67
Vaccine Attitudes	0-42	27.02	8.92	31.02**	7.06
Vaccine Subjective Norms	0-63	28.22	11.22	34.46***	9.75
Vaccine PBC	0-28	22.07	5.06	23.73*	3.19
Anticipatory Regret	0-21	17.20	4.03	18.17	2.77
Intent	0-21	10.44	6.03	13.17**	4.90

*$p < .05$; **$p < .01$; ***$p < .001$

Informational Intervention. The paired-samples t-tests demonstrated changes as hypothesized with significant increases in knowledge and attitudes, but not the other TPB variable (see Table 4 for range, mean, and standard deviation). Students demonstrated a significant increase in knowledge of HPV, $t(34) = -6.00$, $p < .001$, $\eta^2 = .51$ and the HPV vaccine, $t(34) = -4.16$, $p < .001$, $\eta^2 = .34$. The results also showed increased positive attitudes towards vaccination uptake, $t(34) = -3.15$, $p = .003$, $\eta^2 = .23$. Individuals in the IIG did not report significant changes in subjective norms, PBC, AR, or intent for vaccination uptake (*p*s >.05).

No Intervention. The paired-samples t-test indicated a significant difference in HPV vaccine knowledge between pre and 1-week post-test, $t(34) = 2.43$, $p = .02$, $\eta^2 = .15$; however, scores *decreased* (see Table 5 for range, mean, and standard deviation). Unexpectedly, there was a significant change in subjective norms for this group, $t(34) = -2.31$, $p = .03$, $\eta^2 = .14$, indicating increased perceptions that others would approve of vaccine uptake. There were no other significant changes for the NICG from the pre- to 1-week post-test scores in the TPB variables.

Table 4

Informational Intervention TPB Variables

		Pre-Test		1-Week Post-Test	
Variable	Range	*M*	SD	*M*	SD
HPV Knowledge	0-13	7.03	2.93	10.77***	2.07
HPV Vaccine Knowledge	0-7	3.77	1.77	5.20***	1.45
Vaccine Attitudes	0-42	24.34	6.38	28.31**	6.87
Vaccine Subjective Norms	0-63	24.40	10.64	28.89	11.40
Vaccine PBC	0-28	23.51	3.80	24.11	3.41
Anticipatory Regret	0-21	16.49	4.15	16.43	4.12
Intent	0-21	9.11	5.75	10.31	4.86

*$p < .05$; **$p < .01$; ***$p < .001$

Table 5

No Intervention TBP Variables

		Pre-Test		1-Week Post-Test	
Variable	Range	*M*	*SD*	*M*	*SD*
HPV Knowledge	0-13	8.60	3.16	8.29	2.78
HPV Vaccine Knowledge	0-7	4.89	2.04	4.06*	1.45
Vaccine Attitudes	0-42	25.60	8.07	27.23	8.47
Vaccine Subjective Norms	0-63	24.49	11.48	29.11*	11.26
Vaccine PBC	0-28	21.71	4.64	22.29	4.58
Anticipatory Regret	0-21	16.66	5.36	16.34	5.41
Intent	0-21	9.31	5.69	9.89	4.61

*$p < .05$; **$p < .01$; ***$p < .001$

Hypothesis 2: Between Group Differences on Knowledge and the TPB Variables at 1-week Follow-up

MANOVA: 1-week post-intervention between-group differences. A one-way between-groups multivariate analysis of variance revealed a statistically significant

difference between intervention groups on the TPB dependent variables, $F(14, 204) = 7.24$, $p < .001$, partial $\eta^2 = .33$; Wilk's Lambda = 0.45. When the dependent variables were considered separately, three dependent variables reached statistical significance using a Bonferroni adjusted alpha level of 0.007 (.05/7). The significant variables were HPV knowledge, $F(2, 108) = 36.47$, $p < .001$, partial $\eta^2 = .40$; HPV vaccine knowledge, $F(2, 108) = 35.96$, $p < .001$, partial $\eta^2 = .40$; intent to obtain HPV vaccine uptake, $F(2, 108) = 5.36$, $p = .006$, partial $\eta^2 = .09$. The three groups did not significantly differ on vaccination attitudes, subjective norms, PBC, or AR at 1-week post-test. Thus, follow-up analyses were conducted to identify specific differences among the intervention groups on the significant variables.

Follow-Up univariate analyses. A one-way between-groups analysis of variance showed a statistically significant difference between intervention groups on HPV knowledge, $F(2, 110) = 36.47$, $p < .001$, $\eta^2 = .40$; HPV vaccine knowledge, $F(2, 110) = 35.96$, $p < .001$, $\eta^2 = .40$; and intent to initiate the HPV vaccination series, $F(2, 110) = 5.36$, $p < .01$, $\eta^2 = .09$. Post-hoc comparisons using the Tukey HSD test are presented in Table 6.

Hypothesis 3: Mixed Between-Within Subjects Analysis of Variance

HPV Knowledge. A mixed between-within subjects analysis of variance demonstrated significant main effect for time, $F(1, 108) = 82.56$, $p < .001$, partial $\eta 2 = .43$ and no main effect for intervention group, $F(2, 108) = 1.60$, $p = .21$, partial $\eta 2 = .03$. However, there was a statistically significant interaction between intervention and time on HPV Knowledge, $F(2, 108) = 28.29$, $p < .001$, partial $\eta 2 = .34$. Thus, follow-up testing was completed to assess for simple main effects for both intervention group and time.

Table 6

Post-Hoc Comparisons for 1-week Post-test Means

						95% Confidence Interval	
Variable	Group 1	Group 2	Mean Difference	Std. Error	*p*	Lower Bound	Upper Bound
HPV Knowledge							
	PSIG	IIG	1.38	0.46	.01	0.29	2.46
	PSIG	NICG	3.86	0.46	.00	2.78	4.94
	IIG	NICG	2.49	0.47	.00	1.36	3.61
HPV Vaccine Knowledge							
	PSIG	IIG	1.24	0.28	.00	0.57	1.91
	PSIG	NICG	2.38	0.28	.00	1.71	3.05
	IIG	NICG	1.14	0.29	.00	0.45	1.84
Intent							
	PSIG	IIG	2.86	1.10	.03	0.23	5.48
	PSIG	NICG	3.29	1.10	.01	0.66	5.91
	IIG	NICG	0.43	1.15	.93	-2.30	3.15

Regarding simple main effects for intervention group, there was a statistically significant difference in HPV Knowledge between interventions at the pre-test time point, $F(2, 108) = 46.93$, $p = .01$, partial $\eta 2 = .08$. Specifically, HPV Knowledge was significantly less in the PSIG compared to the NICG ($M = 2.19$, $SE = .75$, $p = .01$), but not statistically different from the IIG ($M = 0.61$, $SE = .75$, $p = .69$). Further, there was no statistical significance in HPV knowledge between the IIG and the NICG ($M = 1.57$, $SE = .78$, $p = .11$).

There was also a simple main effect of group on HPV Knowledge at the 1-week post-test of the intervention, $F(2, 108) = 36.47$, $p < .001$, partial $\eta 2 = .40$. Specifically,

HPV Knowledge was significantly greater in the PSIG than both the IIG (M = 1.37, SE = .46, p = .001) and the NICG (M = 3.86, SE = .46, p < .001). Additionally, HPV knowledge in the IIG was significantly greater than the NICG (M = 2.50, SE = .47, p < 001).

For simple main effect for time, there was a statistically significant effect of time on HPV knowledge for the PSIG, $F(1, 40) = 107.75$, $p < .001$, partial $\eta 2 = .73$ and the IIG $F(1, 34) = 36.03$, $p < .001$, partial $\eta 2 = .51$. However, there was not a statistically significant effect of time on HPV Knowledge for the NICG, $F(1, 34) = .31$, $p = .58$, partial $\eta 2 = .009$. See Figure 2.

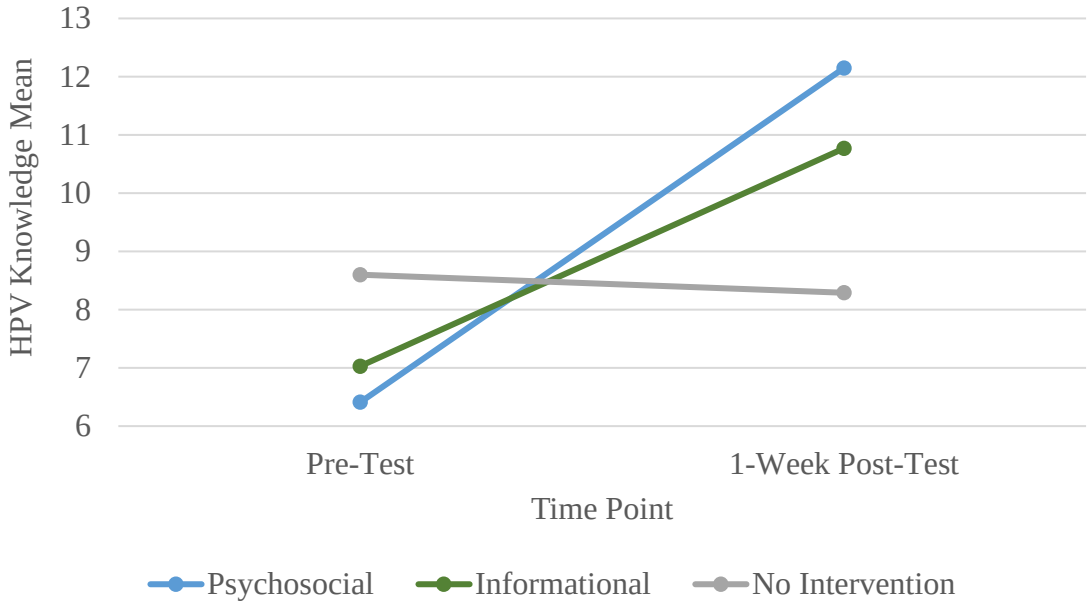
HPV Vaccine Knowledge. There were statistically significant main effects for time, $F(1, 108) = 17.55$, $p < .001$, partial eta = .14 and group, $F(2, 108) = 4.86$, $p = .01$, partial eta = .08. However, there was a statistically significant interaction between the intervention and time on vaccine knowledge, $F(2, 108) = 16.74$, $p < .001$, partial $\eta 2 = .24$. Thus, follow-up testing was completed to test for simple main effects for both intervention group and time.

For simple main effect for intervention group, there was not a statistically significant difference in HPV Vaccine Knowledge between interventions at the pre-test time point, $F(2, 108) = 2.08$, $p = .13$, partial $\eta 2 = .04$. However, the simple main effect for intervention group was statistically significant for HPV Vaccine Knowledge between interventions at the 1-week follow-up $F(2, 108) = 35.96$, $p < .001$, partial $\eta 2 = .40$. Specifically, HPV Vaccine knowledge was significantly greater in the PSIG compared to the IIG (M = 1.24, SE = .28, p < .001) and the NICG (M = 2.38, SE = .281, p < .001). HPV Vaccine knowledge among the IIG was significantly greater than the NICG (M = 1.14, SE = .29, p < .001).

There was a statistically significant simple effect of time on HPV Vaccine Knowledge for the PSIG, $F(1, 40) = 25.78$, $p < .001$, partial $\eta 2 = .40$ and the IIG $F(1, 34) = 35.71$, $p < .001$, partial $\eta 2 = .34$. Both groups had an increase in knowledge from pre-test to 1-week follow-up. There was also a significant effect of time on HPV vaccine Knowledge for the NICG, $F(1, 34) = 5.88$, $p = .02$, partial $\eta 2 = .15$; however, this was a decrease in knowledge from pre-test to 1-week follow-up. See Figure 3.

Figure 2

HPV Knowledge Mixed Between-Within Analysis of Variance

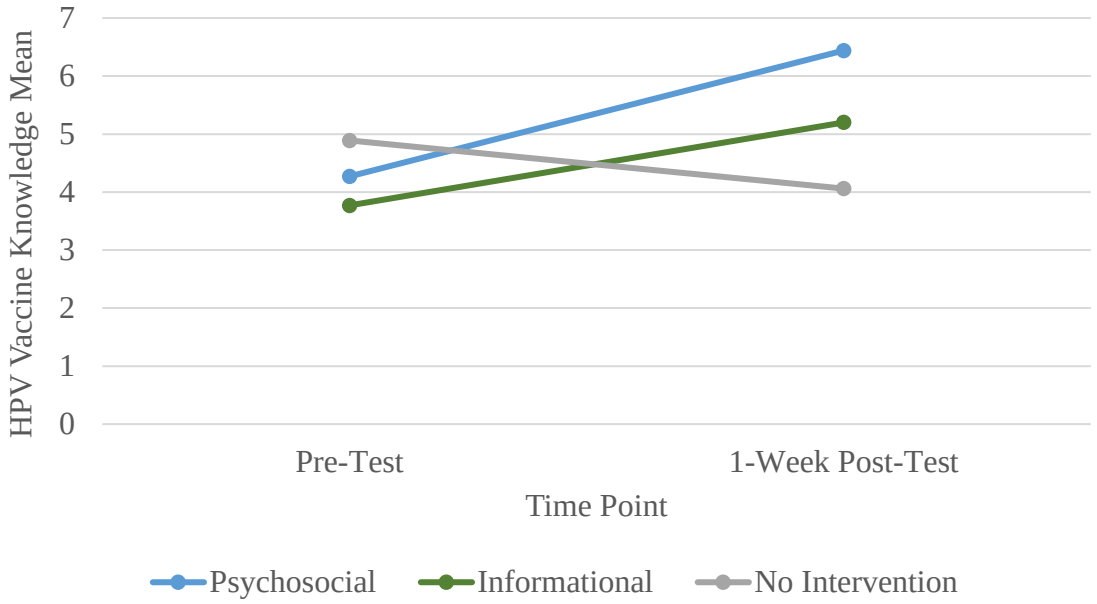


Intent to Vaccinate. A mixed between-within subjects analysis of variance demonstrated a significant main effect for time in intent to vaccinate at the two time points, $F(2, 108) = 7.52$, $p = .007$, partial $\eta 2 = .07$. Pairwise comparisons showed an increase in intent from pre-test to 1-week follow-up ($M = 1.5$, $SE = .55$, $p = .01$). The main effect of group showed that there was a not statistically significant difference in intent to vaccinate between intervention groups $F(2, 108) = 2.95$, $p = .06$, partial $\eta^2 = .05$.

Pairwise comparisons showed no differences among the groups *p*s >.05. Finally, there was no statistically significant interaction between the intervention and time on intent to vaccinate $F(2, 108) = 1.44$, $p = .24$, partial $\eta 2 = .02$. See Figure 4.

Figure 3

HPV Vaccine Knowledge Mixed Between-Within Analysis of Variance

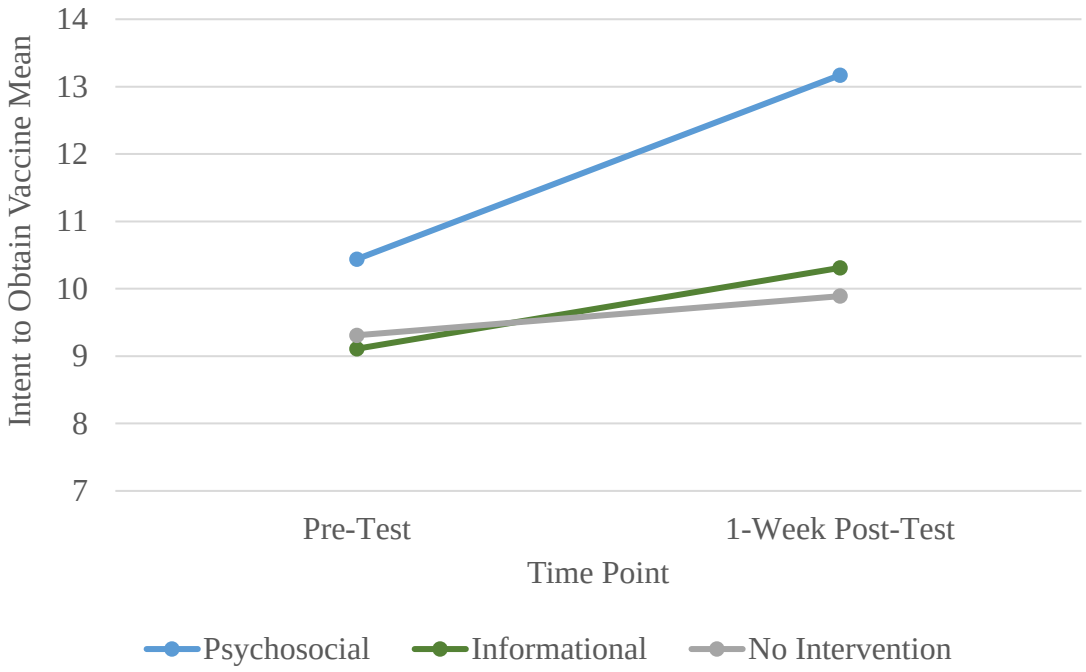


Hypothesis 4: Vaccination Uptake at 6-month Follow-up

Psychosocial Intervention. At the 6-month follow-up, 18 (43.90%) participants from the PSIG responded. Eight participants (19.5% of the original sample or 44% of those who completed 6-month follow-up) endorsed that they had initiated the HPV vaccination series. Three participants completed the entire 3-shot vaccination series, 2 participants completed 2 shots, and 3 students completed the first shot in the series. The most commonly endorsed reasons for not initiating the vaccination series were "Cost" (n = 8), "I do not need the vaccine" (n = 5), "Safety concerns" (n = 4), and "My parent did not support vaccination" (n = 2).

Figure 4

Intent to Obtain Vaccine Uptake Mixed Between-Within Analysis of Variance



Informational Intervention. At the 6-month follow-up, 17 of the 35 participants in the IIG completed the survey. Only one participant indicated vaccination uptake and had received 2 shots of the series. Participants endorsed the following reasons for not initiating vaccine uptake "I do not need the vaccine" (*n* = 13), "I forgot to get the vaccine" (*n* = 9), "Cost" (*n* = 5); and "Safety concerns" (*n* = 5).

No Intervention Control Group. At the 6-month follow-up, 10 of the 35 participants in the NICG completed the survey and none reported HPV vaccine uptake.

Hypothesis 5: Acceptability of the Psychosocial Intervention

Participants rated acceptability of the psychosocial session on a series of questions with a scale ranging from 0 – 7 (positive endpoint). Overall, participants reported that they enjoyed the psychosocial session (*M* = 6.59, *SD* = 0.69) and would recommend the session to a friend (*M* = 6.30, *SD* = 0.88). Participants also felt that they

learned a significant amount of information about HPV (*M* = 6.70, *SD* = 0.59) and the HPV vaccination (*M* = 6.66, *SD* = 0.61). Participants endorsed that the session changed their opinion about HPV (*M* = 5.69, *SD* = 1.49) and the HPV vaccine (*M* = 5.52, *SD* = 1.41).

Hypothesis 6: Hierarchical Regression for Intent at 1-week

Hierarchical multiple regression assessed the ability of knowledge, traditional TPB variables, and anticipatory regret (AR) to predict intent to vaccinate at 1-week follow-up (see Table 7). The model was significant $F(6, 110) = 17.13$, $p < .001$ and accounted for 49.7% of the variance in intent to obtain vaccine uptake. HPV/HPV vaccine knowledge were entered at Step 1, explaining 3.5% of the variance in intent. The traditional TPB variables (attitudes, subjective norms, and PBC) entered at Step 2 explained an additional 42.9% variance and AR at Step 3 contributed an additional 3.3%. Only attitudes, subjective norms, and AR uniquely contributed to the full model (see Table 8).

Table 7

Hierarchical Multiple Regression Model Summary

			Change Statistics			
Model	R Square	Std. Error of the Estimate	R Square Change	*F* Change	*Df*	Sig. *F* Change
Step 1	.04	4.94	.035	1.97	(2, 108)	.15
Step 2	.46	3.74	.423	27.98	(3, 105)	.00
Step 3	.50	3.64	.033	6.88	(1, 104)	.01

Table 8

Regression Coefficients for Predicting Intent to Vaccinate at 1-week

	β	*t*	*P*
HPV Knowledge	-.06	-0.68	.50
HPV Vaccine Knowledge	.03	0.36	.72
Vaccine Attitudes	.37	3.70	.00
Vaccine Subjective Norms	.24	2.93	.00
Vaccine PBC	.02	0.22	.83
Anticipatory Regret	.24	2.62	.01

Hypothesis 7: Regression for Vaccination Uptake at 6months

A direct logistic regression assessed the impact of knowledge and TPB variables at 1-week post-test on vaccination uptake at 6 months for those individuals who responded (n = 46). Vaccination uptake status was based upon a single yes/no question indicating if the participant had initiated the vaccination series. Thus, uptake was at least one shot and not necessarily completion of the series. The model contained seven independent variables (HPV Knowledge, HPV vaccine knowledge, attitudes, subjective norms, PBC, AR, and intent. The full model containing all predictors was statistically significant, $\chi^2 = (7, N = 46) = 25.12$, $p = .001$, indicating the model was able to distinguish between respondents who did and did not endorse vaccination uptake. The model explained between 42% (Cox and Snell R square) and 67% (Nagelkerke R squared) of the variance in vaccination status, and correctly classified 87% of the cases. However, none of the independent variables significantly contributed to model.

Table 9

Logistic Regression Predicting Likelihood of Reporting Vaccination Uptake at 6-months

	B	S.E.	Wald	*p*	Exp (*B)*
HPV Knowledge	0.16	0.57	0.08	0.78	1.17
HPV Vaccine Knowledge	0.85	1.11	0.58	0.45	2.34
Vaccine Attitudes	0.59	0.35	2.84	0.09	1.81
Vaccine Subjective Norms	0.05	0.06	0.77	0.38	1.06
Vaccine Self-efficacy	-1.17	0.67	3.11	0.08	.31
Anticipatory Regret	-0.02	0.41	0.00	0.96	.98
Intent	0.00	0.16	.000	0.99	1.00

CHAPTER IV:

DISCUSSION

The present study aimed to assess the effectiveness of a theoretically informed psychosocial intervention to increase HPV vaccine uptake among young adults in the "catch-up group." The intervention was developed based on an enhanced model of the Theory of Planned Behavior (TPB) that included an affective component, anticipatory regret (AR). Specifically, the psychosocial intervention targeted education of HPV and HPV vaccine and the TPB variables (attitudes, subjective norms, PBC control, and AR). Additionally, the Psychosocial Intervention Group (PSIG) was compared to an Informational Intervention Group (IIG) and No Intervention Control Group (NICG) to ensure the psychosocial intervention targeted the variables as desired and to identify specific factors that impact vaccine uptake. Given the lack of uptake among the catch-up group, it is essential to develop interventions that addresses barriers salient to this population that can be easily disseminated. Results indicated that the PSIG was successful at increasing knowledge and the TPB variables and seemingly superior to an education only intervention. The following outlines findings related to these aims.

Findings Related to Research Aims

HPV and HPV Vaccine Knowledge

Consistent with previous literature (Brewer & Fazekas, 2007; Gerend et al., 2020; Johnson & Ogletree, 2017; Ratanasiripong et al., 2013) college students in this study's sample had considerable deficits in HPV and HPV vaccine knowledge at pretest. This is problematic because HPV-related knowledge has been associated with vaccine intent and uptake (Allen et al., 2009; Bendik & Mayo, 2001; Ratanasiripong, 2012) and was associated with intent to vaccinate in the current study. The psychosocial intervention effectively increased participants' knowledge of HPV and the HPV vaccine, as assessed

by the ability to correctly identify true and false statements at 1-week post-intervention. As expected, those in the IIG demonstrated an increase in HPV and HPV vaccine knowledge. Effect sizes were similar among the PSIG and IIG, indicating similar effectiveness of the two interventions on knowledge acquisition. As expected, the NICG had no improvement in HPV and HPV vaccine knowledge. While increased knowledge does not necessarily result in increased vaccine uptake (Fernandez et al., 2015), increased knowledge is associated with an increase in vaccination acceptability (Suarez et al., 2018); thus, it is an important component for vaccination intervention.

Theory of Planned Behavior Variables

Attitudes. In the current study, the participants in the PSIG endorsed more positive feelings (e.g., good, wise, necessary, and effective) toward the HPV vaccine at 1-week post-intervention. Individuals in the IIG also endorsed a more positive attitude about HPV vaccination uptake following the intervention. These results are as expected because increased knowledge improves attitudes towards the HPV vaccine and willingness for uptake (Roussos-Ross et al., 2017; Suarez et al., 2018). The NICG did not report differences in vaccination attitudes.

Subjective Norms. The psychosocial intervention effectively increased participants' beliefs that peers and significant others would approve vaccination uptake. Therefore, according to the TPB, those in the PSIG would feel an increased pressure to obtain vaccination themselves. Perceived subjective norms are shared via social interaction with others (Rimal & Real, 2003), and can be influenced by hearing narratives of others' experience (Lee & Su, 2020; Moran et al., 2013; Rhodes & Ellithorpe, 2016). Thus, the PSIG was likely effective in increasing norms due to the group format and documentary videos. The IIG endorsed an increase in subjective norms, but did not reach statistical significance. The NICG reported a significant increase in

social norms; however, at both pretest and post-test there was a large variability in scores (*SD* = 11.48, 11.26, respectively). Additionally, the small effect size indicates that the change was magnitude was minimal.

Perceived Behavioral Control. Individuals in the PSIG reported increased PBC in obtaining HPV vaccination. Unlike the PSIG, neither the IIG nor the NICG had a significant increase in PBC. These results are not surprising since the psychosocial intervention specifically targeted: (1) barriers to obtaining vaccination; (2) communication with parents and medical providers about vaccination; (3) specific plan to vaccinate; (4) and provided addresses and telephone numbers for nearby locations that provide vaccination. These results suggest that individuals in the PSIG not only increased knowledge about HPV/HPV vaccine, but also believed they developed skills to complete uptake if desired. This is essential because newly acquired knowledge about a health behavior does not necessarily increase one's sense of self-efficacy to a desired action. The TPB suggests that one needs both education and self-agency as motivators for intent/behavior. PBC is a central factor in the decision-making process and associated with intent to get the HPV vaccine (Kahn et al., 2008; Rosenthal et al., 2008). It has been suggested that PBC is a moderator between attitudes and intention (Britt et al., 2014). If education prompts one to believe the vaccine is needed, PBC is the confidence and certainty of being able to perform the health behavior (Yzer, 2007, 2012). Therefore, given positive attitudes towards the vaccine and perceived social norms, intention and uptake will be increased when one has increased PBC (Ajzen, 2002; Yzer, 2007).

Anticipatory Regret. Contrary to our hypothesis, participants in the PSIG did not endorse a significant increase in anticipatory regret (AR) following the intervention at 1-week post-test. While the increase was approaching significance, the effect size was medium, suggesting that the magnitude of the intervention was effective. Interestingly,

participants endorsed high levels of AR at pretest, despite limited knowledge of HPV or the HPV vaccine. In fact, the pretest mean score of AR for the PSIG was near the maximum value of the scale range which may have limited ability to demonstrate meaningful change at post-intervention. Recall, AR results from an affective evaluation of the consequences of one's behavior or anticipated inaction. It was expected that viewing the narrative videos, learning about HPV related cancer and genital warts, and discussing the ease of HPV transmission to a partner would induce AR of inaction, thereby allowing for increased emotional involvement with the information. Based on previous research, the formation of health behavior intentions and behavior is dependent on both affective and cognitive processing (Brewer et al., 2016; Cox et al., 2014).

Consistent with our hypotheses, both the IIG and NICG did not report significant increases in AR. This was expected since the informational brochures were fact based and did not include personal narratives regarding the impacts of HPV.

Intent at 1-week post-test. Only participants in the PSIG endorsed a significant increase in intent to obtain vaccination at 1-week post-test. This suggests that the theoretically informed intervention was superior to education only and that individuals' intent to vaccinate requires additional intervention targets than education alone. This is inconsistent with research that has shown increased knowledge is directly associated with intent (Allen et al., 2009; Bendik & Mayo, 2001; Ratanasiripong, 2012). Additionally, intent to vaccinate was greatest among those in the PSIG and there was no difference between the IIG and NICG on intent. Thus, in the current study, an education-based intervention was not more effective than a control group in increasing intent. This adds to the growing literature that interventions aimed at HPV vaccine uptake among the catch-up group require more than education (for a meta-analytic review see Barnard et al., 2019).

According to the hierarchical multiple regression, the traditional TPB variables accounted for the majority (43%) of variance in *intent* to vaccinate while knowledge of HPV/HPV vaccine and AR each contributed a smaller amount to variance. The entire model accounted for 50% of the variance in intent to vaccinate. Our findings were consistent with previous research that suggests traditional TPB variables typically account for 39% of the variance in intent to vaccinate (Armitage & Conner, 2001). In the final model, attitudes toward the vaccine, perceived subjective norms for obtaining vaccination uptake, and anticipatory regret were the unique predictors of intent to obtain HPV vaccine. This supports that interventions need to address both affective and cognitive factors to be effective for the catch-up group. Additionally, these variables were uniquely addressed in the psychosocial intervention and thus support this type of intervention approach.

Anticipatory regret only added a small additional percentage of variability in uptake, but it remained a unique factor. This is consistent with recent arguments that the traditional TPB model is overly dependent on rational reasoning (Sniehotta et al., 2014) and its utility could be increased with the addition of an affective component such as AR (Conner et al., 2015; Conner et al., 2006). Furthermore, anticipated *inaction* regret (e.g., not getting vaccinated) is often more reliably associated with behavioral intention than action regret and typically adds an additional 7% to the variance above and beyond the TPB predictors (Brewer et al., 2016). While the findings in this study were not as robust, they certainly support AR as a potent addition to TPB-based intervention to increase uptake.

Vaccination Uptake. While the above information is helpful for understanding within and between group differences and factors that impact intent, research demonstrates that intent does not always translate to behavior (e.g., Juraskova et al.,

2012). For this reason, focusing on actual HPV vaccination uptake as compared to intention to get vaccinated is important to guide intervention development. Thus, an aim of the current study was to assess vaccine uptake at the 6-month follow-up, consistent with the vaccination schedule. Unfortunately, there was substantial attrition and minimal participation at the 6-month time point. Even with this attrition, individuals in the PSIG who did respond at 6-months, reported uptake at an increased rate than the IIG. The NICG did not have any individuals report vaccine uptake.

At the 6-month follow-up, our regression model using HP/HPV vaccine knowledge, TPB variables, and AR was able to differentiate between respondents who did and did not endorse vaccination uptake. However, these results must be interpreted with caution due to the small sample size.

Acceptability of the Psychosocial Intervention. Most importantly, participants indicated that they enjoyed the psychosocial intervention and would recommend the session to a friend. Participants provided direct qualitative feedback and indicated a sense of increased literacy and autonomy due to better understanding of HPV, its associated consequences, and the vaccine. Several expressed appreciation for ability to make an informed decision related to HPV vaccine and communication tools for discussing HPV/HPV vaccine uptake with referent others. This is consistent with other qualitative research showing willingness and eagerness by college students to obtain HPV-related education (Gerend et al., 2020). Participants reported that they felt the psychosocial intervention changed their opinion about both HPV and the HPV vaccination.

Other Considerations. Although the purpose of the current study was not to examine the effects of sexual history variables on treatment outcome, it is important to note that the sexual history of the participants supports the relevance of vaccination among the catch-up population. A notable portion of our student sample was reportedly

naïve to sexual intercourse and would thus obtain HPV vaccination uptake prophylactically as recommended. For those students who were sexually active, most reported later sexual debut and limited lifetime number of sexual partners, all factors which limit exposure to the high-risk HPV types. Thus, the current study supports previous research that many in the catch-up group have not been exposed to high-risk strains of HPV and would thereby benefit from vaccination (Introcaso et al., 2014; Liu et al., 2016).

Limitations

The most significant limitation of the current study was participant attrition between pretest and 6-month follow-up. Participants received their extra credit allotment within the semester; therefore, many had minimal incentive to respond at the 3- and 6-month follow-up. The PSIG had the highest rate of participation throughout the study, most likely because the participants had personal contact with the researcher.

A potential limitation of the psychosocial intervention was group size. The researcher delivered the intervention to only 1-5 participants at each session. Most students on this specific campus commute daily and are employed; thus, allowing for limited availability. Research has shown that peer influence is important among college students and vaccination uptake is more likely to be endorsed if it is perceived as the accepted social norm (Hopfer & Clippard, 2011; Liddon et al., 2010; Mehta et al., 2014; Rambout et al., 2014; Ratanasiripong et al., 2013; Reiter et al., 2014). Social norms are conceptualized beliefs that determine what constitutes and influence behavior through motivation to comply with referents' beliefs and expectations. Without having peers present during the intervention, the sense that others would pursue vaccination may have been diminished. Additionally, the researcher did not pilot test the two personal narrative videos for effectiveness in evoking anticipatory regret. Given that the anticipatory regret

scores did not *significantly* increase from pretest to 1-week post-test and the effect size remained small, assessing for effectiveness prior to the study would have been best practice.

A limitation for the IIG was that participants did not complete their intervention in a controlled environment. Participants read the informational brochures from their own selected location; thus, the researcher could not ensure that the participant read the information in its entirety and answered HPV and HPV vaccine knowledge questions without utilizing sources.

The current sample endorsed limited sexual activity which could be an anomaly and have impacted perceived need for vaccine. However, another larger, more traditional Texas university reported a similar rate of students (33.6%) who had never engaged in any type of sexual activity (ACHA-NCHA II, 2017). Additionally, national data suggests a large portion of college students reported having either no sexual partners or one partner within the past 12 months (33.1% and 43.6%, respectively) (ACHA-ACHA, II, 2019).

This may have been a factor in why *low susceptibility/need for the vaccine* was one of the top reasons individuals in both the PSIG and IIG did not obtain uptake. This suggests that even after attending the psychosocial intervention, which directly targeted myths related to susceptibility, students still felt at low risk for contracting HPV. Specifically, the intervention emphasized that the rate of acquiring HPV from just one sex partner is significant, with at least 30% of young women testing positive for HPV within one year of first intercourse experience (Winer et al., 2008). Previous research tells us that young adults who are not sexually active or who are in committed monogamous relationships have diminished perceptions of risk (Lehmiller 2015; Swan & Thompson 2016) and are less likely to participate in prevention behaviors (Thompson et

al. 2019; Wilson et al. 2016). Young adults who do not intend to receive the HPV vaccine often cite current abstinence from sexual activity as the primary reason (Ragan et al., 2018). Thus, further information is needed to understand what would increase perceived risk among the catch-up group.

Future Directions

The results of the psychosocial intervention are promising, and future studies could aim to enhance the intervention by adjusting certain aspects to increase effectiveness. Originally, the researcher had planned to deliver a limited number of intervention groups with a medical provider present; however, due to scheduling issues, this was not feasible. Thus, to increase effectiveness, it would be helpful to have a medical provider deliver part of the presentation or be present to address questions. Participants were informed that the current researcher was a mental health professional interested in health-related behavior change and as such, was limited in ability to answer specific medical questions. Previous research has shown that college students identify their primary care provider as the preferred referent person to communicate with about HPV and HPV vaccine related information (Gerend et al., 2020; Marchand et al., 2012; Rosenthal et al., 2011). It would be optimal to collaborate with the campus health center and provide an opportunity to introduce students to their campus providers. Student awareness and utilization of campus health clinics has potential to increase HPV vaccine uptake by providing contact with a medical professional and reducing perceived barriers such as inconvenience of making health care appointments, arranging transportation, and remembering to get all three vaccine doses (Rambout et al., 2014). Anecdotally, through discussion at intervention sessions, the researchers discovered that most students in the psychosocial intervention were unaware of the campus health center and its services.

While medical providers have been identified as critical sources of social norms, individuals in the catch-up group look to peers for accepted health behaviors. Therefore, having a peer who has obtained HPV vaccination or been impacted by an HPV related medical condition provide a narrative at the intervention could promote social norms and perceived susceptibility. This could have a substantial impact given it was a unique predictor of HPV vaccination uptake. Extant research has shown that combined peer-medical provider presence may be most potent means of intervention delivery to increase vaccine uptake (Cartmell et al., 2018, Hopfer, 2012; Barnard et al., 2019). Including healthcare-related student organizations or medical students would address this issue in a creative manner (Cartmell et al., 2018).

A few participants from the PSIG who completed the 6-month follow-up reported that they abstained from vaccination uptake due to parent opinion. While those in the catch-up group are often establishing independence, many still rely on their parent(s)/legal guardian(s) to help them make important health decisions (Katz, Krieger, & Roberto, 2011) and for insurance coverage. In the current sample, approximately 50% of students were covered by their parent's insurance and may therefore feel they need their approval for health decisions. This is consistent with the adolescent vaccine literature that has shown that parents perceive their child is not susceptible to HPV or that vaccine uptake will promote risky sexual behavior (Forster et al., 2010; Holman et al., 2014; Quinn et al., 2014). Sadly, these beliefs have been shown to be largely inaccurate and HPV vaccination status is not significantly associated with an increased likelihood of sexual debut, decreased age of sexual debut, nor an increased number of sexual partners (Brouwer et al., 2019). This finding illustrates the important role parents may serve in communicating with their college-age children about HPV/HPV vaccination. Having a parent in attendance at the psychosocial intervention would likely increase parent

education and facilitate communication. Therefore, future TPB interventions could target the parent-child dyad to enhance education and attitudes of referent others.

Interestingly, another Texas university recently utilized a "social media campaign" to increase HPV vaccine awareness and uptake (Hughes et al., 2020). The intervention included various means of media promotion (i.e., student newspaper, video series, Facebook postings), reaching a diverse campus population. Their results demonstrated that the campaign successfully targeted perceived susceptibility to HPV, perceived severity of HPV, and perceived behavioral control for obtaining the vaccine (Hughes et al., 2020). Thus, utilizing social media platforms in conjunction with an in-person psychosocial intervention could disseminate to a larger portion of the college campus in rapid and cost-effective manner.

Finally, regarding future statistical directions, using a scaled down model with less independent variables could increase ability to identify the most robust predictors that predict vaccine uptake. For example, HPV and HPV vaccine knowledge could be summed into a single factor. Additionally, integrating attitudes, subjective norms, and perceived behavioral control into a single integrated variable would align with the conceptualization that these three factors influence intention. This would leave intention as a unique downstream predictor since it is conceptualized as the most proximal factor to behavior (i.e., uptake). Alternately, using more advanced modeling such as path analysis could elucidate causal relationships between the variables. For example, knowledge may impact the three TPB the three TPB factors (i.e., attitudes, subjective norms, and PBC) which then in turn, affects intent and uptake.

Conclusion

HPV vaccination uptake among young adults in the catch-up group is suboptimal in the U.S. and as such, increasing HPV vaccine uptake was identified as a targeted goal

in Healthy Campus 2020 (American College Health Association 2018). Young adults are considered a priority population, but unfortunately, rates of vaccination in the catch-up age range among young adults are still low (Williams et al., 2017). Effective interventions are needed to improve catch-up vaccination rates. College campuses are optimal to facilitate easy dissemination and uptake as college students have increased autonomy on healthcare decisions, an estimated 80% have health insurance that would cover the cost of the vaccination, and campus health centers reduce barriers to complete the three-shot series (Barnard et al., 2019; Turner and Hurley, 2002; United States Government Accountability Office, 2008). Early adulthood can still be a key opportunity for HPV vaccination as a preventative measure for cancer and STI acquisition. Research suggests that the vaccine will be effective for this age range, even among individuals who are already sexually active (Couto et al., 2014; Lu et al., 2011). Increased vaccine uptake in the catch-up group will improve overall public health by the herd-immunity effect (Brisson et al., 2016). However, this cannot be achieved without understanding how to develop effective interventions.

The current study replicated previous interventions that focused on education only (Bennett et al., 2015; Gerend & Shepherd, 2012; Hopfer, 2012; Juraskova et al., 2011; Patel et al., 2012; Perez et al., 2016; Richman et al., 2016), but also attempted to targeted TPB variables which have been shown to impact health-related behavior. The current study also included previously supported strategies such as messaging focused on cancer prevention, comparing HPV related cancers to other more widely known cancers (e.g., breast or prostate), and personal narratives to increase effectiveness (Barnard et al., 2019; Cartmell et al., 2018).

The current study is unique in that it included a comparison intervention group and a control group. A meta-analysis of HPV interventions revealed that most previous

studies targeting HPV uptake utilized two interventions without a control condition for comparison (Barnard et al., 2019). Results supported that the TPB variables increased intervention efficacy above and beyond education alone. TPB variables and anticipatory regret explained 45.6% of the variance in intent to vaccinate, while education only contributed 3.5% to the variance. Factors unique to the psychosocial intervention (attitudes, subjective norms, and anticipatory regret), were the significant contributors to variance in intent to obtain vaccine uptake. Therefore, these are important factors to address in future interventions. Our intervention model was also effective in differentiating those who did and did not endorse vaccination uptake at 6 months and explained between 42% and 67% of the variance in vaccination status.

With the HPV vaccine's availability spanning over a decade and suboptimal vaccination uptake among adolescents, continued efforts are needed to promote catch-up vaccination among young adults. Thus, the present study helped move forward knowledge on interventions that can increase vaccination among young adults who now possess the autonomy for vaccine decisions. Partnering with colleges and university health centers to implement HPV vaccine interventions is a promising strategy for increasing HPV vaccination and reducing HPV related sequelae and disease burden among the catch-up group.

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APPENDIX A:

WELCOME TO THE HPV SURVEY

Thank you for participating in our survey.

You have selected to participate in a survey about HPV that has three separate participant groups. Depending on the group you are in, you will receive 1.0 hour of extra credit, 2.5 hours extra credit, or 3.0 hours of credit.

Below, you will click on either option A, B or C. By doing this, you will be randomized to one of the three groups participating in the study. One group requires one hour of time and the other two groups require 2.5 hours of commitment. The three groups share some of the same activities, but each is slightly different as briefly described below.

How the groups are the same: All groups will be asked to complete a pretest (20 minutes on-line), an online post-test (15 minutes), a 3-month online follow-up (15 minutes), and a 6-month online follow-up (15 minutes). For individuals who have a 2.5 hour time commitment, they will participate in an intervention (online or in-person) to obtain information about the Human Papillomavirus (HPV).

For the 2.5-hour time commitment groups:

- Group one will complete the intervention on-line by reading some informational brochures via the internet. This group receives 2.5 research credits.

- Group two will be asked to attend a 45 minute, on campus information session about HPV/HPV vaccination for the intervention. Those in group two may bring up to two friends to the session, and refreshments will be served. This group will also receive two sets of text (or email) reminders at the 3-month and 6-month time points. Participants in this group get 3.0 research credits (0.5 extra for attending in-person)

Once you click on either option A, B or C, you will be taken to the appropriate consent form. The consent form will include further details about your participation. After the consent, you will be able to immediately access the pretest portion of the study.

If you have any questions before proceeding, please contact the primary researcher, Kristina Harper, at the information below:

Kristina Harper harper@uhcl.edu
[redacted]

Thank you for your time and efforts.

Please select Option A, Option B, option C for randomization into one of the three groups.

- ○ Option A
- ○ Option B
- ○ Option C

APPENDIX B:

INFORMED CONSENT PSYCHOSOCIAL INTERVENTION

Informed Consent to Participate in Research

You are being asked to participate in the 2.5-hour time commitment research project described below. You will receive 3.0 research credits for your time, which includes 0.5 extra hours for attending an in-person session. Your participation in this study is entirely voluntary and you may refuse to participate, or you may decide to stop your participation at any time. Should you refuse to participate in the study or should you withdraw your consent and stop participation in the study, your decision will involve no penalty or loss of benefits to which you may be otherwise entitled. You are being asked to read the information below carefully and ask questions about anything you don't understand before deciding whether or not to participate.

Title: '1-2-3! Catch-up for HPV'

Student Investigator(s): Kristina Harper

Faculty Sponsor: Mary B. Short, PhD.

PURPOSE OF THE STUDY

The purpose of this research is to examine young adult's knowledge and attitudes about the human papillomavirus and the HPV vaccine. Further, the research is looking at the option of using a University based intervention to increase HPV uptake.

PROCEDURES

The research procedures consist of several components, and are as follows:

- You will be asked to complete an **online pretest survey** that should take approximately 20 minutes to fill out. These questions will assess demographics,

various components of your sexual and/or gynecological history, knowledge about HPV and the HPV vaccination, and your feelings about the HPV vaccine;

- You will be asked to attend an in-person, one time, 45-minute psychosocial session about HPV and the HPV vaccine. The session will take place on campus during school hours, and attendance will be between 5 and 15 students. The session will be both informational and interactive, and refreshments will be served. You will be allowed to invite up to two friends to attend the session and refreshments will be served.
- At the end of the psychosocial session you will be asked to complete a short paper survey assessing HPV and HPV vaccine knowledge. This should take approximately 15 minutes.
- One week following the psychosocial session you will be sent an email link to complete a short online follow-up post-test survey. The survey should take approximately 15 minutes to complete.
- You will be contacted by email for two brief online follow-up surveys at 3-months and 6-months. These should each time 10-15 minutes to complete.
- You will be asked to receive text message or email reminders about the HPV vaccine at 1-month, 3-months and 6-months.

EXPECTED DURATION

The total anticipated time commitment will be approximately 2 to 2.5 hours over the course of 6-months.

RISKS OF PARTICIPATION

Possible study risks include discomfort caused by exposure to sensitive questions about sexual and gynecological history. This risk is expected to be very low. There is a remote risk that online study data could be revealed by a computer hacker if the survey monkey site server were to be compromised. During actual Internet communication procedures or accessing an unprotected wireless system, there is a possible risk of breach of confidentiality or data security.

BENEFITS TO THE SUBJECT

Some participants will be receiving 3.0 hours of research credit following the post-test survey for participating in this study. You may also attain new information about HPV and the HPV vaccination. Participants who complete the 6-month survey will be eligible to enter a raffle to win 1 of (10) $25.00 gift cards. Aside from this, there is no direct benefit received from your participation in this study, but your participation will help the investigators better understand young adult's knowledge and attitudes regarding HPV and the HPV vaccination.

CONFIDENTIALITY OF RECORDS

Every effort will be made to maintain the confidentiality of your study records. For online participation, your confidentiality will be kept to the degree permitted by the technology being used. No guarantees can be made regarding the interception of data via the Internet or emails. The data collected from the study will be used for educational and publication purposes, however, you will not be identified by name. For federal audit purposes, the participant’s documentation for this research project will be maintained and safeguarded by Mary Short, Ph.D. for a minimum of three years after completion of the study. After that time, the participant’s documentation may be destroyed. Your

confidentiality will be kept to the degree permitted by the technology being used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties.

FINANCIAL COMPENSATION

Upon completion of the study, participants will be offered the opportunity to enter to win 1 of (10) $25.00 gift cards. A side from this, there is no financial compensation to be offered for participation in the study.

I**NVESTIGATOR'S RIGHT TO WITHDRAW PARTICIPANT**

The investigator has the right to withdraw you from this study at any time.

CONTACT INFORMATION FOR QUESTIONS OR PROBLEMS

The investigator is offering to answer questions. If you have additional questions during the course of this study about the research or any related problem, you may contact the Student Researcher, Kristina Harper, at [redacted]. The Faculty Sponsor, Mary Short Ph.D., may be contacted at phone number [redacted] or by email at shortmb@uhcl.edu.

THE UNIVERSITY OF HOUSTON-CLEAR LAKE (UHCL) COMMITTEE FOR PROTECTION OF HUMAN SUBJECTS HAS REVIEWED AND APPROVED THIS PROJECT. ANY QUESTIONS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UHCL COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (281-283-3015). ALL RESEARCH

PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT UHCL ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT. (FEDERALWIDE ASSURANCE # FWA00004068)

I have read and understand the consent form.

◯ Yes ◯ No

APPENDIX C:

INFORMED CONSENT INFORMATIONAL INTERVENTION

Informed Consent to Participate in Research

You are being asked to participate in the 2.5 hour research project described below. Your participation in this study is entirely voluntary and you may refuse to participate, or you may decide to stop your participation at any time. Should you refuse to participate in the study or should you withdraw your consent and stop participation in the study, your decision will involve no penalty or loss of benefits to which you may be otherwise entitled. You are being asked to read the information below carefully, and ask questions about anything you

don't understand before deciding whether or not to participate.

Title: '1-2-3! Catch-up for HPV'

Student Investigator(s): Kristina Harper

Faculty Sponsor: Mary B. Short, PhD.

PURPOSE OF THE STUDY

The purpose of this research is to examine young adult's knowledge and attitudes about the human papillomavirus and the HPV vaccine. Further, the research is looking at the option of using a University based intervention to increase HPV uptake.

PROCEDURES

The research procedures consist of the following components:

- You will be asked to complete an online pretest survey that should take approximately 20 minutes to fill out. These questions will assess demographics, various components of your sexual and/or gynecological history, knowledge about HPV and the HPV vaccination, and your feelings about the HPV vaccine.

- Immediately following the survey, you will be asked to read three online brochures about HPV and the HPV vaccine. These will be posted online along with the survey, nd should take approximately 45 minutes to read.
- Immediately after reading the brochures, you will take a second short online survey assessing the same factors as the pretest. This survey should take 15 minutes to complete.
- One week following the pretest survey and HPV brochure information, you will be emailed a link to complete a short online post- test survey. The survey should take approximately 15 minutes to complete.
- You will be contacted for two brief online follow-up surveys at 3-months and 6-months. These should each time 10-15 minutes to complete.

EXPECTED DURATION

The total anticipated time commitment will be approximately 2 to 2.5 hours over the course of 6-months.

RISKS OF PARTICIPATION

Possible study risks include discomfort caused by exposure to sensitive questions about sexual and gynecological history. This risk is expected to be very low. There is a remote risk that online study data could be revealed by a computer hacker if the survey monkey site server were to be compromised. During actual Internet communication procedures or accessing an unprotected wireless system, there is a possible risk of breach of confidentiality or data security.

BENEFITS TO THE SUBJECT

Participants will be receiving 2.5 hours of research credit following the post-test survey for participating in this study, if they are enrolled in a class offering this option or upon teacher approval. You may also obtain new information about HPV and the HPV vaccination. Participants who complete the 6-month survey will be eligible to enter a raffle to win 1 of (10) $25.00 gift cards. Aside from this, there is no direct benefit received from your participation in this study, but your participation will help the investigators better understand young adult's knowledge and attitudes regarding HPV and the HPV vaccination.

CONFIDENTIALITY OF RECORDS

Every effort will be made to maintain the confidentiality of your study records. For online participation, your confidentiality will be kept to the degree permitted by the technology being used. No guarantees can be made regarding the interception of data via the Internet or emails. The data collected from the study will be used for educational and publication purposes, however, you will not be identified by name. For federal audit purposes, the participant's documentation for this research project will be maintained and safeguarded by Mary Short, Ph.D. for a minimum of three years after completion of the study. After that time, the participant's documentation may be destroyed. Your confidentiality will be kept to the degree permitted by the technology being used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties.

FINANCIAL COMPENSATION

Upon completion of the study, participants will be offered the opportunity to enter to win 1 of (10) $25.00 gift cards. Aside from this, there is no financial compensation to be offered for participation in the study.

INVESTIGATOR'S RIGHT TO WITHDRAW PARTICIPANT

The investigator has the right to withdraw you from this study at any time.

CONTACT INFORMATION FOR QUESTIONS OR PROBLEMS

The investigator is offering to answer questions. If you have additional questions during the course of this study about the research or any related problem, you may contact the Student Researcher, Kristina Harper, at harper@uhcl.edu. The Faculty Sponsor, Mary Short Ph.D., may be contacted at phone number 281-283-3412 or by email at shortmb@uhcl.edu.

THE UNIVERSITY OF HOUSTON-CLEAR LAKE (UHCL) COMMITTEE FOR PROTECTION OF HUMAN SUBJECTS HAS REVIEWED AND APPROVED THIS PROJECT. ANY QUESTIONS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UHCL COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (281-283-3015). ALL RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT UHCL ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT. (FEDERALWIDE ASSURANCE # FWA00004068)

I read and understand the consent.

○ Yes ○ No

APPENDIX D:

INFORMED CONSENT NO INTERVENTION CONTROL GROUP

Informed Consent to Participate in Research

You are being asked to participate in the 1-hour credit research project described below. Your participation in this study is entirely voluntary and you may refuse to participate, or you may decide to stop your participation at any time. Should you refuse to participate in the study or should you withdraw your consent and stop participation in the study, your decision will involve no penalty or loss of benefits to which you may be otherwise entitled. You are being asked to read the information below carefully and ask questions about anything you don't understand before deciding whether to participate.

Title: '1-2-3! Catch-up for HPV'

Student Investigator(s): Kristina Harper

Faculty Sponsor: Mary B. Short, PhD.

PURPOSE OF THE STUDY

The purpose of this research is to examine young adult's knowledge and attitudes about the human papillomavirus and the HPV vaccine. Further, the research is looking at the option of using a University based intervention to increase HPV uptake.

PROCEDURES

The research procedures consist of:

- An online survey that should take approximately 20 minutes to fill out. These questions will assess demographics, various components of your sexual and/or gynecological history, knowledge about HPV and the HPV vaccination, and your feelings about the HPV vaccine.

- A second online survey that will be emailed to you one week later. This survey should take 15 minutes to complete and will assess the same factors.
- You will be asked to be contacted via email in 3 and 6 months to complete an online survey that should take approximately 10 minutes to complete. These questions will assess HPV vaccination uptake, and feelings about the HPV vaccine.

EXPECTED DURATION

The total anticipated time commitment will be approximately 60 minutes (20 minutes for the initial survey,15 minutes for the second survey, and 10-15 minutes at 3 and 6-months).

RISKS OF PARTICIPATION

Possible study risks include discomfort caused by exposure to sensitive questions about sexual and gynecological history. This risk is expected to be very low. There is a remote risk that online study data could be revealed by a computer hacker if the survey monkey site server were to be compromised. During actual Internet communication procedures or accessing an unprotected wireless system, there is a possible risk of breach of confidentiality or data security.

BENEFITS TO THE SUBJECT

Some participants will be receiving 1 hour of research credit following the second survey for participating in this study. This is with the expectation that participants will continue and finish the 3- and 6-month surveys. Participants who complete the 6-month survey will be eligible to enter a raffle to win 1 of (10) $25.00 gift cards. Aside from this, there is no direct benefit received from your participation in this study, but your participation

will help the investigators better understand young adult's knowledge and attitudes regarding HPV and the HPV vaccination.

CONFIDENTIALITY OF RECORDS

Every effort will be made to maintain the confidentiality of your study records. For online participation, your confidentiality will be kept to the degree permitted by the technology being used. No guarantees can be made regarding the interception of data via the Internet or emails. The data collected from the study will be used for educational and publication purposes, however, you will not be identified by name. For federal audit purposes, the participant's documentation for this research project will be maintained and safeguarded by Mary Short, Ph.D. for a minimum of three years after completion of the study. After that time, the participant's documentation may be destroyed. Your confidentiality will be kept to the degree permitted by the technology being used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties.

FINANCIAL COMPENSATION

Upon completion of the 6-month follow-up, participants will be offered the opportunity to enter to win 1 of (10) $25.00 gift cards. Aside from this, there is no financial compensation to be offered for participation in the study.

INVESTIGATOR'S RIGHT TO WITHDRAW PARTICIPANT

The investigator has the right to withdraw you from this study at any time.

CONTACT INFORMATION FOR QUESTIONS OR PROBLEMS

The investigator is offering to answer questions. If you have additional questions during the course of this study about the research or any related problem, you may contact the

Student Researcher, Kristina Harper, at krissyharper22@gmail.com. The Faculty Sponsor, Mary Short Ph.D., may be contacted at phone number [redacted] or by email at shortmb@uhcl.edu.

THE UNIVERSITY OF HOUSTON-CLEAR LAKE (UHCL) COMMITTEE FOR PROTECTION OF HUMAN SUBJECTS HAS REVIEWED AND APPROVED THIS PROJECT. ANY QUESTIONS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT MAY BE ADDRESSED TO THE UHCL COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (281-283-3015). ALL RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT UHCL ARE GOVERNED BY REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT. (FEDERALWIDE ASSURANCE # FWA00004068)

I have read and understand the consent form.

○ Yes ○ No

APPENDIX E:

CODE IDENTIFICATION CREATION

Before beginning the survey, please create a 6-digit code that you will enter at the start of each survey. This will allow your surveys to be connected by code identification.

To create the code, please you the last three digits of your phone number and the last three letters of your mother/father/guardian's name. This prompt will be given at each survey to help you remember your unique code.

Please enter the 6-digit code.

APPENDIX F:

PRE-TEST FOR THREE INTERVENTIONS

1. What is your current age, in years?

2. Please indicate your gender. ○ Female ○ Male

3. What is your race?

○ African American or Black ○ American Indian/Alaskan Native

○ Asian ○ Caucasian or White

○ Native Hawaiian/ Pacific Islander ○ Multi-racial

○ Other

If other, please specify_____

4. Are you of Hispanic or Latino descent? ○ Yes ○ No

5. In what year of school are you currently enrolled?

○ Freshman ○ Sophomore ○ Junior ○ Senior

○ 1st year Master's Program ○ 2nd year Master's Program

1. Do you currently have health insurance?

○ Yes, ensured by my employer ○ Yes, under my parent's insurance

○ Yes, school insurance ○ Yes, spouse or partner's insurance

○ Yes, Exchange from Affordable Care Act ○ Unsure

○ No, I do not currently have health insurance ○ Prefer not to answer

11. Which of the following best describes your current relationship status?

○ Married ○ Single

○ In a domestic partnership/civil union ○ Widowed

○ Involved with a boyfriend or girlfriend ○ Divorced

12. Indicate your sexuality.

○ Heterosexual ○ Homosexual ○ Bisexual ○ Other

14. Have you ever had vaginal sexual intercourse? ○ Yes ○ No

15. Have you ever had anal sexual intercourse? ○ Yes ○ No

16. Have you even engaged in oral sex? ○ Yes ○ No

17. Are you currently sexually active? ○ Yes ○ No

18. Do you currently engage in vaginal sexual intercourse? ○ Yes ○ No

19. Do you currently engage in anal sexual intercourse? ○ Yes ○ No

20. At what age did you first engage in sexual intercourse (oral, anal, or vaginal) _____

21. Please indicate your number of lifetime sexual partners

22. Please indicate the number of sexual partners you have had in the past year

23. Please indicate the number of sexual partners you have had in the past 3 months ____

24. Have you had a new sexual partner in the past three months? ○ Yes ○ No

25. Do you currently have **more than one** sexual partner?

○ Yes ○ No ○ Prefer not to answer

26. On average, how often do you use condoms during sexual intercourse?

○ Never ○ Occasionally ○ About half of the time

○ Often ○ Always

27. Did you use a condom during your last sexual encounter?

○ Yes ○ No ○ Not Applicable, not sexually active

28. Do you have a history of any sexually transmitted infection (STI/STD)?

○ Yes ○ No

29. Have you ever been diagnosed with any of the following?

	Yes	No
HPV	◯	◯
Genital Warts	◯	◯
Herpes	◯	◯
Chlamydia	◯	◯
Gonorrhea	◯	◯

30. For women, do you have a regular gynecologist? (Males, please select "Not Applicable")

◯ Yes ◯ No ◯ Not applicable, I am a male

31. For women, have you ever had a pap test (pap smear)? (Males, please select "Not Applicable")

◯ Never

◯ Within the past year

◯ More than 1 year ago but less than 2 years

◯ More than 2 years ago

◯ Not Applicable, I am a male

32. Are you currently being treated for a sexually transmitted infection? ◯ Yes ◯ No

33. For women, do you have any history of an abnormal pap test (pap smear)? (Males, please select "Not Applicable")

◯ Yes ◯ No ◯ Unsure

◯ Not applicable/I am female and never had a pap test (pap smear)

◯ Not applicable, I am a male

34. Has a close friend ever been diagnosed with any of the following?

	Yes	No
HPV	◯	◯

Cervical Cancer	◯	◯
Penile Cancer	◯	◯
Cancer of the neck or throat	◯	◯
Genital warts	◯	◯

35. Has a **spouse/partner/boyfriend/girlfriend** ever been diagnosed with any of the following?

	Yes	No
HPV	◯	◯
Cervical Cancer	◯	◯
Penile Cancer	◯	◯
Cancer of the neck or throat	◯	◯
Genital Warts	◯	◯

36. Has a **family member** ever been diagnosed with any of the following?

	Yes	No
HPV	◯	◯
Cervical Cancer	◯	◯
Penile Cancer	◯	◯
Cancer of the neck or throat	◯	◯
Genital Warts	◯	◯

In the next section of the survey, you will be asked a series of questions about the Human Papillomavirus (HPV) and the Human Papillomavirus (HPV) vaccine. Please answer the following questions based on **your own current knowledge.** Please **do not use** any resources (e.g., internet, books, other people) to help you answer the questions. It is **very important** for the purposes of the study to follow these directions and avoid getting assistance from any outside resources to complete the questions. Please remember, your answers are only connected by your ID number, and correct/incorrect

answers have no effect on your participation in the study. Thank you for your attention and help.

37. I understand that I am to complete the following questions without any resources, such as the internet. ◯ Yes, I understand.

38. By checking yes, you acknowledge that the below survey will be completed without internet help. ◯ Yes, I will complete the following survey without resources.

39. Please select Yes, No, or Not Sure for each item

	Yes	No	Not Sure
Before today, had you ever heard of the Human Papillomavirus (HPV)?	◯	◯	◯
Have you ever heard about the HPV vaccine?	◯	◯	◯
Have you ever spoken with a doctor about the HPV vaccine?	◯	◯	◯
Have you ever spoken with a parent about the HPV vaccine?	◯	◯	◯
Have you ever spoken with a friend about the HPV vaccine?	◯	◯	◯
Have you ever spoken with a spouse/partner/boyfriend/girlfriend about the HPV vaccine?	◯	◯	◯

40. **HPV KNOWLEDGE.** Please read each statement below regarding HPV. Then click on one response choice (true, false, I don't know) for each statement.

	TRUE	**FALSE**	**DON'T KNOW**
HPV can cause cervical cancer.			
A person could have HPV for many years without knowing it.			
HPV is very rare.			
HPV can be passed on during sexual intercourse.			
HPV always has visible signs or symptoms.			
Using condoms reduces the risk of getting HPV.			
HPV can cause HIV/AIDS.			
HPV can be passed on by genital skin-to-skin contact.			
Men cannot get HPV.			
Having sex at an early age increases the risk of getting HPV.			
There are many types of HPV.			
HPV can cause genital warts.			
HPV can be cured with antibiotics.			
Most sexually active people will get HPV at some point in their lives.			
HPV usually doesn't need any treatment.			
Having many sexual partners increases the risk of getting HPV.			

41. **HPV Vaccine Knowledge.** Please read each statement below about the Human Papillomavirus (HPV) vaccine. Then click on one response choice (true, false, I don't know) for each statement.

	TRUE	FALSE	DON'T KNOW
Girls who have had an HPV vaccine do not need a Pap test when they are older.			
One of the HPV vaccines offers protection against genital warts.			
HPV vaccines offer protection against all sexually transmitted infections.			
Someone who has an HPV vaccine cannot develop cervical cancer.			
HPV vaccines offer protection against most cervical cancers.			
The HPV vaccine requires three doses.			
HPV vaccines are most effective if given to people who have never had sex.			

TPB VARIALBES - Attitude About HPV Vaccine

For each item, please click on the number within the range that best corresponds with how you feel about the statement.

42. For me, getting the **human papillomavirus vaccine** (HPV vaccine) would be:

1**- Good** 2 3 4 5 6 7 - **Bad**

43. For me, getting the HPV vaccine would be:

1 – **Foolish** 2 3 4 5 6 7 - **Wise**

44. For me, getting the HPV vaccine would be:

1 – **Unpleasant** 2 3 4 5 6 7 - **Pleasant**

45. For me, getting the HPV vaccine would be:

1- **Unnecessary** 2 3 4 5 6 7 - **Necessary**

46. For me, getting the HPV vaccine would be:

1 – **Effective** 2 3 4 5 6 7 - **Ineffective**

47. For me, getting the HPV vaccine would be:

1 - **Painful** 2 3 4 5 6 7 – **Painless**

48. My parents think I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 **–Very Much**

49. My **friends** think I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

50. My **doctor** thinks I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

51. Most people who are important to me think I should get HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

52. My **partner/spouse/boyfriend/girlfriend** thinks I should get the (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

53. My friends think the HPV vaccine is important.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

54. My friends have received the HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

55. I would be much more likely to get the HPV vaccine if a friend went with me.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

56. It is important for me to have my parent's approval before I get the HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

57. I am confident that if I wanted to, I could get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

58. Whether or not I get the human papillomavirus (HPV) vaccine is completely up to me.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

59. For me to get the human papillomavirus (HPV) vaccination series is....

1 -Not at All 2 3 4 5 6 7 **–Very Much**

60. I feel I would be capable of getting the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

61. If I do not get the HPV vaccine, and later develop the human Papillomavirus infection, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

62. If I do not get the HPV vaccine, and later develop cervical or others cancers related to the human papillomavirus, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

63. If I do not get the HPV vaccine, and later transmit the human papillomavirus to my partner, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

64. If I do not get the HPV vaccine, and later transmit the human papillomavirus to my partner, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

65. I intend to get the human papillomavirus (HPV) vaccine within the next 6 months.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

66. I intend to initiate the HPV vaccination series within the next 6 months.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

67. I intend to get all three shots to complete human papillomavirus (HPV) vaccination series.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

THE FINAL STEP --- PLEASE COMPLETE -- If you do not do this, I will not be able to give you credit or contact you for the rest of the survey. Please complete the survey, by entering your contact information. The researcher will contact you via email to arrange for the next portion of the study. This information will remain separate from your survey data and only be used for the purpose of follow-up surveys and extra credit allotment. Please COPY AND PASTE THE LINK BELOW into a NEW WINDOW. This will take you to a separate survey to enter your contact information. If you do not do this, I will not be able to give you credit or contact you for the rest of the survey.

APPENDIX G:

CONTACT INFORMATION

Please enter your contact information below.

Name:

Email:

Phone Number:

Please enter your class and teacher information for extra credit purposes

Please enter your 6-digit code

APPENDIX H:

1-WEEK POST-TEST FOR NO ITERVENTION AND INFORMATIONAL INTERVENTION

Thank you for participating in our survey. Your feedback is important.

For the following questions, please do not use any sources to help you answer the questions regarding HPV/HPV vaccination. Please remember, the following responses are only connected to your ID number and your participation is in no way affected by the number of correct/incorrect responses. Thank you for your time.

1. By checking yes, you acknowledge that the below survey will be completed without internet help. ○ Yes

2. Before beginning the survey, please enter the 6-digit code your created at the start of the survey. To create the code, you were prompted to use the last three digits of your phone number and the last three letters of your mother/father/guardian's name. Please enter the 6-digit code. [ ]

3. **Please select Yes, No, or Not Sure for each item**

	Yes	No	Not Sure
Before today, had you ever heard of the HPV?	○	○	○
Have you ever heard about the HPV vaccine?	○	○	○
Have you ever spoken with a doctor about HPV?	○	○	○
Have you ever spoken with a parent about HPV vaccine?	○	○	○
Have you ever spoken with a friend about HPV vaccine?	○	○	○
Have you ever spoken with a SO about HPV vaccine?	○	○	○

4. HPV Knowledge. Please read each statement below about the Human Papillomavirus (HPV). Then click on one response choice (true, false, I don't know) for each statement.

	TRUE	FALSE	DON'T KNOW
HPV can cause cervical cancer.			
A person could have HPV for many years without knowing it.			
HPV is very rare.			
HPV can be passed on during sexual intercourse.			
HPV always has visible signs or symptoms.			
Using condoms reduces the risk of getting HPV.			
HPV can cause HIV/AIDS.			
HPV can be passed on by genital skin-to-skin contact.			
Men cannot get HPV.			
Having sex at an early age increases the risk of getting HPV.			
There are many types of HPV.			
HPV can cause genital warts.			
HPV can be cured with antibiotics.			
Most sexually active people will get HPV at some point in their lives.			
HPV usually doesn't need any treatment.			
Having many sexual partners increases the risk of getting HPV.			

5. **HPV Vaccine Knowledge.** Please read each statement below about the Human Papillomavirus (HPV) vaccine . Then click on one response choice (true, false, I

don't know) for each statement.

	TRUE	FALSE	DON'T KNOW
Girls who have had an HPV vaccine do not need a Pap test when they are older.			
One of the HPV vaccines offers protection against genital warts.			
HPV vaccines offer protection against all sexually transmitted infections.			
Someone who has an HPV vaccine cannot develop cervical cancer.			
HPV vaccines offer protection against most cervical cancers.			
The HPV vaccine requires three doses.			
HPV vaccines are most effective if given to people who have never had sex.			

TPB VARIALBES - For each item, please click on the number within the range that best corresponds with how you feel about the statement.

5. For me, getting the **human papillomavirus vaccine** (HPV vaccine) would be:

1**- Good** 2 3 4 5 6 7 **- Bad**

○ ○ ○ ○ ○ ○ ○

6. For me, getting the HPV vaccine would be:

1 – **Foolish** 2 3 4 5 6 7 **- Wise**

○ ○ ○ ○ ○ ○ ○

7. For me, getting the HPV vaccine would be:

1 – **Unpleasant** 2 3 4 5 6 7 **- Pleasant**

○ ○ ○ ○ ○ ○ ○

8. For me, getting the HPV vaccine would be:

1- **Unnecessary** 2 3 4 5 6 7 - **Necessary**

9. For me, getting the HPV vaccine would be:

1 – **Effective** 2 3 4 5 6 7 - **Ineffective**

10. For me, getting the HPV vaccine would be:

1 - **Painful** 2 3 4 5 6 7 – **Painless**

11. My parents think I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 **–Very Much**

12. My **friends** think I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

13. My **doctor** thinks I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

14. Most people who are important to me think I should get HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

15. My **partner/spouse/boyfriend/girlfriend** thinks I should get the (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

16. My friends think the HPV vaccine is important.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

17. My friends have received the HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

18. I would be much more likely to get the HPV vaccine if a friend went with me.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

19. It is important for me to have my parent's approval before I get the HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

20. I am confident that if I wanted to, I could get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

21. Whether or not I get the human papillomavirus (HPV) vaccine is completely up to me.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

22. For me to get the human papillomavirus (HPV) vaccination series is....

1 -Not at All 2 3 4 5 6 7 **–Very Much**

23. I feel I would be capable of getting the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

24. If I do not get the HPV vaccine, and later develop the human Papillomavirus infection, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

25. If I do not get the HPV vaccine, and later develop cervical or others cancers related to the human papillomavirus, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

26. If I do not get the HPV vaccine, and later transmit the human papillomavirus to my partner, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

27. If I do not get the HPV vaccine, and later transmit the human papillomavirus to my partner, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

28. I intend to get the human papillomavirus (HPV) vaccine within the next 6 months.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

29. I intend to initiate the HPV vaccination series within the next 6 months.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

30. I intend to get all three shots to complete human papillomavirus (HPV) vaccination series.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

At the start of the survey, you were instructed to answer the questions without using any resources (e.g., the internet) to help you answer the questions. Did you follow these directions? By clicking "Yes" below, you acknowledge that you answered the questions about HPV and the HPV vaccine without any help. Remember, please be honest and your answer is only connected to an ID number.

- ○ Yes, I followed the directions
- ○ No, I did not follow the directions.

At the start of the survey, you were instructed to answer the questions without using any resources (e.g., the internet) to help you answer the questions. Did you follow these directions?

- ○ Yes
- ○ No

APPENDIX I:

3- AND 6-MONTH FOLLOW-UP SURVEYS FOR NO INTERVENTION

Thank you for participating in the 3-month follow-up survey. Your continued participation is very much appreciated. Please remember, your answers are only connected to your ID number. Your responses in no way affect your participation in the survey. Thank you for your honest feedback. The survey should take approximately 10 - 15 minutes to complete.

Before beginning, please enter your 6-digit ID code you created at the start of the survey.

When you created the code you were prompted to use the last three digits of your phone number and the last three letters of your mother/father/guardian's name.

Please enter the 6-digit code. ☐

1. In the past three months have you spoken with any of the following individuals about HPV/HPV vaccination?

	Yes	No	Not Sure
Doctor/medical professional	○	○	○
Parent/guardian	○	○	○
Friend	○	○	○
Spouse/partner/boyfriend/girlfriend	○	○	○
Other family member	○	○	○
Classmate or Acquaintance	○	○	○

2. Have you received any shots in the HPV vaccination series? ○ Yes ○ No

3. You indicated you have received a shot in the HPV vaccination series. How many shots have you received?

   ○ One ○ Two ○ Three

4. I intend to finish the HPV vaccination series.

1 -Definitely Not	2	3	4	5	6	**7 –Definitely**
○	○	○	○	○	○	○

5. How confident are you that you will finish getting all three shots in the HPV vaccine series? Please select N/A if you have completed the series.

1- **Not Confident**	2	3	4	5	6	7 – **Confident**
○	○	○	○	○	○	○

6. You indicated that you have not received any shots in the HPV vaccination series, do you intend to initiate the HPV vaccine series within the next 6 months?

1 -Definitely Not	2	3	4	5	6	**7 –Definitely**
○	○	○	○	○	○	○

APPENDIX J:

INFORMATIONAL INTERVENTION

Thank you for completing the consent and pretest portion of the survey.

In this part of the study, you will be asked to follow links to three on-line informational brochures about HPV and the HPV vaccination. Please OPEN EACH LINK IN A NEW WINDOW and thoroughly read the information. You can either hit the 'control' button with the mouse click on the link OR copy and paste the link into a NEW window. It is important for the study that you read the information.

After reading each brochure, please close out of the links, and complete the survey.

Thank you for your help. If you have and questions or concerns, please contact the primary investigator at the information below:

Kristina Harper

[redacted]

harper@uhcl.edu

I agree to follow each link and read the on-line brochures. Yes No

Before beginning, please enter your 6-digit ID code you created at the start of the survey. When you created the code you were prompted to use the last three digits of your phone number and the last three letters of your mother/father/guardian's name.

The First Information Brochure: HPV Vaccination Information Sheet.
The following two-page sheet developed by the U.S. Department of Health and Human Services Center for Disease Control and Prevention provides a summary of information regarding HPV vaccination.

Please OPEN THE LINK IN A NEW WINDOW and thoroughly read the information. You can either hit the 'control' button with the mouse click on the link OR copy and paste the link into a NEW window.

https://www.cdc.gov/vaccines/hcp/vis/vis-statements/hpv.pdf

I clicked on the link and read the information. ○ Yes

The Second Informational Brochure: Genital HPV Infection - CDC Fact Sheet.
This is a three-page document that provides a brief overview of HPV and the HPV vaccine. Last updated in 2017 by the CDC.

Please OPEN THE LINK IN A NEW WINDOW and thoroughly read the information. You can either hit the 'control' button with the mouse and click on the link OR copy and paste the link into a NEW window.

https://www.cdc.gov/std/hpv/hpv-Fs-July-2017.pdf

I clicked on the link and read the information. ○ Yes

The third informational brochure: HPV Questions and Answers
The 4-page document presents common questions and answers posed about HPV and the vaccine. It is produced by the Immunization Action Coalition and the content is reviewed by the CDC.

Please OPEN THE LINK IN A NEW WINDOW and thoroughly read the information. You can either hit the 'control' button with the mouse click on the link OR copy and paste the link into a NEW window.

Please click on the following link http://www.immunize.org/catg.d/p4207.pdf

I clicked on the link and read the information. ○ Yes

Thank you for reading the brochures and for completing the part of the study. We appreciate your time and efforts! The researcher will contact you in ONE WEEK by email to complete the follow-up survey. You will receive your 2.5 hours of extra credit after completing the next step. Thank you and have a nice day.

APPENDIX K:

3-MONTH FOLLOW-UP INFORMATIONAL AND PSYCHOSOCIAL INTERVENTION

Thank you for participating in the 3-month follow-up survey. Your continued participation is very much appreciated. Please remember, your answers are only connected to your ID number. Your responses in no way affect your participation in the survey. Thank you for your honest feedback.

The survey should take approximately 10 -15 minutes to complete.

Before beginning, please enter your 6-digit ID code you created at the start of the survey. When you created the code you were prompted to use the last three digits of your phone number and the last three letters of your guardian's name. ☐

1. In the past three months have you spoken with any of the following individuals about HPV/HPV vaccination?

	Yes	No	Not Sure
Doctor/medical professional	○	○	○
Parent/guardian	○	○	○
Friend	○	○	○
Spouse/partner/boyfriend/girlfriend	○	○	○
Other family member	○	○	○
Classmate or Acquaintance	○	○	○

2. In the past three months have you received any shots in the HPV vaccination series?

   ○ Yes, I have received **one** shot

   ○ Yes, I have received **two** shots

   ○ No, I have not started the HPV vaccination series

You indicated you have received at least one shot in the HPV vaccination series. Do you plan to complete the three-shot series?

○ Yes ○ No ○ Unsure

3. I intend to complete the three shot HPV vaccination series

1 -No, Definitely Not	2	3	4	5	6	**7 – Yes, Definitely**
○	○	○	○	○	○	○

4. How confident are you that you will be able to complete the three shot HPV vaccination series?

1- **Not at All Confident**	2	3	4	5	6	7 – **Very Confident**
○	○	○	○	○	○	○

5. You indicated that you have not started the HPV vaccination series, do you intend to get the HPV vaccine in the future?

1 -No, Definitely Not	2	3	4	5	6	**7 – Yes, Definitely**
○	○	○	○	○	○	○

6. Which of the following are reasons that you have not started the HPV vaccination series?

- ○ I decided I don't want the vaccine
- ○ I forgot to get it
- ○ My parents don't want me to get it
- ○ My Significant other/spouse doesn't want me to get
- ○ The vaccine costs too much
- ○ I am afraid of the needle aspect of the vaccine

- ○ I am worried about vaccine safety
- ○ I don't think I need the vaccine
- ○ My doctor discouraged the vaccine
- ○ I feel it is too difficult to get the vaccine
- ○ I think I will regret getting the vaccine
- ○ I wasn't sure where to get the vaccine
- ○ I feel too embarrassed to ask my parents for permission
- ○ I feel too embarrassed to talk to my doctor about the vaccine

APPENDIX L:

6-MONTH FOLLOW-UP INFORMATIONAL AND PSYCHOSOCIAL INTERVENTION

Thank you for participating in the 6-month follow-up survey. Your continued participation is very much appreciated. Please remember, your answers are only connected to your ID number. Your responses in no way affect your participation in the survey. Thank you for your honest feedback. The survey should take approximately 10 - 15 minutes to complete.

Before beginning, please enter your 6-digit ID code you created at the start of the survey. When you created the code you were prompted to use the last three digits of your phone number and the last three letters of your mother/father/guardian's name.

Please enter the 6-digit code. ☐

1. In the past 3 months have you spoken with any of the following individuals about the HPV vaccine?

	Yes	No	Not Sure
Doctor/medical professional	○	○	○
Parent/guardian	○	○	○
Friend	○	○	○
Spouse/partner/boyfriend/girlfriend	○	○	○
Other family member	○	○	○
Classmate or Acquaintance	○	○	○

2. Have you received any shots in the HPV vaccination series?

○ Yes ○ No

3. You indicated you have received at least one shot in the HPV vaccination series. How many shots have you received?

   ○ One ○ Two ○ Three

4. If you have not received all three shots in the vaccination series, do you intend to finish the series? Please select N/A if you have completed the series.

1 -No, Definitely Not	2	3	4	5	6	**7 – Yes, Definitely**
○	○	○	○	○	○	○

5. How confident are you that you will finish getting all three shots in the HPV vaccine series? Please select N/A if you have completed the series.

1- **Not Confident**	2	3	4	5	6	7 – **Very Confident**
○	○	○	○	○	○	○

6. You indicated that you have not received any shots in the HPV vaccination series, do you intend to initiate the HPV vaccine within the next 6 months?

1 -No, Definitely Not	2	3	4	5	6	**7 – Yes, Definitely**
○	○	○	○	○	○	○

7. Do you intend to get all three shots to complete the HPV vaccine?

1 -No, Definitely Not	2	3	4	5	6	**7 – Yes, Definitely**
○	○	○	○	○	○	○

8. Please check the <u>three main reasons</u> you have not received the 1st HPV vaccine shot

   ○ I decided I don't want the vaccine

   ○ I forgot to get it

   ○ My parents don't want me to get it

   ○ Costs too much

- ○ My Significant other/spouse doesn't want me to get
- ○ I am afraid of the needle aspect of the vaccine
- ○ I am worried about vaccine safety
- ○ I don't think I need the vaccine
- ○ My doctor discouraged the vaccine
- ○ I feel it is too difficult to get the vaccine
- ○ I will regret getting the vaccine
- ○ I wasn't sure where to get the vaccine
- ○ I feel too embarrassed to ask my parents for permission
- ○ I feel too embarrassed to talk to my doctor about the vaccine

APPENDIX M:

SAMPLE REMINDER MESSAGES

Message 1: DON'T HESITATE, VACCINATE!
Don't forget to schedule your HPV shot today.
UHCL Health Clinic **Phone**: 281.283.2626

Message 2: ALL IT TAKES IS 1-2-3 TO PREVENT HPV!
Don't forget to schedule your HPV shot today.
UHCL Health Clinic **Phone**: 281.283.2626

Message 3: GRAB A FRIEND AND MAKE A DATE TO VACCINATE!
Don't forget to schedule your HPV shot today.
UHCL Health Clinic **Phone**: 281.283.2626

Message 4: 1-2-3 FOR HPV! 'CATCH-UP' TO TAKE CARE OF ME!
Don't forget to schedule your HPV shot today.
UHCL Health Clinic **Phone**: 281.283.2626

Message 5: 1-2-3 FOR HPV. DON'T HESITATE TO VACCINATE!
Don't forget to schedule your HPV shot today.
UHCL Health Clinic **Phone**: 281.283.2626

APPENDIX N:

1-WEEK POST-TEST PSYCHOSOCIAL INTERVENTION

Thank you for participating in the follow-up survey. Your feedback is important and appreciated. The following survey will have some of the same questions you have answered before. Please, do your best to read each question thoroughly and answer based on your current feelings.

Also, some of the questions will ask you about HPV and the HPV vaccine. Please answer these questions without any help from resources you received at the information session or that you may have access to (e.g., the internet). It is important for the study that you answer the questions based on your own knowledge.

Please remember, that your information is only connected to an ID number, and answering correct or incorrect has no effect on your participation in the survey.

Thank you for your time.

I understand that I am to complete the following questions without any resources, such as the internet. By checking yes, you acknowledge that the below survey will be completed without help from other resources.

○ Yes, I will complete the following survey without other resources

Before beginning, please enter your 6-digit ID code you created at the start of the survey. When you created the code, you were prompted to use the last three digits of your phone number and the last three letters of your mother/father/guardian's name.

Please enter the 6-digit code. [ ]

1. In the past 3 months have you spoken with any of the following individuals about the HPV vaccine?

	Yes	No	Not Sure
Doctor/medical professional	○	○	○
Parent/guardian	○	○	○
Friend	○	○	○
Spouse/partner/boyfriend/girlfriend	○	○	○
Other family member	○	○	○
Classmate or Acquaintance	○	○	○

2. **HPV Vaccine Knowledge.** Please read each statement below about the Human Papillomavirus (HPV) vaccine . Then click on one response choice (true, false, I don't know) for each statement.

	TRUE	**FALSE**	**DON'T KNOW**
Girls who have had an HPV vaccine do not need a Pap test when they are older.			
One of the HPV vaccines offers protection against genital warts.			
HPV vaccines offer protection against all sexually transmitted infections.			
Someone who has an HPV vaccine cannot develop cervical cancer.			
HPV vaccines offer protection against most cervical cancers.			
The HPV vaccine requires three doses.			
HPV vaccines are most effective if given to people who have never had sex.			

3. **HPV KNOWLEDGE.** Please read each statement below regarding HPV. Then click on one response choice (true, false, I don't know) for each statement.

	TRUE	FALSE	DON'T KNOW
HPV can cause cervical cancer.			
A person could have HPV for many years without knowing it.			
HPV is very rare.			
HPV can be passed on during sexual intercourse.			
HPV always has visible signs or symptoms.			
Using condoms reduces the risk of getting HPV.			
HPV can cause HIV/AIDS.			
HPV can be passed on by genital skin-to-skin contact.			
Men cannot get HPV.			
Having sex at an early age increases the risk of getting HPV.			
There are many types of HPV.			
HPV can cause genital warts.			
HPV can be cured with antibiotics.			
Most sexually active people will get HPV at some point in their lives.			
HPV usually doesn't need any treatment.			
Having many sexual partners increases the risk of getting HPV.			

TPB VARIALBES - For each item, please click on the number within the range that best corresponds with how you feel about the statement.

4. For me, getting the **human papillomavirus vaccine** (HPV vaccine) would be:

1**- Good** 2 3 4 5 6 7 **- Bad**

5. For me, getting the HPV vaccine would be:

1 – **Foolish** 2 3 4 5 6 7 **- Wise**

6. For me, getting the HPV vaccine would be:

1 – **Unpleasant** 2 3 4 5 6 7 **- Pleasant**

7. For me, getting the HPV vaccine would be:

1**- Unnecessary** 2 3 4 5 6 7 **- Necessary**

8. For me, getting the HPV vaccine would be:

1 – **Effective** 2 3 4 5 6 7 **- Ineffective**

9. For me, getting the HPV vaccine would be:

1 **- Painful** 2 3 4 5 6 7 – **Painless**

10. My parents think I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 **–Very Much**

11. My **friends** think I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

12. My **doctor** thinks I should get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

13. Most people who are important to me think I should get HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

14. My **partner/spouse/boyfriend/girlfriend** thinks I should get the (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

15. My friends think the HPV vaccine is important.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

16. My friends have received the HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

17. I would be much more likely to get the HPV vaccine if a friend went with me.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

18. It is important for me to have my parent's approval before I get the HPV vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

19. I am confident that if I wanted to, I could get the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

20. Whether or not I get the human papillomavirus (HPV) vaccine is completely up to me.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

21. For me to get the human papillomavirus (HPV) vaccination series is....

1 -Not at All 2 3 4 5 6 7 **–Very Much**

22. I feel I would be capable of getting the human papillomavirus (HPV) vaccine.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

23. If I do not get the HPV vaccine, and later develop the human Papillomavirus infection, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

24. If I do not get the HPV vaccine, and later develop cervical or others cancers related to the human papillomavirus, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

25. If I do not get the HPV vaccine, and later transmit the human papillomavirus to my partner, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

26. If I do not get the HPV vaccine, and later transmit the human papillomavirus to my partner, I will regret my decision.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

27. I intend to get the human papillomavirus (HPV) vaccine within the next 6 months.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

28. I intend to initiate the HPV vaccination series within the next 6 months.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

29. I intend to get all three shots to complete human papillomavirus (HPV) vaccination series.

1 -Not at All 2 3 4 5 6 7 **–Very Much**

Please answer the following questions about the psychosocial session you attended on campus about HPV and the HPV vaccine.

1. During the session, I learned new information about the human papillomavirus.

1 -No, Not at All 2 3 4 5 6 7 **– Yes, Definitely**

2. During the session, I learned new information about the HPV **vaccination series.**

1 -No, Not at All 2 3 4 5 6 7 **– Yes, Definitely**

3. I enjoyed the information session.

1 -No, Not at All 2 3 4 5 6 7 **– Yes, Definitely**

4. I would recommend a friend to attend a similar session.

1 -No, Not at All 2 3 4 5 6 7 **– Yes, Definitely**

5. I felt differently about HPV after attending the session.

1 -No, Not at All	2	3	4	5	6	7 – **Yes, Definitely**
○	○	○	○	○	○	○

6. I felt differently about the HPV vaccination series after attending the session.

1 -No, Not at All	2	3	4	5	6	7 – **Yes, Definitely**
○	○	○	○	○	○	○

7. **Please comment on any specific aspects <u>you liked</u> about the session.**

8. **Please comment on any suggestions you may have to improve the session.**

APPENDIX O:

HANDOUT #1 CDC FACT SHEET

Genital HPV Infection - CDC Fact Sheet

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States. Some health effects caused by HPV can be prevented by the HPV vaccines.

What is HPV?

HPV is the most common sexually transmitted infection (STI). HPV is a different virus than HIV and HSV (herpes). 79 million Americans, most in their late teens and early 20s, are infected with HPV. There are many different types of HPV. Some types can cause health problems including genital warts and cancers. But there is a vaccine that can stop these health problems from happening.

How is HPV spread?

You can get HPV by having vaginal, anal, or oral sex with someone who has the virus. It is most commonly spread during vaginal or anal sex. HPV can be passed even when an infected person has no signs or symptoms.

Anyone who is sexually active can get HPV, even if you have had sex with only one person. You also can develop symptoms years after you have sex with someone who is infected. This makes it hard to know when you first became infected.

Does HPV cause health problems?

In most cases, HPV goes away on its own and does not cause any health problems. But when HPV does not go away, it can cause health problems like genital warts and cancer.

Genital warts usually appear as a small bump or group of bumps in the genital area. They can be small or large, raised or flat, or shaped like a cauliflower. A healthcare provider can usually diagnose warts by looking at the genital area.

Does HPV cause cancer?

HPV can cause cervical and other cancers including cancer of the vulva, vagina, penis, or anus. It can also cause cancer in the back of the throat, including the base of the tongue and tonsils (called oropharyngeal cancer).

Cancer often takes years, even decades, to develop after a person gets HPV. The types of HPV that can cause genital warts are not the same as the types of HPV that can cause cancers.

There is no way to know which people who have HPV will develop cancer or other health problems. People with weak immune systems (including those with HIV/AIDS) may be less able to fight off HPV. They may also be more likely to develop health problems from HPV.

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CDC

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How can I avoid HPV and the health problems it can cause?

You can do several things to lower your chances of getting HPV.

Get vaccinated. The HPV vaccine is safe and effective. It can protect against diseases (including cancers) caused by HPV when given in the recommended age groups. (See "Who should get vaccinated?" below) CDC recommends 11 to 12 year olds get two doses of HPV vaccine to protect against cancers caused by HPV. For more information on the recommendations, please see: https://www.cdc.gov/vaccines/vpd/hpv/public/index.html

Get screened for cervical cancer. Routine screening for women aged 21 to 65 years old can prevent cervical cancer.

If you are sexually active

- Use latex condoms the right way every time you have sex. This can lower your chances of getting HPV. But HPV can infect areas not covered by a condom - so condoms may not fully protect against getting HPV;
- Be in a mutually monogamous relationship – or have sex only with someone who only has sex with you.

Who should get vaccinated?

All boys and girls ages 11 or 12 years should get vaccinated.

Catch-up vaccines are recommended for boys and men through age 21 and for girls and women through age 26, if they did not get vaccinated when they were younger.

The vaccine is also recommended for gay and bisexual men (or any man who has sex with a man) through age 26. It is also recommended for men and women with compromised immune systems (including those living with HIV/AIDS) through age 26, if they did not get fully vaccinated when they were younger.

How do I know if I have HPV?

There is no test to find out a person's "HPV status." Also, there is no approved HPV test to find HPV in the mouth or throat.

There are HPV tests that can be used to screen for cervical cancer. These tests are only recommended for screening in women aged 30 years and older. HPV tests are not recommended to screen men, adolescents, or women under the age of 30 years.

Most people with HPV do not know they are infected and never develop symptoms or health problems from it. Some people find out they have HPV when they get genital warts. Women may find out they have HPV when they get an abnormal Pap test result (during cervical cancer screening). Others may only find out once they've developed more serious problems from HPV, such as cancers.

How common is HPV and the health problems caused by HPV?

HPV (the virus): About 79 million Americans are currently infected with HPV. About 14 million people become newly infected each year. HPV is so common that almost every person who is sexually-active will get HPV at some time in their life if they don't get the HPV vaccine.

Health problems related to HPV include genital warts and cervical cancer.

Genital warts: Before HPV vaccines were introduced, roughly 340,000 to 360,000 women and men were affected by genital warts caused by HPV every year.* Also, about one in 100 sexually active adults in the U.S. has genital warts at any given time.

Cervical cancer: Every year, nearly 12,000 women living in the U.S. will be diagnosed with cervical cancer, and more than 4,000 women die from cervical cancer—even with screening and treatment.

There are other conditions and cancers caused by HPV that occur in people living in the United States. Every year, approximately 19,400 women and 12,100 men are affected by cancers caused by HPV.

*These figures only look at the number of people who sought care for genital warts. This could be an underestimate of the actual number of people who get genital warts.

I'm pregnant. Will having HPV affect my pregnancy?

If you are pregnant and have HPV, you can get genital warts or develop abnormal cell changes on your cervix. Abnormal cell changes can be found with routine cervical cancer screening. You should get routine cervical cancer screening even when you are pregnant.

Can I be treated for HPV or health problems caused by HPV?

There is no treatment for the virus itself. However, there are treatments for the health problems that HPV can cause:

1. **Genital warts** can be treated by your healthcare provider or with prescription medication. If left untreated, genital warts may go away, stay the same, or grow in size or number.
2. **Cervical precancer** can be treated. Women who get routine Pap tests and follow up as needed can identify problems before cancer develops. Prevention is always better than treatment. For more information visit www.cancer.org.
3. **Other HPV-related cancers** are also more treatable when diagnosed and treated early. For more information visit www.cancer.org

Where can I get more information?

HPV Topic Page
www.cdc.gov/hpv/index.html

HPV Vaccination
www.cdc.gov/vaccines/vpd/hpv/index.html

Cancer Prevention and Control
www.cdc.gov/cancer/

Cervical Cancer – What Should I Know About Screening?
www.cdc.gov/cancer/cervical/basic_info/screening.htm

CDC's National Breast and Cervical Cancer Early Detection Program
www.cdc.gov/cancer/nbccedp/

Division of STD Prevention (DSTDP)
Centers for Disease Control and Prevention
www.cdc.gov/std

CDC-INFO Contact Center
1-800-CDC-INFO
(1-800-232-4636)
wwwn.cdc.gov/dcs/ContactUs/Form

CDC National Prevention Information Network (NPIN)
npin.cdc.gov/disease/stds
P.O. Box 6003
Rockville, MD 20849-6003
E-mail: npin-info@cdc.gov

American Sexual Health Association (ASHA)
P. O. Box 13827
Research Triangle Park, NC
27709-3827
1-800-783-9877

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APPENDIX P:

HANDOUT #2 CDC FACT SHEET FOR MALES

HPV and Men - CDC Fact Sheet

Nearly all sexually active people will get human papillomavirus (HPV) at some time in their life if they don't get the HPV vaccine. Although most HPV infections go away on their own without causing problems, HPV can cause genital warts, or cancer. Getting vaccinated against HPV can help prevent these health problems.

What is HPV?

HPV is a very common virus that can be spread from one person to another person through anal, vaginal, or oral sex, or through other close skin-to-skin touching during sexual activity. 79 million Americans, most in their late teens and early 20s, are infected with HPV. Nearly all sexually active people who do not get the HPV vaccine get infected with HPV at some point in their lives. It is important to understand that getting HPV is not the same thing as getting HIV or HSV (herpes).

How do men get HPV?

You can get HPV by having sex with someone who is infected with HPV. This disease is spread easily during anal or vaginal sex, and it can also be spread through oral sex or other close skin-to-skin touching during sex. HPV can be spread even when an infected person has no visible signs or symptoms.

Will HPV cause health problems for me?

Most HPV infections go away on their own and don't cause any health problems. However, if an infection does not go away, it is possible to develop HPV symptoms months or years after getting infected. This makes it hard to know exactly when you became infected. Lasting HPV infection can cause genital warts or certain kinds of cancer. It is not known why some people develop health problems from HPV and others do not.

What are the symptoms of HPV?

Most men who get HPV never develop symptoms and the infection usually goes away completely by itself. However, if HPV does not go away, it can cause genital warts or certain kinds of cancer.

See your healthcare provider if you have questions about anything new or unusual such as warts, or unusual growths, lumps, or sores on your penis, scrotum, anus, mouth, or throat.

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Division of STD Prevention

CDC

What are the symptoms of genital warts?

Genital warts usually appear as a small bump or group of bumps in the genital area around the penis or the anus. These warts might be small or large, raised or flat, or shaped like a cauliflower. The warts may go away, or stay the same, or grow in size or number. Usually, a healthcare provider can diagnose genital warts simply by looking at them. Genital warts can come back, even after treatment. *The types of HPV that cause warts do not cause cancer.*

Can HPV cause cancer?

Yes. HPV itself isn't cancer but it can cause changes in the body that lead to cancer. HPV infections usually go away by themselves but, when they don't, they can cause certain kinds of cancer to develop. These include cervical cancer in women, penile cancer in men, and anal cancer in both women and men. HPV can also cause cancer in the back of the throat, including the base of the tongue and tonsils (called oropharyngeal cancer). All of these cancers are caused by HPV infections that did not go away. Cancer develops very slowly and may not be diagnosed until years, or even decades, after a person first gets infected with HPV. Currently, there is no way to know who will have only a temporary HPV infection, and who will develop cancer after getting HPV.

How common are HPV-related cancers in men?

Although HPV is the most common sexually transmitted infection, HPV-related cancers are not common in men.

Certain men are more likely to develop HPV-related cancers:

- Men with weak immune systems (including those with HIV) who get infected with HPV are more likely to develop HPV-related health problems.
- Men who receive anal sex are more likely to get anal HPV and develop anal cancer.

Can I get tested for HPV?

No, there is currently no approved test for HPV in men.

Routine testing (also called 'screening') to check for HPV or HPV-related disease before there are signs or symptom, is not recommended by the CDC for anal, penile, or throat cancers in men in the United States. However, some healthcare providers do offer anal Pap tests to men who may be at increased risk for anal cancer, including men with HIV or men who receive anal sex. If you have symptoms and are concerned about cancer, please see a healthcare provider.

Can I get treated for HPV or health problems caused by HPV?

There is no specific treatment for HPV, but there are treatments for health problems caused by HPV. Genital warts can be treated by your healthcare provider, or with prescription medication. HPV-related cancers are more treatable when diagnosed and treated promptly. For more information, visit www.cancer.org.

How can I lower my chance of getting HPV?

There are two steps you can take to lower your chances of getting HPV and HPV-related diseases:

- Get vaccinated. The HPV vaccine is safe and effective. It can protect men against warts and certain cancers caused by HPV. Ideally, you should get vaccinated before ever having sex (see below for the recommended age groups). CDC recommends 11 to 12 year olds get two doses of HPV vaccine to protect against cancers caused by HPV. For more information on the recommendations, please see: https://www.cdc.gov/vaccines/vpd/hpv/public/index.html
- Use condoms the correct way every time you have sex. This can lower your chances of getting all STIs, including HPV. However, HPV can infect areas that are not covered by a condom, so condoms may not give full protection against getting HPV.

Can I get the HPV vaccine?

In the United States, the HPV vaccine is recommended for the following men:

- All boys at age 11 or 12 years (or as young as 9 years)
- Older boys and men through age 21 years, if they did not get vaccinated when they were younger
- Gay, bisexual, and other men who have sex with men through age 26 years, if they did not get vaccinated when they were younger
- Men with HIV or weakened immune systems through age 26 years, if they did not get vaccinated when they were younger

What does having HPV mean for me or my sex partner's health?

See a healthcare provider if you have questions about anything new or unusual (such as warts, growths, lumps, or sores) on your own or your partner's penis, scrotum, anus, mouth or throat. Even if you are healthy, you and your sex partner(s) may also want to get checked by a healthcare provider for other STIs.

If you or your partner have genital warts, you should avoid having sex until the warts are gone or removed. However, it is not known how long a person is able to spread HPV after warts are gone.

What does HPV mean for my relationship?

HPV infections are usually temporary. A person may have had HPV for many years before it causes health problems. If you or your partner are diagnosed with an HPV-related disease, there is no way to know how long you have had HPV, whether your partner gave you HPV, or whether you gave HPV to your partner. HPV is not necessarily a sign that one of you is having sex outside of your relationship. It is important that sex partners discuss their sexual health and risk for all STIs, with each other.

Where can I get more information?

HPV Topic Page
www.cdc.gov/hpv/index.html

Gay and Bisexual Men's Health
www.cdc.gov/msmhealth/

Division of STD Prevention (DSTDP)
Centers for Disease Control and Prevention
www.cdc.gov/std

CDC-INFO Contact Center
1-800-CDC-INFO
(1-800-232-4636)
https://wwwn.cdc.gov/dcs/ContactUs/Form

CDC National Prevention Information Network (NPIN)
https://npin.cdc.gov/disease/stds
P.O. Box 6003
Rockville, MD 20849-6003
E-mail: npin-info@cdc.gov

American Sexual Health Association (ASHA)
http://www.ashasexualhealth.org/stdsstis/
P. O. Box 13827
Research Triangle Park, NC 27709-3827
1-800-783-9877

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APPENDIX Q:

HANDOUT FOR PSYCHOSOCIAL GROUP

Let's Talk About It (**HPV 1-2-3!**)

1. The three I's -- Interested in making Informed and Individual decisions about YOUR health

2. Emphasize CANCER prevention

- HPV can lead to cervical, vaginal, vulvar, penile, anal, throat and neck cancer
- What if this was a vaccine for breast and/or prostate cancer?
- Protecting future partners from Cancer

3. Normalize and de-stigmatize

- More than 50% who are sexually active will be exposed to some type of HPV
- NOT about being promiscuous - only takes one partner and your partner could have NO symptoms

4. Cost now vs. the potential cost down the road

5. How will we feel later, if I don't get the vaccine now?

Tips: Write down key points, practice ahead of time, bring notes

APPENDIX R:

HANDOUT FOR PSYCHOSOCIAL GROUP

MAKE A PLAN (**HPV 1-2-3!**)

1. **Research** further to make informed choice for **YOUR** healthcare and future.

2. **Talk** with parents, partners, primary care, gynecologist.

3. **Call** Insurance Company for Coverage.

4. Choose a **Location** (see list for examples).

5. **Make a Date to Vaccinate.**

6. Place **reminders** on Phone, Email, and/or Calendar for the 2nd and 3rd shots.

APPENDIX S:

HANDOUT FOR PSYCHOSOCIAL GROUP

MAKE A PLAN - FIND A LOCATION

1. **Your Gynecologist or Primary Care Doctor**

2. **University of Houston-Clear Health Center**
   SSCB 1.301
   Phone: 281-283-2626
   Fax: 281-283-2624

   Regular Hours
   Mon - Thu: 9:00 am - 7:00 pm
   Fri: 8:00 am - 12:00 noon

3. **CVS/pharmacy® Minute Clinic**
   2469 BAY AREA BLVD,
   HOUSTON, TX 77058

   MinuteClinic® hours:
   M-F: 8:30 AM - 7:30 PM
   Sat: 9:00 AM - 5:30 PM
   Sun: 10:00 AM - 5:30 PM

   Lunch hours:
   M-F: 1:30 PM - 2:30 PM
   Sat: 1:00 PM - 1:30 PM
   Sun: 1:00 PM - 1:30 PM

4. **Planned Parenthood (Dickinson Health Center)**
   3315 Gulf Freeway
   Dickinson, TX 77539
   713.514.1105

5. **Merck Vaccine Patient Assistance Program** - Individuals ages 19 - 26 who have no health insurance and meet financial criteria may qualify for the to receive the HPV vaccine (Gardasil) at no charge.