**HPV: VACCINE EDUCATION AND PROMOTION CAMPAIGN**

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**ABSTRACT**

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Vaccinations are one of public health’s greatest achievements from the last 100 years. They provide a tool to help prevent infection and decrease the burden of disease in the population. The Human Papillomavirus (HPV) vaccine was developed in 2006 and has been shown to reduce the risk of contracting the virus. Some strains of HPV have been linked to the development of cervical, oropharyngeal, and vaginal cancer. Despite the availability of the HPV vaccine, utilization of the vaccine has been relatively low in comparison to vaccination rates of other common vaccines.

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**HPV: VACCINE EDUCATION AND PROMOTION CAMPAIGN**

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In order to address the issue of low HPV vaccination rates, public health officials across the United States have chosen different approaches such as mandates and education campaigns. After an unsuccessful attempt at issuing a mandate for the HPV vaccine for middle school children, the Allegheny County Health Department decided that organizations should take an educational approach to increase HPV understanding and vaccine promotion. A review of literature and marketing techniques was conducted to develop an education and vaccine promotion campaign for the HPV vaccine.

The campaign aims to target adolescents and their parents to inform them about the HPV vaccine utilizing peer education, provider education, and technology as vectors to disseminate the information. The program will be initiated through a health improvement foundation that is already involved in efforts to increase HPV vaccination. The proposal also lays out an evaluation plan to determine if the campaign efforts are making an impact on the target audience in Allegheny County. The goal of this program is to increase awareness, acceptance, and utilization of the HPV vaccine.

A successful HPV education and promotion campaign would be significant to the area of public health because it would help to alleviate some of the burden of disease that HPV causes in terms of cancers, respiratory disease, and sexually transmitted conditions. The campaign influences not only the individuals that receive the vaccine but also act to protect the general public through herd immunity. A successful HPV campaign could be the first step in eliminating the cancer-causing virus from the population.

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Introduction

HPV, the human papillomavirus, is a virus transmitted by intimate skin-to-skin contact that can cause a range of diseases and cancers. A vaccine has been developed to prevent individuals from contracting the cancer-causing virus and is offered in many countries, including the United States. Despite the availability of the vaccine, it has not been accepted and utilized as widely as other routine vaccines. Public health practitioners must develop techniques to increase awareness, acceptance, and reception of the vaccine.

This paper describes a proposal for an HPV education and vaccine promotion campaign for eligible residents in Allegheny County. The proposal utilizes theory-based techniques in an intervention aimed at 11-15 year olds and their parents. The proposed intervention will deliver relevant education about HPV and the vaccine as well as provide resources for follow-up. An evaluation of the proposed campaign would indicate if the program should be expanded to other areas of the state.

The proposed campaign is based on marketing research to better understand how to create behavior change in the target audience. Public health theories and models were also utilized in the development of the proposed campaign materials and design. The evidence-based campaign aims to educate about and promote the HPV vaccine to eligible adolescents and their parents.

# Background

### Human Papillomavirus

HPV, the human papillomavirus, is a group of sexually transmitted viruses that affect the epithelial cells on certain internal and external body surfaces (NIH, 2015). These viruses are broken down into type depending on the disease process that they can cause and the risk the virus has of causing the infection (CDC, 2016). Many infected individuals are not even aware that they have been exposed to the virus because the body’s immune system attacks and destroys it before any symptoms are known. However, unresolved HPV infections can cause genital or non-genital warts as well as cancer in the individuals unable to clear the virus with their own immunity (CDC, 2016).

**1.1.1.1 Transmission**

HPV is a virus that requires direct skin-to-skin contact to be contracted. Direct contact is made through oral, anal, and vaginal sex, and exposure occurs through contact with a partner who has been previously infected with the virus (CDC, 2016). The type of transmission and symptom expression contribute to the number of individuals who will contract HPV in their lifetime. Like other sexually transmitted infections, HPV may be asymptomatic in an individual for years (CDC, 2016). An asymptomatic individual is still infectious, however, and partners can contract the virus at any time (CDC, 2016). Sexual behavior is one of the major risk factors for contracting this infection (CDC, 2016).

####  Prevalence and Incidence of Disease

According to the Centers for Disease Control and Prevention (CDC), HPV is the most common sexually transmitted infection, with over 14 million new cases each year (CDC, 2016). This equates to approximately 79 million cases of HPV infection in the United States (US) at this time (CDC, 2016). Additionally, individuals can be infected with multiple types of HPV simultaneously so the incidence of the disease may be greater than what is represented by the numbers (CDC, 2016).

#### Impact of Disease

Different strains of HPV result in different effects on the individual infected with the virus. As previously mentioned, many strains of HPV result in no symptoms or complications. However, several clinical manifestations of HPV contribute to the burden of the disease. One such symptom is genital warts, which are skin-colored raised areas that can range from barely visible to cauliflower in shape (Mayo Clinic, 2017).

Another condition that is caused by HPV is called recurrent respiratory papillomatosis attributed to two different strains of the virus (NIH, 2017). The condition results in tumors that grow throughout the respiratory tract, particularly in the larynx, which are often recurrent despite removal. The symptoms of the disease include difficulty breathing, chronic cough, and difficulty breathing while asleep (NIH, 2017).

HPV is also commonly linked to several different types of cancer including cervical, vaginal, anal, penile, and oropharyngeal cancers. It is estimated that in the United States over 38,000 cancers that are diagnosed each year are related to HPV infections (CDC, 2014). The most common is cervical cancer, which is almost always caused by HPV (NIH, 2016). In the United States, over 12,000 women are diagnosed with cervical cancer annually with around 4,000 deaths each year despite the availability of prevention measures like such as the HPV vaccine (CDC, 2014). Vaginal cancer is another type of cancer that is associated with HPV. Each year approximately 4,800 new cases are diagnosed with around 1,200 women in the US dying annually as a result. According to the American Cancer Society, HPV is associated with 90% of those diagnoses (American Cancer Society, 2016).

The burden of HPV can be seen in both genders. HPV accounts for close to 63% of penile cancer diagnoses in the United States. This results in approximately 1,100 new cases of penile cancer per year (CDC, 2016). Anal cancer is diagnosed with around 8,200 new cases each year with men accounting for nearly 3,000 of those cases (American Cancer Society, 2017).

Oropharyngeal cancers have also been linked to the human papillomavirus and result in the greatest incidence of cancer of all the HPV-linked cancers. Each year, almost 16,000 new cases of this cancer are diagnosed with a significantly higher rate in men than women (US DHHS, 2016). Though cancers of the mouth and airway have other risk factors that contribute to cancer, these are just the rates of cancer associated with HPV. Increasing the uptake of the HPV vaccine can mitigate the cancer burden that is caused by HPV.

### Vaccine

The burden of disease for HPV can be decreased by use of a safe and effective vaccine that is available for both men and women and has been shown to prevent HPV. Developed over 10 years ago, the HPV vaccine comes in either quadrivalent or 9-valent doses (CDC, 2016). These vaccines prevent against either the top four or nine strains of HPV that cause cancer. Evidence regarding the efficacy of the vaccine shows that it is very effective when given to those who have not yet experienced an exposure to HPV prior to vaccination. Exposure to HPV occurs through sexual contact so it is more effective before an individual becomes sexually active. It has not shown any significant effects once an individual has been exposed to a specific strain but did still protect against the other strains (CDC, 2016).

One study described the benefits of receiving even just one dose of the vaccine and its ability to prevent HPV infection. The study, conducted in Costa Rica, looked at the antibody response of females inoculated with the vaccine over a four-year period. Even after only one dose of the vaccine the women in the study experienced the antibody response and maintained it throughout the duration of the study (Safaein et al., 2013). Another study researched the efficacy of the vaccine over a nine-year period. Researchers in this study noted that the immune response was maintained in subjects who received the vaccination initially for the duration of the nine years that the study was conducted (Naud et al., 2014). The vaccine is efficacious and has lasting effects thus far, though additional studies will need to be conducted as the initial cohort of vaccinated individuals age.

Due to the fact that the vaccine is less effective once individuals have been exposed to the virus, it is important for individuals to be vaccinated before their initial exposure. Because of this, the CDC recommends that boys and girls begin the vaccination process at age 11. In addition it also advises the vaccine for females up until age 26 and males until age 21 (CDC, 2016). The vaccination series is most effective if it is completed before the individual’s first sexual contact to avoid exposure to HPV before vaccination (CDC, 2016). Studies conducted with individuals who have been previously exposed to the virus have shown that the vaccine does not protect against or clear individuals who are already infected. One example is a randomized controlled trial conducted with young women previously infected by HPV. The results showed that vaccination was not able to eliminate the virus from their systems at a rate significantly faster than their control group participant counterparts (The FUTURE II Study Group, 2007).

Though beneficial to receive the vaccine prior to exposure to the virus, evidence suggests that receiving the vaccine can still be valuable to those who have been exposed to some strains of the virus. One study conducting efficacy trials of the HPV vaccine showed that women who were previously exposed to some strains of HPV benefited from the quadrivalent HPV vaccine (The FUTURE II Study Group, 2007). This suggests that the vaccine protected against HPV strains the study participants had not previously been exposed to.

### Barriers to Vaccination

The low rate of vaccination for HPV, especially when compared to other recommended vaccines, is a result of some unique obstacles to the HPV vaccine. One barrier is a lack of information about the vaccine so parents are hesitant to allow their children to be vaccinated. Another barrier is the dose schedule of the vaccine, which hinders to completing the series (Holman, Benard, Roland, Watson, Liddon, & Stokley, 2014). Vaccinations must occur in a two-dose series with the second dose administered between six and 12 months after the initial dose (Holman et al., 2014). It may be difficult for individuals to correctly schedule and then receive the vaccination because of the dosing schedule. Evidence shows that adherence to the prescribed scheduling guidelines is often lacking with one study stating that over 50% of individuals vaccinated received doses late (Widdice, Bernstein, Leonard, Marsolo, & Kahn, 2011).

 Finally, studies show that because HPV is sexually transmitted, parents are deterred from vaccinating their children for fear of influencing their child’s sexual behavior (Holman et al., 2014). This can be a difficult barrier to overcome because their pre-conceived ideas about sexual norms of teenagers are very strong. There are also issues surrounding idea that the vaccine will influence teens’ sexual behavior. Additionally, parents may find it difficult to even discuss a prevention practice for a sexually transmitted infection if they have not first had discussions with their child about sexual practices. A program should plan to dispel any myths relating the vaccine to teenage sexual behavior and focus on the long-term benefits that it provides.

### Policy Overview

Mandating vaccinations has been a topic of contention for many years, although it has a strong impact on adherence to recommended vaccine guidelines. Mandates require vaccination of individuals in order to participate in certain arenas such as public schools or workplaces. Without a mandate requiring vaccination, individuals may not follow the recommendations given by the CDC. Many states have mandates for vaccines such as varicella or meningitis, allowing for exemptions at times. Some states have even instituted mandates requiring HPV vaccination for children in middle school. In the summer of 2016, Allegheny County, PA considered imposing such a mandate.

#### Allegheny County

As noted above, the HPV vaccine is recommended by the CDC for boys and girls beginning at age 11, but currently there are no policies in place that require vaccination in Allegheny County, PA. In the summer of 2016, the Allegheny County Health Department proposed a mandate that would require all eligible individuals to have begun the vaccination series for entrance into the 7th grade (D’Anonia, 2016).

Throughout the summer of 2016, public forums were held by the Allegheny County Board of Health to gather public opinion on the proposed mandate. Many praises and objections were heard during the forums and after review of the information, the Board of Health decided not to proceed with the mandate. The board decided instead to use educational campaigns to inform providers, parents, and young adults about the vaccination to encourage utilization.

Evidence suggests that a vaccination mandate would increase the uptake of the HPV vaccination rate considerably. Results from a study looking at the rates of vaccination in Australia after a mandate was passed showed coverage greater than 70%, which positively contributed to herd immunity in the area (Osazuwa-Peters, 2013). School-based programs in other regions of the world also show an increased rate of vaccination. One example is in Rwanda, which has a school-based HPV vaccination program with a very high vaccination success rate. It was able to achieve a 93% vaccination rate and attributes part of this success to the program (Osazuwa-Peters, 2013).

##### States with Mandates

Allegheny County was not the first to propose the use of mandates to increase utilization of the HPV vaccine. Some states have opted for mandates similar to the one proposed by Allegheny County. Virginia, the District of Columbia and Rhode Island all mandate vaccination for female students. Rhode Island has issued the mandate to cover both male and female students (Immunization Action Coalition, 2017). Virginia was the first state to have a mandate for HPV vaccination of school-aged girls in 2007 (Helderman & Kunkle, 2011). The District of Columbia also passed a mandate in 2007 with stricter guidelines than Virginia (Washington Times, 2009). Rhode Island was the state to pass the mandate most recently in 2016 (North & Towne, 2015). Because the mandates have been in effect for such a short time, it is still unclear what level of impact that they will have on vaccination rates and adherence to the CDC’s guidelines.

# campaign design

Health education campaigns should be based on health behavior theories in order to be effective at influencing behavior. Campaigns should also use health communication principles and strategies in order to target appropriate audiences. In addition, the organization that releases the campaign should be considered. The non-profit sector can be utilized and an industry analysis should be done to ensure that this sector is the most relevant for the purposes of a health communication campaign and development of campaign materials. Finally, it is important to develop an evaluation approach in order to determine if the educational campaign achieves the desired health outcome.

### General Design Principles

Successful educational campaigns follow several key design principles that generally guide public health campaigns. Initially, a problem is identified and evidence is gathered to justify the need for a solution to address the problem. Once a problem is recognized, theory and theoretical frameworks are used to develop an intervention to combat the issue. In addition to identifying the problem and theories that can be used to address the problem, public health practitioners should decide on the target audience that will be most impacted by an intervention. It is then that an intervention is developed that can influence the target audience and provide the necessary education to alleviate the burden of the problem. In conjunction with creating an intervention, it is important to create an evaluation in order to determine if the intervention was successful. Finally, an organization needs to be identified that can carry out the intervention to reap the most success and have the greatest benefit to the target audience. These steps are important to crafting a public health campaign with a strong influence on the population’s health.

#### Health Behavior Theory

The Health Belief Model (HBM) is a theory that states that an individual’s beliefs and perceptions as the main motivators for behavior change (Hayden & Paterson, 2014). The model identifies several factors that influence behavior including the perception of seriousness, susceptibility, benefits, and barriers (Hayden & Paterson, 2014). The HBM can be utilized to understand motivations for the population to act on certain health promotion activities, including vaccinations. An educational campaign based on the HBM can help the target audience understand its risk factors, in this case, for contracting HPV. It can also provide information to address perceived barriers and promote the benefits of getting vaccinated.

The HBM has been shown to be effective in health promotion campaigns. One study utilized it in a campaign that was promoting cervical cancer screening in Thailand. The results of the study indicated that the campaign was successful in changing the participants’ perception of cervical cancer risk and the benefit of screenings (Wichachai, Songserm, Akakul, & Kuasiri, 2016). Another study using the HBM discussed its use to promote H1N1 vaccination in Indiana. The study concluded that perceived barriers was a strong gauge for uptake of the intervention. Additionally, it discussed how the utilization of the model constructs in the campaign was useful in changing behavior (Jones, Jensen, Scherr, Brown, Christy, & Weaver, 2015).

In addition to the Health Belief Model, the Transtheoretical Model is another theory that can be utilized in health education campaigns. The Transtheoretical Model, sometimes referred to as the Stages of Change Model, is based on the idea that individuals intentionally make behavior changes and that they go through different stages do that (Boston University, 2016). The stages of the model are as follows: pre-contemplation, contemplation, preparation, action, maintenance, and termination. Interventions can be applied at different stages of the model in order to affect behavior (Boston University, 2016).

A study of minority adults in New Hampshire utilized the Transtheoretical Model to modify behavior in relation to diabetes and cardiovascular disease (Smith & Ryan, 2006). Interventions were applied at different stages and resulted in behavior change and advancement through the stages of change for participants (Smith & Ryan, 2006). Another article described how an education program promoting physical activity that utilized the Transtheoretical Model was successful in increasing physical activity compared to the control group (Pirzadeh, Mostafavi Ghofranipour, & Feizi, 2015). This and other research shows that this model can be successful for modifying behavior over time.

The Social Cognitive Theory is another popular theory that is used in health promotion and education activities. The theory surmises that behavioral change will occur when interventions target personal, environmental, and behavioral factors of an individual (Pajares, 2002). This uses the idea that self-efficacy is crucial in an individual’s effort to make health behavior changes (Pajares, 2002). The theory can be used in health promotion to improve self-efficacy for a particular action so that individuals participate in that activity to improve their health outcomes.

The Social Cognitive Theory has been utilized for many health promotion interventions. One study described a weight loss campaign that utilized the theory to help employees modify their lifestyle to improve health (Abdi et al., 2015). The campaign provided individuals with lessons on nutrition and activity to increase understanding of the effect of their actions on their weight (Abdi et al., 2015). Additionally, a randomized study of college students showed that the Social Cognitive Theory was a predictor of health behavior change. The results showed that self-efficacy was a major indicator of behavior (Wallace, Buckworth, Kirby, & Sherman, 2000). Self-efficacy is important to address in health promotion campaigns. It is imperative that an individual is given information and strategies so that they feel competent to actively improve their health.

The Social Ecological Model is a framework that is based on the idea that health is influenced by a multitude of factors at several levels that affect an individual, not just the individual themself. The model suggests that an individual is only one part of health behavior and that surrounding policy, community, institutions, and family all impact the health outcome. (ACHA, 2016). This approach suggests that in order to influence health behavior, interventions must affect all aspects of an individual’s surrounding ecological system.

The CDC utilizes this model in several campaigns to promote positive health outcomes. It is used in a program for colorectal cancer prevention in which the CDC describes the different levels of the social ecological system that need to be addressed (CDC, 2015). The program explains how factors at the individual, interpersonal, organizational, and community levels impact the program. For example, at an organizational level, healthcare systems and problems involving Medicare and Medicaid need to be addressed because they influence an individual’s ability to access healthcare services (CDC, 2015).

This framework has been utilized by the CDC in strategies for violence prevention (CDC, 2015). The strategy looks to determine how an individual is influenced by personal experiences and relationships. In the case of violence prevention, the CDC looks at any personal history of violent behavior as well as any close personal relationships that might increase the likelihood of this type of behavior (CDC, 2015). The next levels deal with community and societal influences. In the case of violence prevention, public health officials will need to address problems with both community and societal climate that can impact violence prevention (CDC, 2015). This model is beneficial for prevention campaigns because it tackles factors at multiple levels that influence individuals and their behavior.

#### Health Communication Strategies

In order to develop a health education campaign to reach target audiences, it is important to understand different health communication strategies that can be useful. One such strategy is social marketing, the use of marketing strategies to influence a change in an individual or a population’s behavior (Weinreich, 2006). This technique treats the public as a consumer and the product for sale is a change in behavior. In terms of a health communication campaign, the consumers are individuals engaging in adverse health behaviors and the product that is being marketed is the alternative behavior.

Many marketing strategies take into account factors referred to as the four Ps: product, price, place, and promotion (Weinreich, 2006). The product in a health situation is the behavior that you want to change; this could be stopping a harmful behavior or engaging in a health promotion activity (University of Kansas, 2016). The next variable to be considered is the cost to the individual that changing their behavior will entail (University of Kansas, 2016). An example of this is healthy eating for which individuals may incur an increased cost by purchasing healthier food options or their effort to cook those types of meals.

Place is another consideration that social marketing accounts for because there must be an understanding that location can be a barrier that will prevent individuals from buying into that behavior change (University of Kansas, 2016). Finally, social marketing campaigns consider promotion. This aspect is how the message is going to get to the target audience, which can be a variety of avenues including social media, television, or print (University of Kansas, 2016).

A review of literature on the use of social marketing in health promotion campaigns reveals that it can have a positive impact on changing health behavior. One study evaluating the effectiveness of social marketing for oral cancer screening among African Americans showed that a social marketing campaign resulted in a significant number of individuals being screened (Jedele & Ismail, 2010). Another study looked at evidence to determine the effectiveness of social marketing tactics for improving health. This study determined that social marketing could be useful, specifically in the areas of nutrition, alcohol, drug abuse, and tobacco use, noting that marketing strategies work differently amongst various target audiences (Gordon, McDermott, Stead, & Angus, 2006).

Vaccination promotion is another area in which social marketing techniques can modify preconceived notions or behaviors towards vaccinations. A study that focused on techniques to address vaccine hesitancy discussed social marketing as an effective approach for decreasing reluctance (Nowak, Gelin, MacDonald, & Butler, 2015). The study described a vaccination through the lens of social marketing in order to determine the context, audience segmentation, and promotion of vaccine convenience to enhance the uptake of vaccinations (Nowk et al., 2015). The techniques discussed in this study and others could be utilized to develop a strategy to effectively engage parents and teens in the discussion of the HPV vaccine in Pittsburgh.

### Nonprofit Considerations

In developing a health education campaign, determining the organization that implements the intervention and delivers the message is critical. Nonprofit organizations or foundations that promote advocacy are one type of organization that can be considered. It is important to involve an organization that is established and can compete in its field. This will allow the organization to have the greatest impact on the target population and thus help the campaign to be successful. One type of organization that can be useful in delivering health education campaigns is the foundation industry.

It is important to understand the industry and environment that exists in to determine if it is an appropriate choice for a health education and promotion campaign. Despite its size, Pittsburgh has an influential foundation base. It is estimated that in 2012, the total foundation assets in Pittsburgh were close to $13 billion, which makes it one of the strongest areas for foundations in the country (Doyle, 2014). Independent foundations account for the majority of funds awarded to grant recipients with a reported 86.2% of funding coming from these types of foundations (Modern Healthcare, 2013). Nationally, the foundation industry is growing at an average annual rate of 1.6% (IBISWorld, 2016). It is unclear of the rate of growth of Pittsburgh foundations in particular but because of the city’s prominence in the industry, it can be expected that the growth rate would be comparable.

Due to the high volume of foundations in Pittsburgh, the industry is crowded with over 2,000 organizations classified as foundations in the region that must compete with each other for capital, consumers, and prestige. It is estimated that competition in the foundation industry in general is moderate, with potential to increase in the coming years (IBISWorld, 2016). Established foundations may experience less trouble with competition due to their history and recognition in the area. In contrast, newer organizations may experience a lot of competition for donations. This is important because an HPV vaccination is a debated topic and it will be important for the organization implementing the intervention to have an already established donation base. If not, funding may not be adequate if donors are not comfortable investing in HPV vaccine efforts.

In addition to a foundation’s history, its reputation is also a key factor for success in the industry. People must trust that the organization will steward their donations towards the areas that individuals or companies want to support. An organization that has a reputation for negligent care of funds will have a more difficult time acquiring capital to disperse as funds because it may be considered untrustworthy. In the same vein of managing donations appropriately, successful foundations must also manage their own funds adequately (IBISWorld, 2016). It is important that foundations are able to use their endowments and other assets well so that they are perceived as a financially capable organization.

### Vaccine Promotion Efforts

There have been national campaigns with goals and objectives aiming to educate the public about the HPV vaccine. The National Gynecologic Cancer Awareness Campaign was developed and implemented by the CDC in order to educate individuals about the risk factors for all gynecological cancers, including cervical cancer. It promotes prevention and screening and cites the HPV vaccine as a method for prevention (CDC, 2016). In addition to the Centers for Disease Control and Prevention’s efforts, Merck & Co. launched a campaign called “One Less,” which utilized video media to promote vaccination among young women (CDC, 2016).

Efforts to reduce HPV and promote vaccination have been implemented through regional campaigns in other areas of the country. Alabama took an approach with a campaign titled “Third Time’s a Charm,” which utilized a commercial to promote vaccination. The commercial was shown in movie theaters to help reach the target audiences (CDC, 2012). New York State also developed a strategy to promote HPV vaccination by creating a toolkit that provides organizations with information on how to create their own awareness and outreach campaign. The packet offers tips on marketing and materials that can be utilized by healthcare providers and organizations to help increase the understanding and utilization of the vaccine (“Human Papillomavirus (HPV) Vaccine,” 2016).

States have not been the only actors in the HPV education arena; cities and counties have developed strategies to educate citizens about HPV and promote vaccination. One example is the HPV Immunization Project in Philadelphia. Its efforts focused on increasing the completion rate of the vaccine and included offering education to medical professionals, marketing targets at parents of eligible teens, and sending reminders through the postal service (Philadelphia Department of Public Health, 2015). In Pittsburgh, several organizations have begun efforts to address the problem of low HPV vaccination rates including UPMC Cancer Centers, Foundation for Women’s Cancer, and the Jewish Healthcare Foundation. These organizations have already developed strategies and could be good partners to implement an educational campaign.

# materials development

A successful campaign hinges on the development of an intervention that will reach the intended audience. Materials such as educational pamphlets, videos, or infographics are important means of relaying information to the target audience. Developing materials requires an extensive knowledge of the target audience in order to understand the best intervention approach. Additionally, consideration of the health literacy of the intended audience is important because materials that are at too high of a reading level will not be effective. Low health literacy, as well as other barriers, should be considered when developing materials for the intervention. Finally, it is imperative to recognize the importance of evaluation and to ensure that the intervention can be evaluated.

## Target audience

In order to develop an effective health education campaign, materials must be developed that relay key messages to the target audience of the campaign. The first step in materials development is to identify the individuals who can benefit from vaccination so that the campaign can tailor its efforts. An HPV vaccine education campaign will need to consider two different audiences: boys and girls within the vaccination age range (11-18) and parents of children aged 11-18.

The two audiences, parents and children, will need to be targeted but in different ways. The rationale for having parents as one audience is that parents may be in opposition to the vaccine and not allow their child to be vaccinated while still a minor. Parents will have a strong influence on whether or not their minor receives the vaccine. It is important to include them in the intervention. Additionally, targeting children age 11-18 with information and education about HPV will help those children advocate for themselves to their parents and providers to get the vaccination. Separate materials may need to be developed or existing materials adapted in order to reach the separate audiences.

## Marketing strategies

### Marketing to Audience

Targeting individuals eligible for the HPV vaccine will likely need a different dissemination approach than traditional campaigns that promote other vaccines such as the flu. Marketing strategies specifically for millennial consumers should be connected to technology in order to have the greatest effectiveness. This is because millennials are individuals born after the 1980s and many have been immersed in technology from a young age. Efforts to disperse an educational campaign should have a technology component when being marketed to this age cohort.

An HPV promotional campaign is a type of advertisement for healthy behavior because public health practitioners want to sell the idea of vaccination. A review from the American Academy of Pediatrics discussed how advertisements of tobacco could have a greater impact on an adolescent’s likelihood to smoke than factors at other links of the social ecological model such as family or peers (Committee on Communications, 2006). The statement also discusses that alcohol advertisements on television can increase risk of adolescents consuming alcohol (Committee on Communications, 2006). This research provides just one example of how strategic marketing can influence the behavior of a child. Social marketing of vaccinations can use these techniques to promote healthier behavior.

Pharmaceutical advertising is another arena that should be considered when discussing marketing techniques for the HPV vaccine. Drug companies, such as Merck & Co., utilize marketing strategies to promote the sale of their drugs. In the case of the HPV vaccine, public health practitioners can evaluate the success of pharmaceutical campaigns for the vaccine when creating their own campaign. An article discussing direct consumer advertising of pharmaceuticals indicates that this type of advertising has led to increased sales of the drugs promoted, although advertising to physicians remains the top priority for pharmaceutical sales due to its high return (Donohue Cevasco, & Rosenthal, 2007).

Though marketing campaigns that aim to influence young adults are effective in influencing behavior, research has shown that other factors are at play regarding the HPV vaccine. One quantitative study from the *Journal of Health Communications* found that relatives and peers were significant in convincing young women got vaccinated (Manika, Ball, & Stout, 2014). It is important to understand the influences on individuals when developing an educational and promotional campaign for HPV vaccines because it will direct the methods that will be used to develop and encourage promotional materials. This study shows evidence that peers and families are significant influences on an individual’s decision making.

The target audience for the HPV vaccine goes beyond those individuals program coordinators want to get vaccinated. Because parental consent is required for adolescents under 18 years of age, it is important to understand the motivations and concerns of parents regarding the vaccine and how to market to them. One study examined what factors would influence parents most by conducting a qualitative study of African American girls. In the study, researchers conducted focus groups with mothers and daughters about their decision to vaccinate against HPV in order to develop recommendations for future campaigns. The results of the study show that normalization of the vaccine so that it appears to be a routine part of the adolescent vaccination schedule can help to increase vaccine uptake (Hull, Williams, Khabele, Dean, Bond, & Sanderson, 2014).

This recommendation was echoed by the CDC, which stated that a strategy for the parental target audience should revolve around normalizing the HPV vaccine and providing education about the potential harm it can prevent (New York Department of Health, 2016). These materials could include information about the safety and efficacy of the vaccine in order to help quell any fears surrounding the vaccine. It is also be important for parents to understand the vaccination schedule and availability of the vaccine for their child. Evidence suggests that parents who received materials from their children’s healthcare providers are more likely to accept the vaccination (Gonik, 2006).

Evidence also suggests that perceptions of marketing strategies are different depending on the cultural lens through which they are viewed. One study looked at a Puerto Rican audience and discovered that it felt they could not relate to the advertising (Calo, Fernandez, Fernandex-Espada, & Colon-Lopez, 2015). For example, the advertisements did not show any individuals who resembled them and therefore they did not feel that the ads were meant for them (Calo et al., 2015).

The above are examples of considerations that should be taken into account in the development and dissemination of materials to promote HPV vaccination. A successful campaign will be able to target different audiences based on the specific social marketing and promotion strategies that each group responds best to. A successful campaign will also consider the cultural backgrounds of the individuals targeted and be able to reasonably adapt their approach to accommodate those differences. For example, if in a culture the female head of household typically makes health decisions, any educational materials given out should be geared towards the needs of those individuals.

### Health Literacy

Despite its great significance, understanding how to market materials is not the only aspect of materials development to consider. Another factor that can influence the effectiveness of a health education and promotion campaign is the health literacy of the audience that public health practitioners are targeting. Because increasing HPV vaccine knowledge and acceptance is imperative for all individuals regardless of socioeconomic status or level of education, it is important to consider health literacy. Individuals in the target audience must understand the information about the vaccine because their comprehension will impact health decisions when developing a campaign to educate and promote HPV vaccination.

Health literacy is the ability of an individual to get information and comprehend it in order to inform their decisions about their healthcare (US DHHS, 2006). Unfortunately, statistics show that health literacy in the United States is poor (US DHHS, 2006). Only 12% of the population is able to understand health concepts adequately. In terms of properly understanding tasks such as taking medication as prescribed, approximately a third of the population would have difficulty doing so. Proficiency in health literacy is even lower for those with limited education in that only 1% of those with less than a high school education have proficient comprehension of health-related topics; that number increases to only 3% with the attainment of a high school diploma or GED (NIH, 2016). It is important for materials to give correct and vital information and be written in a way that is easily understood by individuals with different health literacy levels.

One study that discussed the cognitive load theory showed that individuals with low health literacy should not be presented with too much material at one time. The study described that decreasing the amount and depth of information that a patient is expected to understand can help improve health outcomes (Baker et al., 2011). This is because the less cognitive load that providers put on the patient, the more patients will be able to fully understand and retain. This should be considered when developing materials so that only the most important information is presented in the most concise way possible.

## Evaluation

Evaluation of interventions is an important part of a campaign design because it determines if the campaign goals have been achieved. At the onset of campaign development, it is crucial to determine how the campaign will be evaluated to ensure that the correct data is collected as the intervention progresses. For interventions that aim to have a broad impact on society, it is helpful to measure on a short-, medium-, and long-term basis. Two types of evaluations can be done for a program: process and outcome. A process evaluation is done to analyze how an intervention is being implemented and investigating if the current process is the most efficient. An outcome evaluation determines what the impact of the program is having on the target audience.

# campaign proposal

As a result of the Allegheny County Board of Health voting to not implement an HPV vaccination mandate, it proposed that future efforts be focused on educating the public about HPV and the vaccine. One strategy is to develop a health education and vaccine promotion campaign. This requires the use of the public health design principles to develop a successful campaign that will have the greatest impact on HPV vaccination. A scan of Allegheny County shows the need for vaccination promotion efforts and helps to tailor the target audience. Utilizing theory, an educational campaign initiative is proposed involving technology and peer-related activities. A potential organization was chosen to implement this campaign approach in the Allegheny County community. Finally, an evaluation plan employing a natural experiment can be used to determine the effect of this program in the future.

### Environmental Scan

In order to determine if a HPV vaccine education and awareness campaign is needed in Allegheny County, it is important to determine the rate at which eligible residents of the county are receiving the vaccine. Data have not yet been reported by the Allegheny County Health Department but the Jewish Healthcare Foundation has some information on vaccination rates. According to the report from 2014, of eligible 14-17 year olds, less than 50% reported receiving the vaccine; the rate is lower in 13 year olds at 16% (Reid, 2016). The rate of vaccination for Allegheny County is lower than the national average, which has seen the rate of girls beginning the HPV vaccine series at 60%. The current national average for eligible boys beginning the vaccination process for HPV is 50% (CDC, 2016).

It is important to determine not only the rates of vaccination in the region, but also rates of the cancers for which HPV infection is a risk factor. Pennsylvania has a high rate of oral cavity and pharynx cancers with 1,957 cases diagnosed in 2014. Data also show that cervical cancer in the state’s population is 469 cases per year (Pennsylvania Department of Health, 2016). These numbers show the burden of HPV related cancers in Pennsylvania when looking at the mortality rate of those cancers in 2014. Approximately 400 deaths were attributed to oral cavity and pharynx cancer while cervical cancer accounted for 175 deaths (Pennsylvania Department of Health, 2016). When considering the incidence of disease in the region, the mortality rates of those cancers are high. A limitation of using these data is that they do not specify what percentage of these deaths was specifically related to HPV. However, as previously mentioned, evidence shows that HPV does significantly increase the risk of developing these types of cancers.

### Target Audience

The target audience for this proposed HPV education campaign is males and females eligible for vaccination as well as parents of school age children and teens. The rationale for targeting these populations is that the information can raise awareness of HPV and the options for protection before any exposure to the virus. The campaign is also intended to motivate teens and young adults to engage in conversations with their healthcare provider or parents about getting the vaccine. The proposed intervention also focuses on parents of teens because it is ultimately their decision to vaccinate their children while they are minors. As previously discussed, the materials and outreach strategies will be different for diverse audiences.

### Theory

The Health Belief Model, Social Ecological Framework, and the Social Cognitive Theory provide theoretical bases for an HPV education campaign. Utilizing the Health Belief Model, materials and messages distributed to both parents and teens alike will describe how vulnerable individuals are to contracting HPV. Because most people will have an HPV infection during some point in their life, the model can be used to illustrate this susceptibility. This information can help parents and eligible young adults better understand the consequences of not being vaccinated. In addition to the risk of contracting the virus, the risks associated with having persistent infections will be discussed as well. This material can be coupled with information about how to receive the vaccine, so that individuals from the target audience can follow through with action if the education has empowered them to get vaccinated.

Utilizing the Health Belief Model through the construct of self-efficacy as a basis for encouraging individuals to get vaccinated, and the Social Cognitive Theory helps encourage parents and individuals to take the next step and complete the vaccination series. The materials provided through the campaign will be designed to empower individuals as well as provide information about where and how to get the vaccination. If individuals believe that they have all of the necessary information and resources, they may feel able to discuss the vaccine with their parents or healthcare providers.

Along with utilizing public health theories to support the HPV education campaign, theories in social marketing can be used to determine the best possible delivery mechanism. Treating both parents and eligible young adults as consumers of preventive behaviors can help an education campaign realize its potential impact on increasing vaccinations. Marketing the vaccine via a nonprofit agency such as the Jewish Healthcare Foundation can help dispel any thoughts that the incentive for the use of the vaccine is for monetary gain.

### Materials Development

This HPV education and promotion campaign has two separate parts used congruently in order to implement strategies that are based in the research conducted on this topic to both target audiences. The information will be presented to the groups taking literacy and age into account. This will allow for the information to be reinforced to increase the uptake and buy-in of the vaccine.

The first group targeted by this campaign are girls and boys aged 11-15. This cohort was chosen because the research indicated that the vaccine has the most success if individuals receive it before the individual’s first sexual contact. According to the Kinsey Institute, the average age of first sexual intercourse of males is 16 and females is 17 (Kinsey Institute, 2017). The campaign focuses on them in order to reach them before while they are in that window. In addition, this cohort needs the approval of the parents in order to be vaccinated. Therefore, efforts will be targeted at teens advocating for themselves with their providers and parents whereas an older age group can legally make the decision on their own.

Evidence shows that peers and family have a significant influence on the teen audience’s perception and behavior in regards to health (Committee on Communications, 2006). Therefore, this campaign will take a relationship approach from the Social Ecological Framework and elicit the help of peer educators to provide information and guidance for adolescents regarding HPV vaccination. As peer educators, participating adolescents and young adults will be educated about HPV, its risk factors, and the vaccine. They will be partnered with a program associate who will act as their resource for information and concerns.

The program associate will recruit different community organizations that want both adolescent and parental information sessions regarding HPV and the vaccine. The peer educators will facilitate small group discussions with adolescents to review informational materials about HPV and prevention strategies and provide guidance when necessary. This will allow for open and honest conversation about the vaccine with other individuals who may have similar questions or concerns about the vaccine or HPV in general.

Not all adolescents will feel comfortable discussing this topic with other individuals present so the program associate will maintain a corresponding phone app. This app will have all the information presented by the peer educator as well as other resources. It will also provide a messaging option so that individuals can download the app to ask questions anonymously about HPV or the vaccine that will be answered by the program associate. This method of education is based on mobile phones are use by a majority of adolescents and can be considered as tools to engage in their health.

Again, it is important to target not only the adolescents who would be receiving the vaccine, but also the parents of those adolescents. Occurring concurrently with the adolescent discussion with a peer educator, this program will involve interested parents in small group discussions as well. These will be conducted by a licensed medical professional such as a physician or nurse practitioner. The provider will have educational materials to distribute during the discussion of various vaccines that are recommended for their children and will provide a short presentation illuminating the risks associated with not maintaining vaccines for their children. Parents will be given a vaccination schedule and asked to follow up with their child’s physician to coordinate vaccination. They can also ask questions of the practitioner during and following the presentation.

One reason to promote HPV education and vaccination this way is that it helps normalize the HPV vaccine by discussing it along with other vaccinations. Normalizing the vaccine can be effective in promoting HPV vaccination rates. Additionally, the small group discussion format of the activity allows for the materials to be adapted for cultural differences that groups from different organizations may have. Depending on the organization that is participating, the materials can be tailored to fit individual needs.

### Implementation Organization

The organization that will implement this intervention is very important because success will hinge on its ability to communicate messages clearly. As mentioned previously, an organization’s reputation and history are key factors that influence the success of its programs. The organization should exemplify the qualities that were described. One organization in the Pittsburgh area that has the ability to implement the program successfully is the Jewish Healthcare Foundation.

The Jewish Healthcare Foundation is a privately and publicly funded foundation, which puts it in this cohort of Pittsburgh foundations. Though small in comparison to industry giants such as the R. K. Mellon Foundation or the Heinz Endowments, the Jewish Healthcare Foundation ranks among the top 25 philanthropies in Pittsburgh (Gannon, 2013). The foundation also displays many of the qualities laid out in the industry analysis that represents factors for success. One of these is its rich history. The organization was created in 1990 through an endowment from Montefiore Hospital (Jewish Healthcare Foundation, 2017). For over 26 years the organization has expanded and succeeded in its efforts to promote health in the Pittsburgh region.

The focus of the foundation is on improving health and healthcare in the Pittsburgh region. It is a leader in developing innovative projects to help improve healthcare quality and patient care in addition to efforts to combat diseases that affect the community of Western Pennsylvania (“Jewish Healthcare Foundation,” 2017). The foundation has been pivotal in developing strategies to promote the use of the HPV vaccine and circulate information about its safety and efficacy.

The Jewish Healthcare Foundation has been involved in system-wide efforts to promote HPV vaccination by creating collaborations, developing and distributing education, and advocating for policy changes. In 2014 the organization received a grant from the Department of Health and Human Services. It developed an initiative to help promote vaccination and create partnerships with other organizations that are focusing on similar efforts. It has developed a website with information about the HPV as well as educational and promotional material for parents, care providers, and eligible teens and young adults (“Moving the Needle”).

The successes of previous campaigns and interest and involvement in HPV awareness make the Jewish Healthcare Foundation a good agency to promote new education and promotion materials. It can utilize the proposed peer and provider guided education programs as an adjunct to its current practices. This will allow the foundation to build on its current success as well as evaluate the success of previous efforts.

### Evaluation

A quasi-experimental research design can be used to determine the effect of the program on vaccination rates. This research design uses experimental techniques such as control and intervention groups. Randomization is not possible in this evaluation because it is difficult to determine who has been exposed to the campaign’s messages and who has not. The experimental design can be carried out as a natural experiment utilizing another city that has not implemented any HPV vaccination campaigns as the control group. The control city should be comparable in terms of population and demographics to Pittsburgh in order match as close as possible. It is also important that the control city does not have plans to implement a similar campaign in the near future because evaluators will have to measure vaccination rates over time in order to determine effectiveness. A control city is important because national efforts and campaigns will affect both cities and therefore decrease any confounding results.

#### Quantitative Data

In order to evaluate an HPV campaign’s effectiveness, it is important to gather both quantitative and qualitative data. Quantitative data should be collected at baseline and at different intervals in order to determine if the number of individuals receiving the vaccine has changed since the campaign’s onset. In addition, information regarding completion of the vaccination series should be collected to determine if multi-dose treatments are a factor for incomplete vaccination.

Quantitative data can also be gathered in order to conduct a process evaluation as well. For example, the dissemination of materials can be tracked. A survey will be conducted after three months to determine if the materials had reached the target population. This will be done by providing a survey to a sample of the target population in Allegheny County to identify what percent of the target population has been reached. This would determine if the method of dispersing the materials adequately spreads to the desired population. Adjustments could be made at that time to alter the method of distribution in order to get the best reach for the materials.

#### Qualitative Data

Not only will quantitative data be important to analyze in order to determine the impact of the campaign on vaccination rates but qualitative data need to be collected as well. This could involve interviews with individuals in the target audience from Pittsburgh regarding attitudes towards the vaccine and exposure to the materials set out by the campaign. This could be done prior to the campaign in order to assess the baseline of the population. A follow-up survey or interview could be conducted after the intervention to determine if it many any positive changes.

# Conclusion

Vaccinations are an important part of public health and one of the most successful tools public health practitioners have to help prevent the spread of disease. They are a low-risk activity that builds immunity in an individual as well as in the vaccinated person’s surrounding community. Despite the success that vaccines have seen in the last century, the vaccine for the human papillomavirus has not been widely accepted in the United States causing low rates of vaccination. Several strains of human papillomavirus have been linked to cancers such as cervical and oropharyngeal; the vaccine has been shown to prevent individuals from contracting those strains.

In order to increase the awareness, acceptance, and utilization of the vaccine, a public health campaign in necessary. This paper proposed an evidence-based campaign that can be implemented by an organization like the Jewish Healthcare Foundation to provide education and promote vaccination among eligible citizens in Allegheny County. The success of this campaign can increase vaccination rates and in turn decrease the burden of HPV-related diseases in the region. A successful campaign can be translated into a broader campaign that could have a reach outside of the county as well and influence the health of the public in Allegheny County and Pennsylvania.

The proposed program utilizes evidence-based techniques to educate the target audience about the risk factors for contracting HPV, the consequences of acquiring the virus, and the strategies to prevent the spread of the virus. As a follow-up to the recent vote to not implement a mandate requiring HPV vaccination for middle school children, the proposal strives to increase awareness, acceptance, and utilization of the vaccine.

The proposed campaign will utilize the peer and provider education models based in the rationales of the Health Belief Model and the Social Cognitive Theory. A technology component in the form of an interactive app will help to reach a broader net of eligible participants. With the introduction of the program, residents of Allegheny County can increase their knowledge and acceptance of the vaccine and ultimately decrease the spread of HPV-related cancers in the region.

The HPV vaccine education and promotion campaign that is proposed does have some limitations that will not be addressed. One limitation is that the impact of the study will not be realized for many years. The main goal of the proposed campaign is to decrease the burden of disease that HPV causes. Because the disease can lie dormant for many years without symptoms, it will be difficult to determine if the main objective of the campaign was successful. In addition, the campaign is limited because it is a voluntary program that will only be provided to willing participants. Parents that are strongly opposed to this vaccine and opt to not participate will not have the opportunity reap the benefits of the campaign’s education.

Despite the limitations of the proposed campaign, it is imperative that this education and promotion campaign be implemented in Allegheny County, PA. The health impact that HPV can have on residents of the county warrants an intervention to promote vaccination. The HPV vaccine can prevent the spread of the virus and ultimately prevent the diseases and cancers that it causes. The proposed campaign will provide information and guidance necessary for residents to make an informed decision about getting their children vaccinated.

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