

**Improving Provider Recommendation of Gardasil Vaccination in Women 27-45 years of
Age**

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Table of Content

Background and Significance.....	6
Need Assessment.....	9
Problem Statement.....	11
Clinical Question.....	11
Aims and Objectives.....	11
Review of Literature.....	12
Theoretical Framework.....	19
Methodology.....	21
Settings.....	21
Study Population.....	21
Subject Recruitment.....	22
Consent.....	22
Risks and Harm.....	22
Subjects Cost and Compensation.....	23
Study Intervention.....	23
Outcome Measured.....	24
Project Timeline.....	24
Resources Used.....	25
Evaluation Plan.....	25
Data Analysis.....	25
Data Maintenance and Security.....	26
Results.....	26
Descriptive Statistics.....	26
Correlation of Age and HPV Vaccine.....	28
Two-Sample T-tests of Differences in HPV Vaccination.....	28
Discussion.....	31
Process Evaluation.....	31
Key Facilitators/Barriers.....	32
Unintended Consequences.....	33
Limitations.....	33
Implications.....	34
Health Policy.....	34
Practice.....	34

Economics35

Quality & Safety36

Plans for Sustainability36

Dissemination & Professional Reporting37

Summary37

References39

Appendix A44

Appendix B45

Appendix C51

Appendix D52

Appendix E53

Appendix F56

Appendix G56

Appendix H58

Appendix I59

Abstract

Purpose of Project: The purpose of this project was to improve providers recommendation of Human Papilloma Virus (HPV) vaccine among women 27-45 years of age.

Methodology: This quality improvement project took place in Newark, New Jersey and included provider focused on clinical practice guidelines and recommendations with the aim of improving HPV vaccine uptake among middle age women. A three-month retrospective and prospective chart review was conducted and included analysis based on age, ethnicity, and insurance coverage.

Results: A total of 517 medical records were reviewed and analyzed using two sample t-test of difference. While Human Papilloma Virus vaccine uptake increased by 3.7% following the HPV educational intervention; the difference was not statistically significant, $t(515)=1.0$, $p=0.3187$. No statistical significance was found when considering demographics.

Implications for Practice: Low socioeconomic status has been a barrier to vaccination and other medical resources, and efforts in both states and national level have been successful in confronting the disparity. Healthcare organizations are prioritizing delivery of safe, effective, and equitable care. This quality improvement project serves as a bridge of stabilization to delivery of equal care to women in healthcare practice.

Keywords: Human Papillomavirus, Gardasil, Providers recommendation, Culture, Education

Improving Provider Recommendations of Gardasil Vaccination in Women 27-45 years of Age

The history of vaccination in the United States (U.S.) dates back to the 1800s and has since been the bed rock of health and wellness around the world, particularly in developed nations and Human Papilloma Virus (HPV) vaccine is no exception. (Miller et al., 2018). Human Papilloma Virus is the most common sexually transmitted virus known with over 150 strains including the type that causes cervical cancer, genital warts, oropharyngeal, vulva and anal cancer (Miller et al., 2018). Most HPVs will resolve spontaneously however some strains can remain asymptomatic for over 2 decades before they mature to become a deadly/life altering diseases (Marshall et al., 2019). Strain numbers 16 and 18 are known to propagate 70% of cervical cancers while 6 and 11 are the major causes of genital warts (Miller et al., 2018). For over a decade, the HPV vaccine has been approved for both boys and girls ages 9 to 26 years with a significant evidence-based benefit to prevention of aforementioned disorders. However, in October 2018, the U.S. Food and Drug Administration (FDA, 2018) extended the administration of HPV vaccine to both male and female ages 27 to 45 after a clinical trial conducted over 3.5 years showed that the vaccine is 88% effective in preventing precancerous lesions and warts.

Since 2006 four types of HPV vaccines have been developed, the Monovalent (16) Bivalent (16, 18) Quadrivalent (6,11,16, 18) and Nonavalent (6, 11, 16, 18, 31, 33, 45, 52 and 58) (Miller et al., 2018). The vaccine has evolved over the years covering more strains of dangerous HPV for maximum protection, and Nonavalent (Gardasil 9) is the only one currently being used in the U.S. Despite the benefits and wide recommendation of HPV vaccine, “the uptake of the vaccine varied, ranging from <5–86%” (Patel et al., 2016, p.474). Although, various reasons account for the wide range of uptake of the vaccine, this project focused on

improvement of the inadequacy of clear recommendation of HPV vaccine from providers to women ages 27 to 45 years of age by bringing awareness of the series in compliance with FDA guidelines, provided information regarding the benefit of the series and above all to improve vaccination rate of women 27-45 years of age.

Background and Significance

Dr. Georgios Nicolao Papanicolaou was a Greek American cytopathologist in the early 20th century with a belief that cellular debris can give an accurate evidence to cancer cells, and even denote where a woman is in her menstrual cycle (Bolin, 2017). He proceeded to prove his belief by daily retrieving of cervical cells from his wife and, other women including women with cervical cancer for study and data collection. He found correlation between the cells of women with cervical cancer and those that do not have cervical cancer (Bolin, 2017). In 1928, he presented his finding at a medical conference in Michigan where they found the study preposterous. Fifteen years later, in conjunction with a renowned gynecologist Dr. Hubert Trout, the predictive values of cells in predicting cervical cancer article was published and gained attention of decision makers in the healthcare sectors (Bolin, 2017). By the 1970s, pap smear became a recommendation in the U.S.

According to American Cancer Society (2020), 17 million cases of various types of cancer were reported globally in 2018 with 9.6 million deaths recorded in the same year due to malignancy. World Health Organization (WHO, 2020) reports about 570,000 cases of cervical cancer in 2018 and, approximately 311,000 deaths with 85% of the demise in developing countries. Human Papilloma Virus is a sexually transmitted infection linked to breed 99% of cervical cancer cases (WHO, 2020). Human Papilloma Virus is primarily preventable with

vaccination and screening as a secondary approach to detection which can lead to effective treatment and eradication of most cervical cancer cases. The comprehensive approach to prevent, screen and treat can lead to eradication of cervical cancer within a generation (WHO, 2020). The disparity of incidence and mortality rate of cervical cancer is wide between industrialized country and developing nations because of lack of availability of medical resources and infrastructures. Cervical cancer is the third most common cause of malignancy worldwide, and the second cause of mortality in developing countries averaging 34.5 cases per 100,000 mainly because of the lack of cervical screening resources (Bolin, 2017).

Fourteen million cases of HPV infection are reported in the U.S. annually (American Sexual Health association, 2020). Moreover, Centers for Disease Control and Prevention (CDC, 2019c) reported about 44,000 annual HPV related cancers in 2012 through 2016, of which 25,000 among women and 19,000 among men. Generally, HPV is believed to account for more than 90% of cervical and anal malignancies in addition to 70% of vaginal/vulva cancer. The occurrence of cervical cancer in the U.S. has reduced more than 50% in the last 3 decades due to widespread screening (American College of Obstetrics and Gynecology, [ACOG], 2016). In addition, mortality rate improved from 5.55 per 100,000 women in 1975 to 2.3 per 100,000 women in 2011 (ACOG, 2016). The estimated total annual cost of treatment and prevention of cervical cancer in the U.S. is \$8 billion, and \$52 million isolated as an average annual cost of national screening (Chesson et al., 2012). The cost for follow up of abnormal screening estimates is \$1.2 billion, of which \$400 million estimated for follow up of false positive, and \$800 million in treatment of cervical intraepithelial neoplasia (Chesson et al., 2012). The cost of treatment versus screening highlights the importance of HPV vaccine and the direct correlation to the cost

effectiveness of approximately \$35,000 per quality-adjusted life year gain is substantial (CDC, 2019b).

Vaccination against HPV is a recommendation of both global and national health organizations. World Health Organization (WHO) is currently developing a global approach to eradicating HPV related cancers in 78 developing countries by improving HPV vaccination up to 90%, in addition to improving cervical cancer screening by 70% and treatment of pre-invasive and invasive cervical lesions up to 90% (Canfell et al., 2020). American College of Obstetrics and Gynecology (2017) recommend 2 doses of HPV vaccination 6-12 months apart for both boys and girls from 11 years of age to 14 and, 3 doses 0, 2, and 6 months apart to both boys and girls age 15-26 years. American College of Nurse Midwife in collaboration with CDC also recommends the 2 and 3 series of HPV vaccines. In October 2018, the FDA extended the coverage of 3 series of HPV vaccine to women and men ages 27 to 45 years.

Science alone cannot fix the problem of HPV vaccination acceptance and much work need to be done to bridge the gap. Globally vaccination ranges from <5-86% depending on geographical location (Patel et al., 2016) and “United States is struggling to get HPV vaccination coverage above 40%” (Larson, 2015, p. 1). In the State of New Jersey, 39.1% compliance rate was recorded in 2017 significantly below the State benchmark of 80% (Hurdle, 2019). Newark is the largest city in the State of New Jersey, with the lowest vaccination rate in the country (Rutgers Today, 2015). Amongst Newark adolescents, a 24.7% HPV vaccination rate was recorded with a distinct range in respite to providers (Rutgers Today, 2015). Those treated by pediatricians recorded HPV vaccination rate of 40%, while those treated by gynecologist have the rate of 5% (Rutgers Today, 2015). Although, HPV vaccination uptake data relating to older adult ages 27-45 years was not found due to the newness of the recommendation however, it is

widely believed that “despite the accumulating evidence of the benefits of vaccination of older adults, vaccine uptake is generally limited and far below targets” (Doherty et al., 2018, p. 294).

Need Assessment

There is an overwhelming evidence that HPV vaccination is both efficacious and safe, however, the uptake rate around the world is less than satisfactory. In literature review, various articles narrated HPV vaccination uptake as low with inclusion of causative factors (Miller et al., 2018). Inadequate knowledge of HPV vaccine, association with sex, belief system, culture and clear recommendation by providers were highlighted as the factors that contributed to low compliance rate of HPV vaccination around the world (Miller et al., 2018).

The wide range of compliance to HPV vaccine around the world depends on the model of vaccination that each geographical region adopts. Most European countries record a compliance rate of up to 80% because they utilize health clinic model that include HPV vaccine into their childhood vaccination program and, vaccination of older adults up to 26 years of age (Miller et al., 2018). World Health Organization is currently developing a global approach to eradicating HPV related cancers in 78 developing countries by proposing improving HPV vaccination compliance to 90%, cervical screening up to 70% and treatment of pre-invasive and invasive cervical lesions (Canfell et al., 2020). In the U.S., city-wide range program and campaign to improving HPV vaccine were adopted in certain cities like New York and Philadelphia. New York recorded compliance rate of HPV vaccination of 58% and, Philadelphia recorded a rate of 80.3% (Rutgers Today, 2015). Newark city is also working on city-wide program campaign in partnership with providers to adopt a model to educate mothers and adolescents regarding HPV vaccine (Rutgers Today, 2015).

A strengths, weaknesses, opportunities, and threats (SWOT) analysis was conducted in order to identify factors that may impact the project. A women's health clinic in Newark, New Jersey faces a fair share of the constraint, but committed to the challenge. As such are working to improvement of HPV vaccination rate among the women ages 27 to 45 in compliance with the new guideline. The strength of the organization is embedded in their staff, available resources, and the adoption of the new guidelines to vaccinated women and men ages 27 to 45. The staff are motivated and understood their daily activity and its impact on the organization, in addition to provision of excellent consumer service. The organization has an affiliate with large reputable healthcare organization in the region where they developed a clear policy to vaccinate women immediately post-partum, and the continuation of the series to completion occurs in the clinic. The vaccine is covered by most insurance companies at no cost to the patients and a phone alert system is in place to remind consumers of their upcoming appointments.

However, the weaknesses that impact the low uptake of HPV vaccine were isolated, and it is rooted in lack of clear recommendation from providers. The guideline is recent and there is no designated area within the electronic medical record that addresses HPV vaccine education, consent to initiation of HPV vaccine or refusal of HPV vaccine series, in addition, there is no clearly written policy targeting vaccination of women 27 to 45 years of age currently in the organization. It is imperative to explore the opportunity envisioned in the organization in line with endorsement of CDC, ACOG and FDA. The utilization of mobile technologies that is already instituted in the clinic can be expanded to cover more of patient's medical need, such as vaccination record keeping, and alert consumers to timing of needed annual screenings, in addition to consumer orientation to reading/writing of review. There are threats to be closely

monitored. Consumers are aging, and HPV vaccination is time sensitive to administration. Online advertisement fatigue and widespread of HPV vaccination misconceptions cannot be ignored. For HPV vaccination to be improved among women 27 to 45 years of age, vaccination campaign by providers will be beneficial to serve as correction of misconception regarding HPV vaccine, provision of necessary knowledge regarding the vaccination without the neglect of patient's autonomy and above all, provision of data for future quality improvements.

Problem Statement

Human Papilloma Virus vaccination was extended to cover women ages 27 to 45, with evidence of prevention of HPV related lesions and cancers. A women's health clinic in Newark, New Jersey vaccination rate in 2019 is significantly below the national vaccination benchmark of 80% (Hurdle, 2019).

Clinical Question

The clinical question guiding this project is: "Among middle aged women ages 27-45 year, how does provider recommendation and counselling regarding HPV vaccine impact HPV vaccination rate among women 27 to 45 years over a 3 month period?"

Aims and Objectives

The aim of this project is to improve HPV vaccination rate among women 27-45 years in a women's health clinic in Newark, New Jersey with an ultimate goal of preventing cervical cancer in later years. Cervical cancer is caused by a virus, vaccination against the organism can eradicate cancer within a generation if compliance can attain 100%. The current vaccination

rate of HPV vaccine is lower than the national benchmark of 80% in women 27-45 years of age in the clinic. Hence, this project reaffirmed that providers recommendation improved compliance rate of HPV vaccination rate. The project utilized the following objectives:

- Educate providers to the recent guidelines in HPV vaccination extension to women and men ages 27-45.
- Providers will recommend HPV vaccine to women 27-45 years of age using evidence-based practice
- Schedule the 2 series doses on the date of initiation in women that consent.
- Use captivating HPV signage in sight at the treatment room and provider's offices as a prompt to initiate conversation about HPV vaccine.
- Use the organization's smart phone alert system to remind the women of their upcoming appointments.
- Evaluate results of acceptance/refusal of treatment over a 3 month period.

Review of Literature

A literature search was conducted using PubMed and CINAIL with a combination of Medical subject Heading (Mesh) terms and key words. The results were filtered using humans, english language, the past five years and publication type including systematic reviews and randomized control trials. In addition, an internet search was completed for review of national public health institutes in the U.S. in regard to HPV vaccine and guidelines. The search was accomplished with similar key words in both databases with focus on provider recommendation and the correlation to uptake of HPV vaccine. Search terms included *Human Papillomavirus*,

Gardasil, providers recommendation, education, and culture. see Appendix A for the Preferred Reporting Items for systematic Reviews and Meta-Analysis (PRISMA). A total of 10 articles were used to guide this project and were appraised using the Johns Hopkins Nursing Evidenced Based Practice appraisal tool (see Appendix B). Three of the articles appraised as high quality, six appraised as good to moderate and one appraised poor.

The literature that was synthesized included qualitative, descriptive studies, randomized control trials (RCT), cross sectional surveys, quantitative studies, meta-analysis and mixed methods, including a literature review. Through the review of literature five themes were isolated. Providers intention to vaccinate and recommendation, knowledge of HPV vaccine in different settings, fear of unknown, communication strategies and link to sexuality. All the articles reviewed unanimously state that clear recommendation by a provider is an impetus to improve uptake of HPV vaccine. Provider-patient relationship is based on trust on the part of the patient and they tend to follow the recommendations of the providers that is clear, accurate, unambiguous and intentional. The second theme is about knowledge of HPV in different settings. All the articles reiterate the role of knowledge however, there was a wide range of differences in knowledge of HPV depending on the geographical location. European countries were found to have the most knowledge about HPV, while places like Africa had little to no knowledge about the HPV vaccine series.

Providers Intention to Vaccinate and Recommendation

According to Miller et al. (2018), a provider's recommendation for HPV vaccination is the single most important factor in vaccine initiation however, various studies have proved persistent missed opportunities. Miller et al. (2018) reviewed HPV vaccination programs and uptake around the world including factors that contributes to increase uptake and identified 84%

of unvaccinated adolescents reported a clinic or provider visit where a vaccine other than HPV vaccine was received and concluded successful HPV vaccine uptake requires a commitment from providers. This finding is in alignment with Rosen et al. (2018) who reiterate providers were generally in support of HPV vaccination however there was an imbalance between their knowledge and recommendation practices. In a metaanalysis study by Rosen et al. (2018) aggregate of 60 articles were used, the studies were conducted in US. 48 quantitative and 12 qualitative studies and range of publication dates included 2008 through 2016. They concluded that providers' recommendation for the human papillomavirus (HPV) vaccine seems to be an important force backing parental decisions about vaccination. Gilkey and McRee (2016) stressed improving providers recommendation is the most prioritized objective in the national campaign to improve HPV vaccine uptake and communicating about HPV vaccine by providers is viewed as complex and unclear and also seen as substandard to other vaccines like Tetanus diphtheria and pertussis (Tdap), Measles Mumps and Rubella (MMR). Gilkey and McRee (2016) metaanalysis included 101 quantitative and qualitative articles from the U.S. to reflect the practice and policy environments that influence HPV vaccination. They found an association between the extent to which providers endorsed the importance of HPV vaccine and parents' positive perceptions of HPV vaccine in relation to provider recommendation strength.

In general, the perception of vaccines and uptake is linked to providers recommendation and the ability of women to connect with the provider's intent to vaccinate. Clear recommendations by a provider is an impetus to improve uptake of HPV vaccine. Provider-patient relationship is based on trust and patients are inclined to follow the recommendations of the providers when messaging is clear, accurate, unambiguous, and intentional.

Knowledge of HPV Vaccine/Communication Strategies in Different Settings

Human Papilloma Virus vaccine knowledge across all population is poor and increasing knowledge has been identified as a predictive factor in increasing vaccine uptake (Patel et al., 2016). A meta-analysis study by Patel et al. (2016) included 14 quantitative articles with sample size ranges from 217-1,769 and four qualitative studies with sample size ranges from 10-87, identified female adolescents are more likely to have heard of HPV (n=2,598/5,028 girls versus n=1,033/3,464 boys) and the HPV vaccine (n=1,154/2,556 girls versus n=392/2,074) compared to males. This European study identified adolescents reported the source of HPV vaccine knowledge from media, internet, and school. However, they would have preferred nurse-led small group conversation linking the infection to its disease etiology for informed decision-making. Patel et al. (2016) highlight when vaccine recipients and their parents are provided with balanced information they have improved knowledge and risk perception resulting in increased vaccine uptake. Findings imply that countries with the highest knowledge also reported the highest vaccine uptake with a conclusion that mode of delivery of HPV vaccine education needs re-evaluation to enhance compliance that is knowledge based in Europe. Patel et al.'s (2016) findings support the quantitative study conducted by Ramathuba and Ngambi (2018) in a rural area of South Africa in women 30 years and above. Mean age of respondents were 41 and N=1,546. The finding showed 97.8% of women above 30 years of age lacked knowledge about HPV and HPV vaccine and were unaware of mode of transmission of the infection. Ninety four percent were unaware of eligibility of vaccination and 92.1% portrayed a negative point of view consenting to their daughter's vaccination. Ramathuba and Ngambi (2018) concluded a dire need for HPV education and cervical cancer prevention strategies in Limpopo province.

Socioeconomic Status

People with low socioeconomic status were more likely to be those who lack the most knowledge about the HPV vaccine; while those of higher socioeconomic status were more likely to have more knowledge of HPV vaccine (Joseph et al., 2016). In a randomized control trial by Joseph et al. (2016), sample size among African Americans (n=100), and Haitian American (n=100) in a poor socioeconomic background. They found that knowledge of HPV and HPV vaccine alone did not translate into vaccine uptake in the target group however, an increased in HPV knowledge was noted with statistical significance ($p < .001$). Joseph et al. (2016) concluded there was no significant difference in HPV vaccine uptake in either the control or the target audience. However, the study was conducted among African Americans and Haitian Americans in a low socioeconomic population. Conversely, the RCT by Donahue et al. (2018) achieved a statistical significance level of $p < .001$ in perceived benefit of vaccination and willingness to vaccinate. The RCT encompasses mothers and female legal guardians of adolescents 9-13 years of age in north, midwest, west, and northeastern parts in the U.S. The population comprises of high, mid, and low socioeconomic status people with sample size of 2,476. They concluded that the next step to increasing coverage to HPV vaccine may be an intervention aimed at increasing mothers' perceived benefits of vaccination with provider communication tailored to the vaccine.

Fear/ Safety/Efficacy of the Human Papilloma Vaccine

Fear about safety and efficacy of the HPV vaccine is another common factor identified in the literature and is embedded in the misconceptions about the vaccine. Drolet et al. (2019) conducted a meta-analysis study from 60 million individual for up to 8 years post vaccination to summarize the evidence of effectiveness and quantify the impact of the vaccine within the population. The finding showed 83% reduction in prevalence of HPV 16 and 18, prevalence of HPV 31, 33 and 45 reduced by 54%, anogenital wart diagnosis declined by 67% and cervical

intraepithelial neoplasia (CIN+2) decreased by 51%. Drolet et al. (2019) reiterated increased knowledge, awareness, and health seeking behavior reported by health professionals due to recommendation of Vaccine. Drolet et al. (2019) reaffirmed that the greater impact of multi-cohort vaccination was similar when restricting the analyses to countries with high routine vaccination coverage confirming that the group that benefit most are the ones with high uptake. Drolet et al. (2019) concluded evidence of HPV vaccine efficacy among those who completed the 3 series of HPV vaccine and urge for continue surveillance of the impact of the vaccine within the population. The finding of the study aligns with CDC (2019a) who found 3,819 women age 24 through 45 years, who participated in a RCT had an efficacy rate of 88.7% when vaccinated for HPV. They added that acceptability appeared to higher when vaccine was assumed to be free in addition to providers recommendation.

Link to Sexual Activity

Lastly, the link of HPV vaccine to sexuality was also found to be troubling to most women due to the misconception that HPV vaccine is a license for their teens to begin engaging in sexual behavior. Marshall et al. (2019) conducted a meta-analysis qualitative studies after realizing suboptimal uptake of HPV vaccine despite its efficacy. Thirty-three studies were included featuring the opinion of 1,280 parents and guardians from 14 countries and found most parents are interested to prevent illnesses and diseases in their children. However, the link to sexual intercourse associated with HPV vaccine complicated the discussion. Marshall et al. (2019) concluded providers and healthcare providers can focus on importance of HPV vaccine and the rationale backing the recommendation by providing a timely and accurate information in addition to addressing parental concerns regarding safety and efficacy without neglecting the account of culture and spiritual beliefs.

The literature review targets the adolescent's HPV vaccine uptake; however, this project is focused on middle aged women 27-45 years of age. To the best of knowledge, studies targeting middle age women 27-45 years of age on HPV vaccine and provider's recommendation is unavailable at the time of this project due to the recent extension of HPV vaccine to coverage among women and men 27-45 years of age. However, the review of literature is inversely correlated to women 27-45 years of age because they are the parents/guardians of the adolescents that have been the focus of the studies. Gilkey and McRee (2016) supports the above statement that findings suggest that adolescents are under-represented in the studies, perhaps the role of adolescents directly can have a positive impact on HPV vaccine uptake, particularly given that several studies found that adolescents can have a positive influence on HPV vaccine decision making.

The gaps that influenced provider recommendation in the review was the inconsistencies in recommendation of HPV vaccine. Provider recommendation was higher in at risk adolescents ages 15 and above and women/young adults who had abnormal pap smear. HPV is recommended for children ages 9-13 before any sexual exposure to prevent the disease and was found to be the most beneficial (Marshall et al., 2019). Other inconsistent factors that influenced provider recommendation is the socioeconomic status and demographics. According to Gilkey and McRee (2016) There was a concerning pattern of lack of information/recommendation of HPV vaccine among lower income minorities. Hence more research is needed to ascertain provider's mode of recommendation strategies in addition to provider's intention to vaccinate against HPV.

Theoretical Framework

Pender's health promotion model (PHPM) is suitable for this project because it assesses an individual in a multiple dimension. The assumption focuses on health promotion, healthy lifestyle promotion and disease prevention. The assumption also implies that people interact with their environment in relation to their health and determine if an outside influence or intervention can impact health. Individual characteristics and experiences are the first assumption and it suggest that people are a sum of their experiences both good and bad and the latter tend to produce a better behavioral outcome in regard to HPV vaccine if prior vaccination experiences were pleasant. However convincingly, a number of modern studies have used a cognitive training paradigm to alter attention to emotional stimuli (Browning et al., 2010). Behavior specific cognition and affect is focused on outside influences and interventions with 6 subtopics. First, situational influences are assumed to be the recommendation by FDA that certifies that HPV vaccine is efficacious and safe in addition to endorsement and recommendation by other healthcare body. Secondly, interpersonal influences, assumed to complement provider's recommendation than can aid in altering perceived threat, biological and sociocultural influences on a person, to a commitment of planned action without the neglect of their autonomy. The third is perceived barrier which is assumed to be lack of knowledge or misconception of HPV vaccine this can hinder or enhance a commitment to planned action. However, an accurate effect of interpersonal influence has been proven to enhance a commitment to a health promoting behavior like consenting to HPV vaccination. The fourth is perceived benefit and it is assumed to be as a result providers recommendation that has led to the belief of the benefit of prevention of cervical cancer and other HPV related lesions. The fifth one is perceived self-efficacy a precursor to previously listed subtopics and it is assumed to be motivation to consent to HPV

vaccination. Lastly, activity related affect also a result of all the subtopic and it is assumed to be the reason behind making appointments for the other 2 series to ensure the 3 series of HPV vaccination is completed. The last assumption is behavioral outcome and it can result in 3 scenarios. Immediate competing demands which is assumed to be safety, efficiency and efficacy of HPV vaccine. If the benefit is perceived not to outweighs the risk in the site of an individual, consenting to HPV vaccination may not be achieved, however, if the intervention is successful, a commitment to receive HPV vaccine may be achieved. The second scenario is commitment to a plan of action which is assumed to be acceptance or refusal of HPV vaccination as a result of all the previous actions or assumptions of PHPM. The last scenario is health promoting behavior and this is assumed to be consenting to HPV vaccination in addition to completion of HPV vaccine series.

Improving provider communication/recommendation is one of the most highly prioritized goals in the national movement to increase HPV vaccination coverage (Gilkey and McRee, 2016). Pender's Health Promotion Model is beneficial to understanding behavior-specific cognitions and affect. This can serve as means for providers to develop a strategy to communicate/recommend HPV vaccine in keeping with the individual's socioeconomic background, prior experiences, and level of education. Pender's Health Promotion Model recognizes the influence a provider can exert on patients when application is proportional to the whole person. It is imperative to note that information is power and vital to commitment in health promotion including vaccination. Hence this project utilized PHPM assumptions in understanding individual characteristic by enhancing provider's communication in relation to HPV vaccine for assessment of the level of understanding regarding HPV, cervical cancer, and vaccination. In addition, behavior specific cognition and effect was assessed, including patient's

perception to vaccination, previous experiences, and the belief system of the subject. Providers provided recommendation after assessment, and correction of any misconceptions leading to behavioral outcome of either to initiate or to refuse HPV vaccination (see Appendix C.)

Methodology

This quality improvement project utilized the implementation of provider education session that focused on HPV vaccine recommendation, series of vaccination and the provider recommendation lay emphasis on cancer prevention.

Settings

The setting for this project was an obstetrics and gynecology (OBGYN) clinic located in Newark, New Jersey with an approximate annual clinic visits of 8,250, with about 65% of the women being between the ages of 27-45. The patient population majorly comprises of African Americans and Hispanics, with 65% charity care insurance and 35% private healthcare insurance.

Study Population

This quality improvement project included a retrospective chart review of women visits in the OBGYN clinic three months before implementation. Inclusion criteria were women between the ages of 27 and 45, while exclusion criteria were those who have already initiated HPV vaccine series, pregnant women, and transgender patients. On a monthly basis, the clinic's total visits approximate 685 and about 75% being obstetrics-related leaving about 171 visits. Out of the 171, about 25% of the visits are patients younger than 27 years of age or older than 45 years, leaving an approximate 129 patient visits. As this was a 3-month retrospective and prospective chart review, it was estimated the project would review up to 560 charts.

Subject Recruitment

As a quality improvement project that will not utilize an identifiable factor of any of the subjects, a formal recruitment strategy was adopted to engage practice providers. Data mining through the electronic medical record (Epic) was conducted by the DNP student to identify age range of women 27-45, ethnicity, and insurance type. Charts that meet inclusion criteria for the project were reviewed. Notification of APRNs and physicians took approximately 2 weeks. The stakeholders in this project are the providers and the advance nurse practitioners (APRN) in the clinic and they were notified via email regarding the educational session that focused on the evidence-based strategy of effective communication and recommendation by providers. See Appendix C for the provider letter of invitation.

Consent

The likelihood of harm or discomfort in this project is not greater than regular daily life risk, rights and welfare of subjects was not adversely affected because age, ethnicity, and insurance type were the variables needed in this project. Moreover, if a signature is obtained, it will be the only link to the subjects as an identification. Therefore, waiver of consent process was adopted for this project. It is also important to note that this project explores the compliance of providers implementing standard of care practices related to counseling, recommendations, and uptake related to the HPV vaccine.

Risks and Harm

There was no anticipated discomfort for participants in this study, so risk was minimal. Age, ethnicity, gender and insurance payer, and information specific to HPV counseling and vaccination uptake was the only data that was collected in electronic health record for this project. Although, there are inherent risk of chart review, the risk was further reduced due to

storage of retrieved data in an encrypted flash drive that was in the possession of the DNP student. Only members of the DNP project team had access to the deidentified data. At the conclusion of the project, the flash drive with aggregate data was stored at Rutgers University School of Nursing; 11th Floor – Office 1126; 65 Bergen Street; Newark, New Jersey. The data was destroyed immediately upon the completion of final presentation of the project.

Subjects Cost and Compensation

There was no monetary cost or compensation to participants and stakeholders in this project, and light refreshment that was intended to be provided during the educational session was later cancelled due to social distancing procedure.

Study Intervention

According to the Institute of Medicine (2001) identification of strategic plans to quality care delivery, and implementation of the plans that will lead to an establishment of care that is safe, efficient, and equitable is imminent. This project is focused on the improvement of HPV vaccination for middle aged women between ages 27-45 years in compliance with the new guidelines of HPV vaccination. Literature review showed that effective communication and unambiguous recommendation by providers will lead to improvement in HPV vaccine uptake. Therefore, this project utilized the following intervention:

- 1) Chart review for the three months prior to implementation to evaluate the number of women that initiated HPV vaccine series by gender, age, ethnicity, and insurance payer.
- 2) Delivered educational session to providers using a power point presentation via email and a brief introduction of the project during providers weekly meeting. (see Appendix E).

- 3) Integrated HPV vaccine signage in providers' offices and patient care delivery rooms as a reminder for providers to initiate HPV vaccine recommendation session. (see Appendix F).
- 4) Utilized hospital alert system to remind patients of their upcoming scheduled appointment.
- 5) Implemented the current practice recommendations specific to HPV counseling and vaccination over 3 months. Recorded recommendation outcome in medical record as either initiation or refusal of vaccination.
- 6) In the event of initiation, the series was scheduled at the date of initiation.
- 7) Comparison of HPV vaccine uptake 3 months prior to implementation and HPV vaccine uptake 3 months after implementation.

Outcome Measured

Upon the completion of the project, the rate of HPV vaccine uptake by age, ethnicity, and insurance payer was collected via an excel spread sheet and compared to 3 months prior to implementation. The number of visit 3 months prior to implementation of the project within age 27-45 and those who initiated the series was collected, and the number of women seen 3 months after the implementation of the project and those who initiated the series was also collected. See Appendix G for Excel spread sheet vaccine uptake variables.

Project Timeline

This project lasted eight months from presentation of proposal to the team through the presentation of final project. After the presentation of proposal to team, submission to the Institutional Review Board (IRB) occurred. Upon approval of the project, the retrospective chart review was conducted over the course of one month, followed by implementation of the project

including the educational session/delivery of signage to appropriate location and lasted for a total of 3 months. Analysis of data collected occurred within a month, followed by evaluation and final writing. Lastly, graduation is expected in May of 2021. See Appendix H for project timeline.

Resources Used

Expenditures for the project was minimal due to support of the practice. Expenditures covered by the DNP student was the printing of HPV vaccine signage, statistician consultation and dissemination posters. There was no associated cost or compensation to stakeholders. See Appendix I for budget list.

Evaluation Plan

A Quality Management Report (QMR) tool is a feature in electronic medical record that is used to collect and analyze data. It is built to provide details of report by quality measures, specialty, program, and providers for both internal and external use. This tool afforded the opportunity of creating a retrospective report of HPV vaccine initiation among women 27-45 years of age 3 months prior to implementation of the project. Provider recommendation education session was evaluated 3 months after implementation with HPV vaccine initiation rate in relation to age, ethnicity, gender, and insurance payer to determine the impact of the quality improvement project. The sole purpose of the project is to improve HPV vaccine uptake among women in compliance with the new guidelines, therefore, number of HPV vaccination initiation rate was measured after implementation.

Data Analysis

Descriptive statistics were used to compare retrospective and prospective chart review of HPV vaccine initiation rate, Bar graphs were created to report comparisons of ethnicity, age, gender, and insurance type in relation to HPV vaccine uptake. Shapiro Wilk test was used to test for normal distribution of age among both retrospective and prospective data and Statistical software SPSS with the use of independent T test was used to compare before and after project implementation.

Data Maintenance and Security

Data was stored in encrypted flash drive and stored in Rutgers School of Nursing; 11th Floor - Office 1126; 65 Bergen Street; Newark, New Jersey, 07107 after implementation of the project. Upon completion of the project, closure of IRB and final writing of the project, data was destroyed in accordance with Rutgers State University guidelines.

Results

Descriptive Statistics

The data collected includes complete medical records from 517 participants (n=517). Two-hundred seventy-nine records are from the retrospective record review (n=279), while 238 records are included in the prospective record review (n=238). With regard to receiving HPV education from their provider 28.2% (n=67) of the prospective sample received HPV education, while 21.5% (n=60) of the retrospective sample received HPV education. In terms of ethnicity, the prospective sample consists of 46.2% (n=110) African American, 50.4% (n=120) Spanish, and 3.4% (n=8) Other. The retrospective sample consists of 52.7% (n=147) African American, 44.1% (n=123) Spanish, and 3.2% (n=9) Other. With regard to health insurance, 79.8% (n=190) of the prospective sample had health insurance coverage, while 67.4% (n=188) of the

retrospective sample had health insurance coverage. Finally, 24.8% (n=59) of the prospective sample received the HPV vaccine, while 20.8% (n=58) of the retrospective sample received the HPV vaccine. Descriptive statistics of the variables in the dataset are shown in Table 1 below.

Table 1

Distribution of sample categorical variables

	Retrospective sample (n=279)		Prospective sample (n=238)		Total sample (n=517)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
HPV Educate	60	21.5%	67	28.2%	127	24.6%
No HPV Educate	219	78.5%	171	71.9%	390	75.4%
Ethnicity						
African American	147	52.7%	110	46.2%	257	49.7%
Spanish	123	44.1%	120	50.4%	243	47.0%
Other	9	3.2%	8	3.4%	17	3.3%
Insurance	188	67.4%	190	79.8%	378	73.1%
No insurance	91	32.6%	48	20.2%	139	26.9%
HPV vaccine	58	20.8%	59	24.8%	117	22.6%
No vaccine	221	79.2%	179	75.2%	400	77.4%

The age distribution is similar between the two samples. Table 2 below shows the average age of patients in the sample as well as the results of the Shapiro Wilk test of normality. The mean age in the retrospective sample was 36.3 (SD=5.00), while the mean age of those in the prospective sample was 35.7 (SD=4.89). The average age of patients in both samples was 36 years (SD=4.95). The Shapiro-Wilk test was used to test age in each sample (i.e., prospective, retrospective, and total) for normal distribution. The Shapiro-Wilk test statistic “W” is greater than zero, and less than or equal to one; a “W” test statistic close to one indicates normality. The Shapiro-Wilk test statistics “Ws” are near to 1, indicating the age variable follows a normal distribution.

Table 2*Age of the study sample*

	Retrospective sample (n=279)		Prospective sample (n=238)		Total sample (n=517)	
	Mean	SD	Mean	SD	Mean	SD
Age	36.3	5.00	35.7	4.89	36.0	4.95
	W	Pr < W	W	Pr < W	W	Pr < W
Shapiro-Wilk Test	0.956	<0.0001	0.971	<0.0001	0.966	<0.0001

Correlation of Age and HPV Vaccine

Table 3 below shows the correlation between age and HPV vaccine uptake ratio. Spearman's Rho is a non-parametric test used to measure the strength of association between two variables, where the rho = 1 indicates perfect positive correlation, rho = -1 indicates perfect negative correlation, and rho=0 indicates no correlation. As Table 3 shows, there is a very weak negative correlation between age and HPV vaccine uptake for the total sample, prospective sample, and retrospective sample. Thus, it is concluded that age was not a factor in HPV vaccination uptake.

Table 3*Spearman Correlation Coefficients for Age and HPV Vaccination*

	n	rho
Retrospective sample	279	-0.214
Prospective sample	238	-0.169
Total sample	517	-0.195

Two-Sample T-tests of Differences in HPV Vaccination

In order to test whether HPV vaccine uptake among patients at the clinic improved after the HPV education session, two-sample t-test of differences in proportions were conducted. The procedure tests the difference between two groups. If the difference in proportions is statistically

no different from zero, then they are not different. Table 4 shows the results of the two-sample T-tests. The alpha level is set at $\alpha = .05$ for all of the t-tests performed. As the table shows, the proportion of sample receiving the HPV vaccine was 20.8% for the retrospective sample and 24.5% for the prospective sample. The difference in HPV vaccine uptake (3.7%) between the prospective sample and the retrospective sample failed to reach statistical significance, $t(515)=1.0$, $p=0.3187$. In summary, there was an increase of 3.7% vaccine uptake in the prospective data from the retrospective data.

Regarding patients who received HPV education from their provider, the proportion of the prospective sample receiving the HPV vaccine was 88.1%, while 96.7% of the retrospective sample who received the HPV education were vaccinated. The difference in HPV vaccine uptake for those receiving HPV education was a reduction of 8.6% between the prospective and retrospective samples. However, this reduction in HPV vaccine uptake failed to reach statistical significance, $t(125) = -1.810$, $p=0.0732$. In summary, there was a reduction of 8.6% in vaccine uptake among women who consent to vaccination after education in comparison to retrospective data, although not statistically significant.

Table 4*Tests for differences in proportions of HPV vaccine uptake*

	Retrospective sample			Prospective sample			Two-sample T-test				
	n	mean	SE	n	mean	SE	Diff	SE	DF	t	Pr > t
Total sample	279	0.208	0.024	238	0.245	0.028	0.037	0.037	515	1.000	0.3187
HPV Educate	60	0.967	0.023	67	0.881	0.040	-0.086	0.048	125	-1.810	0.0732
Ethnicity											
African American	147	0.184	0.032	110	0.248	0.042	0.064	0.052	255	1.240	0.2159
Spanish	123	0.252	0.039	120	0.233	0.039	-0.019	0.055	241	-0.340	0.7352
Insurance	188	0.229	0.031	190	0.238	0.031	0.009	0.044	376	0.210	0.8303
No insurance	91	0.165	0.039	48	0.271	0.065	0.106	0.072	137	1.480	0.1405

Regarding patient ethnicity and HPV vaccine uptake, the proportion of African American women in the study receiving the HPV vaccine was 24.8% for the prospective sample and 18.4% for the retrospective sample. However, the increase in HPV vaccine uptake (6.4%) among African American women in the sample failed to reach statistical significance, $t(255)=1.24$, $p=0.2159$). The proportion of Spanish women in the study receiving the HPV vaccine was 23.3% for the prospective sample and 25.2% for the retrospective sample. The slight decrease in HPV vaccine uptake (-1.9%) among Spanish women in the sample failed to reach statistical significance, $t(241)=-0.340$, $p=0.7352$. The sample size in the “Other” ethnicities category was not large enough to perform the two-sample t-test of differences in proportions.

With regard to insurance, the proportion of insured patients in the study receiving the HPV vaccine was 23.8% for the prospective sample and 22.9% for the retrospective sample. The slight increase in HPV vaccine uptake (0.9%) among insured women in the sample was not statistically significant, $t(376)=0.21$, $p=0.8303$. The proportion of uninsured patients in the study receiving the HPV vaccine was 27.1% for the prospective sample and 16.5% for the

retrospective sample. The increase in HPV vaccine uptake (10.6%) among uninsured women suggests the education intervention may be more effective for women with no insurance.

However, the increase in HPV vaccine uptake (10.6%) among uninsured women failed to reach statistical significance, $t(137)=1.48$, $p=0.1405$. Although not statistically significant, the difference in HPV vaccine uptake among uninsured women could be evaluated in future studies.

Discussion

Human papilloma virus remains the leading cause of sexually transmitted infection with over 150 strains including the strains that causes over 90% of cervical cancer in women, however HPV vaccine uptake in the U.S is 40%, less than the healthy people 2020 national benchmark of 80%. The persistently low levels of coverage have prompted a rapid rise in the research literature on determining factors of HPV vaccination, and this work has constantly highlighted the powerful influence of healthcare providers' communication (Gilkey and McRee, 2016). This QI project aligns with previous research that provider's recommendation is the single most powerful influence to improving HPV vaccine uptake. The findings proved that women who received education are more likely to receive HPV vaccine than those who do not, however, this study targets middle age women in contrast to previous studies that were devoted to adolescents. In addition, the method of intervention of this project overwhelmingly differ from the intervention of previous studies. Therefore, understanding and addressing the role of provider's recommendation in HPV vaccine uptake is paramount to HPV vaccine compliance among women.

Process Evaluation

Overall, this quality improvement project evaluated providers education session aimed at improving HPV vaccine uptake among women 27-45 years of age in an OBGYN clinic. Retrospective and prospective data in the aggregate of 517 charts were collected and analyzed with an increase of 3.7% post intervention. The providers recommendation education session was developed using quality indicator and evidence-based literature findings that reflect provider's recommendation as a consistent factor that improved HPV vaccine uptake and was delivered through virtual platform. The method used in delivery of intervention is unpopular for research dissemination, however, it is imperative that this method become strengthened as technology advances in healthcare industry. Clinicians can review materials repeatedly; they can connect with more providers at a given point in time in various ways. Moreover, virtual platform is cost effective, and it is a simple way to cultivate self-discipline toward learning. However, this method would be ideal when providers have become familiar with the process in order to be successful and improve the health outcome of the population.

Key Facilitators/Barriers

Organizational policies are an important determinant of health and wellness of their consumers, and the site for this quality improvement project is in alignment with HPV vaccination for women 27-45 years of age. As a result, they did not just connect with the implementation of the project, they accepted it as an obligation. The Chief Medical Officer, manager, and education department staff were very supportive and provided timely access to facilitate implementation and data analysis. The Chief Medical Officer provided a brief overview of the project in the weekly staff meeting, creating awareness of the project for the larger body of providers in addition to each providers expectation in response to the project. However, lack of clarity by providers, inability of the project leader to be present in the organization during

implementation process, and time constraint impacted the project findings. Therefore, it is imperative that a clear message regarding project be provided frequently, in addition to easily understandable data in captivating format. This can easily result in creating a credible relationship through the virtual platform and a basis for providers to begin a shift from the rigid traditional form of sharing research information to accommodate the advancement in technology.

Unintended Consequences

The project findings ascertain that providers are not on the same page in regard to extending HPV vaccine recommendations to women and men 27-45 years of age. Therefore, there is a dire need for providers education to reiterate new HPV vaccine coverage without neglecting the advantage thereof. Frequent education on provider's recommendation of HPV vaccine is needed for a successful vaccination among the women, in addition to a clear organizational policy within the clinic in regard to HPV vaccination. The clinic has an affiliate with a large hospital where they have a clear policy to vaccinate women postpartum, with the goal for the clinic to continue the series. The vaccine series are sometimes missed; therefore, it is important for the organization to develop a clear policy regarding continuation of HPV vaccine series for 6 weeks postpartum visit and beyond.

Limitations

Providers education is conceivable, cost effective and in alignment with providers primary obligations. However, conventional delivery of evidence-based content became challenged due to lock down in response to COVID-19 forcing the education session into a virtual platform. Healthcare communities rely on live events as a bedrock of medical advancement where ideas, opinions and research studies are disseminated for a meaningful change. However, in the era of COVID-19, mitigation of loss of live interactions would be based

on inherent belief of the participants. Hence, this project was impacted by unconventional delivery of education session, providers compliance, inability to have the project leader present on site and with significant time constraints.

Implications

Health Policy

Introduction and universal use of vaccines have led to extinction of some diseases like smallpox, while others like influenza are mitigated periodically leading to a substantial decline in infectious diseases around the world, and HPV vaccine is no exception. The public health policy of the U.S. is in support of HPV vaccination to women 27-45 years of age to achieve a goal of reduction in cervical intraepithelial precancerous lesions. Lack of providers recommendation is a known citation for suboptimal uptake of HPV vaccine. This quality improvement project serves as healthcare policy advocacy in improving providers' recommendation skills, in addition to broadening the knowledge of providers to new evidence-based practice relating to HPV vaccine in women 27-45 years of age. According to World Health Organization (2020), successful comprehensive approach to prevent, screen, and treat HPV can lead to eradication of cervical cancer within a generation.

Practice

Health disparity is a term used in the U.S. to describe dissimilarity in the environment, access to utilization of, and quality of care, health status, or a particular health outcome among populations (Pattin, 2017). The U.S. Congress commissioned a key report by the Institute of Medicine confronting racial and ethnic disparities in health care, discussing variations in the rate of medical procedures by race, insurance status, income, age, and severity of conditions and they

found out that minorities are less likely to receive optimal care (Pattin, 2017). However, remarkable efforts have been accomplished since then to eradicate such distinction both from local and national level in order to achieve equitable care for all. This and many more interventions have led healthcare organizations to prioritizing the delivery of safe, effective, and equitable care irrespective of insurance status or ability to pay. Therefore, improvement of providers' recommendation of HPV vaccine to women 27-45 years of age has the potential of achieving the goal despite the wide range in economic and social status. This quality improvement project serves as a bridge of stabilization to delivery of equal care to women in healthcare practice.

Economics

The most significant impact of vaccines is prevention of morbidity and mortality rate from serious infectious diseases (Rodrigues, 2020). Healthy people live longer, are productive, and more concerned about financial obligations and responsibilities, in addition with the ability to contribute their own quota within the society. Infectious diseases with the potential of leading to life altering sequelae must not be ignored particularly if provision to mitigate or eradicate it is within reach. The Human Papilloma Virus vaccine has been shown to reduce and eradicate precancerous lesions among those infected, ultimately leading to a healthier population. The estimated total annual cost of treatment and prevention of cervical cancer in the U.S. is \$8 billion, and \$52 million isolated as an average annual cost of national screening (Chesson et al., 2012). Vaccination of women ages 27-45 years against HPV is efficacious in preventing HPV related diseases and billions of dollars are allocated annually for cervical cancer screening and treatment. Reduction in incidence of cervical cancer due to HPV vaccine uptake will improve

revenue to other areas within the system with a remarkable decline in local and national economic burden.

Quality & Safety

Vaccines are liable to licensure in in the U.S. by the FDA following the studies that addressed safety and efficacy (Hinman and Malone, 2007). Determination to approval of vaccines is sorely based upon safety, effectiveness, and benefit outweighing risks. Human Papilloma Virus vaccine was licensed by FDA in October 2018 for women and men 27-45 years of age after being shown to be effective in preventing precancerous lesions. Knowledge of FDA approval by women who meet the inclusion criteria of the vaccine may translate to improvement in HPV vaccine uptake. This project is a source of HPV vaccine dialogue between women and providers for shared decision making.

Plans for Sustainability

A provider recommendation is a fundamental impetus to facilitate HPV vaccine uptake in any organization. Electronic Medical Record system is also integral to HPV vaccination services ranging from documentation of education, initiation of vaccine, tracking of vaccination series, and determination of eligibility. Modification of the electronic medical system to incorporate HPV vaccine template and the presence of hard-stop alert will be an ideal measure for sustainability. In addition, incorporation of vaccination template to patient portal to include vaccinations that are up to date and those that are delinquent. This can promote patient-provider inquiry about HPV vaccine, and providers can safely mark the box of patient education on HPV vaccine in relation to patient's response. Findings of this project support provider's recommendation and HPV vaccine compliance, and positive influence of consistent provider's

recommendation will enhance vaccine uptake. Future projects can include re-delivery of provider recommendation in conventional education platform, periodic promotion of effective strategies within the organization, and involvement of ancillary staff member involved in influx and efflux of women care in the clinic.

Dissemination & Professional Reporting

The healthcare industry has been flourishing for decades due to the process of sharing research findings/design among stakeholders, and target audiences. Moreover, professional reporting provides a platform where the research can be utilized by potential adopters or influencers of possible adopters with the use of report template that narrates the details of the research in a concise manner. This quality improvement project will be disseminated to Rutgers University as part of the requirements for the Doctor of Nursing Practice degree. Project findings will also be shared with project site stakeholders via presentation and posters. Results will also be shared with community centers via poster presentations. Findings will also be shared in local churches and statewide women's health conferences. Considerations will also be made for submissions to conferences including the American College of Obstetrics and Gynecology and American Certified Nurse Midwives due to direct correlation to their professional guidelines.

Summary

The HPV vaccine was approved to women ages 27-45 years of age after a nearly four randomized control trial reflecting 88% effectiveness in prevention of precancerous lesions. Human Papilloma Virus vaccine uptake is suboptimal at the rate of 24% in the city accounting for the lowest rate in the nation, and lack of providers recommendation was a major factor to low

uptake. This project focused on improving provider' education and extension of vaccination to middle age women with the aim of preventing cervical cancer. Provider communication education done through virtual platform in an OBGYN clinic in a weekly staff meeting and via email. Retrospective and prospective data were collected and analyzed, and findings of the project support the evidence based leading indicator for low HPV vaccine uptake. Hence, provider's recommendation is an important factor that consistently guide HPV vaccine uptake in middle age women.

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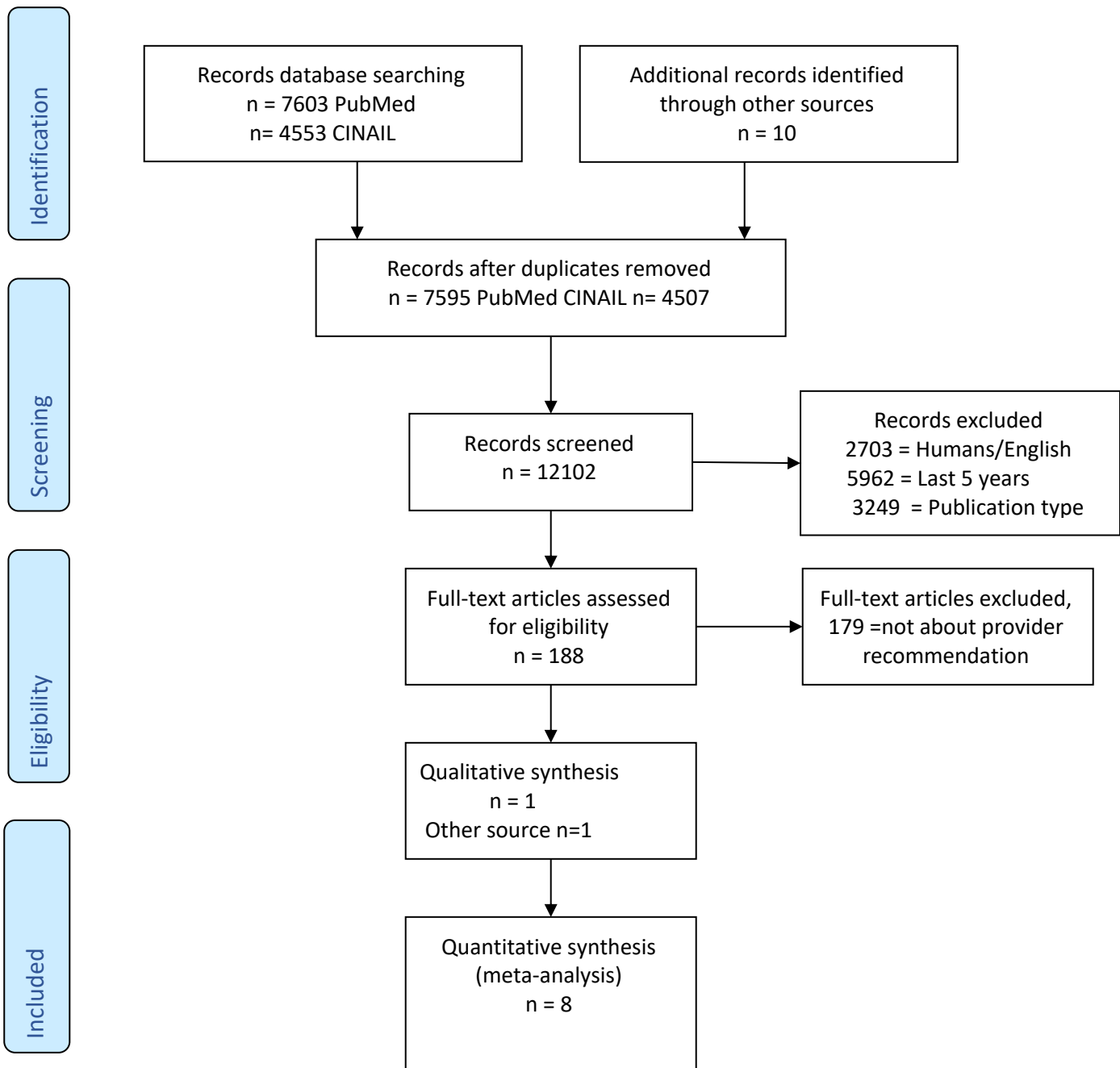
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Appendix A

Prisma Diagram



Appendix B

Table of Evidence

EBP Question: Among middle aged women ages 35-45 year, how does provider recommendation and counselling regarding HPV vaccine impact HPV vaccination rate among women 35 to 45 years over a 3 month period?

Date: March 5, 2020

Article	Author, Date	Evidence Type	Sample, Sample Size, Setting	Study Findings that help answer EBP question	Limitations	Evidence Level & Quality
#1	Melanie Drolet, Elodie Bernard, Norma Pérez, Marc Brisson 2019	Systematic review that used both single and multiple cohort studies	60 million people, 65 articles from high income countries.	Increased knowledge, awareness, and health seeking behavior reported by health professionals due to recommendation of Vaccine. The greater impact of multi-cohort vaccination was similar when restricting the analyses to countries with high routine vaccination coverage. The group that benefit most are the ones with high uptake.	There are 3 limitation first limitation is that causality between HPV vaccination and the observed changes in HPV-related endpoints cannot be concluded Secondly, the number of studies too small for us to do multivariate metaregression analyses. The third is all studies identified in the systemic review are from high-income countries,	Research Level II, High quality

#2	Hersha Patel, Yadava B Jeve, Susan M Sherman, Esther L Moss January, 2016	Systematic review. Includes 14 quantitative and 4 qualitative data	Sample size ranged from 217 to 1769 for the quantitative and from 10 to 87 for the qualitative studies. Most of the included studies had been conducted in Europe	When vaccine recipients and their parents are provided with balanced information, they have improved knowledge and risk perception, which results in increased vaccine uptake.	Limited by the scope of the primary studies. Five of the survey studies had not validated their questionnaires and there were considerable variations in the way specific acceptance of HPV knowledge were assessed. The study populations were all heterogeneous and therefore difficult to truly compare	Research Level III, moderate/good quality
#3	Kathryn Miller, MD; Sarah E. Dilley, MD; Warner K. Huh, MD 2018	Expert Reviews	Reviewing HPV vaccination programs and uptake around the world including factors that contribute to increase uptake	Provider's recommendation for vaccination is the single most important factor in parental vaccine initiation.	It's an expert review, no limitations isolated.	Expert Review Level V, Good/moderate quality.
#4	Joseph, N. Bernstein, J. Pelton, S. Belizaire, M. Goff, G.	Randomized Control Trials	N 100 African Americans, N=100 Haitian American, poor socioeconomic	Lack of information about the HPV vaccine is the most common barrier preventing black women	Sample size too small, Study conducted in African Americans and Haitians, not a true representation of entire population.	Guideline Level I, High quality

	Horanieh, N. Freund, K. 2016		background.	from having their daughters vaccinated.9-12. Our findings, however, suggest that changes in knowledge alone were insufficient to motivate women to consent for HPV vaccination in these populations		
#5	Donahue, K. Hendrix, K. Sturm, L. Zimet, G. 2018	Randomized Control Trial	Participants were mothers or female legal guardians of 9-13-year-olds living in the United States. N=2,476 mothers Randomized to HPV and Flu target group.	Provider communication about vaccination need to be tailored to the vaccine in question. A next step to increasing coverage to HPV vaccine may be an intervention aimed at increasing mothers' perceived benefits of vaccination.	Data were not collected from a nationally representative sample. Willingness to vaccinate measure was not accounted for. It is web based, unable to truly evaluate provider's recommendation.	Research Level II, Good quality
#6	Ramathuba, D. U. Ngambi, D.	Quantitative cross-sectional survey	Participants were black women of Vhanda and Vatsonga	The study confirms that there is still a lack of information or access to information about HPV and	Convenient data, self-reporting questionnaire, the validity and reliability instrument used cannot be verified.	Research Level III, Low/poor quality

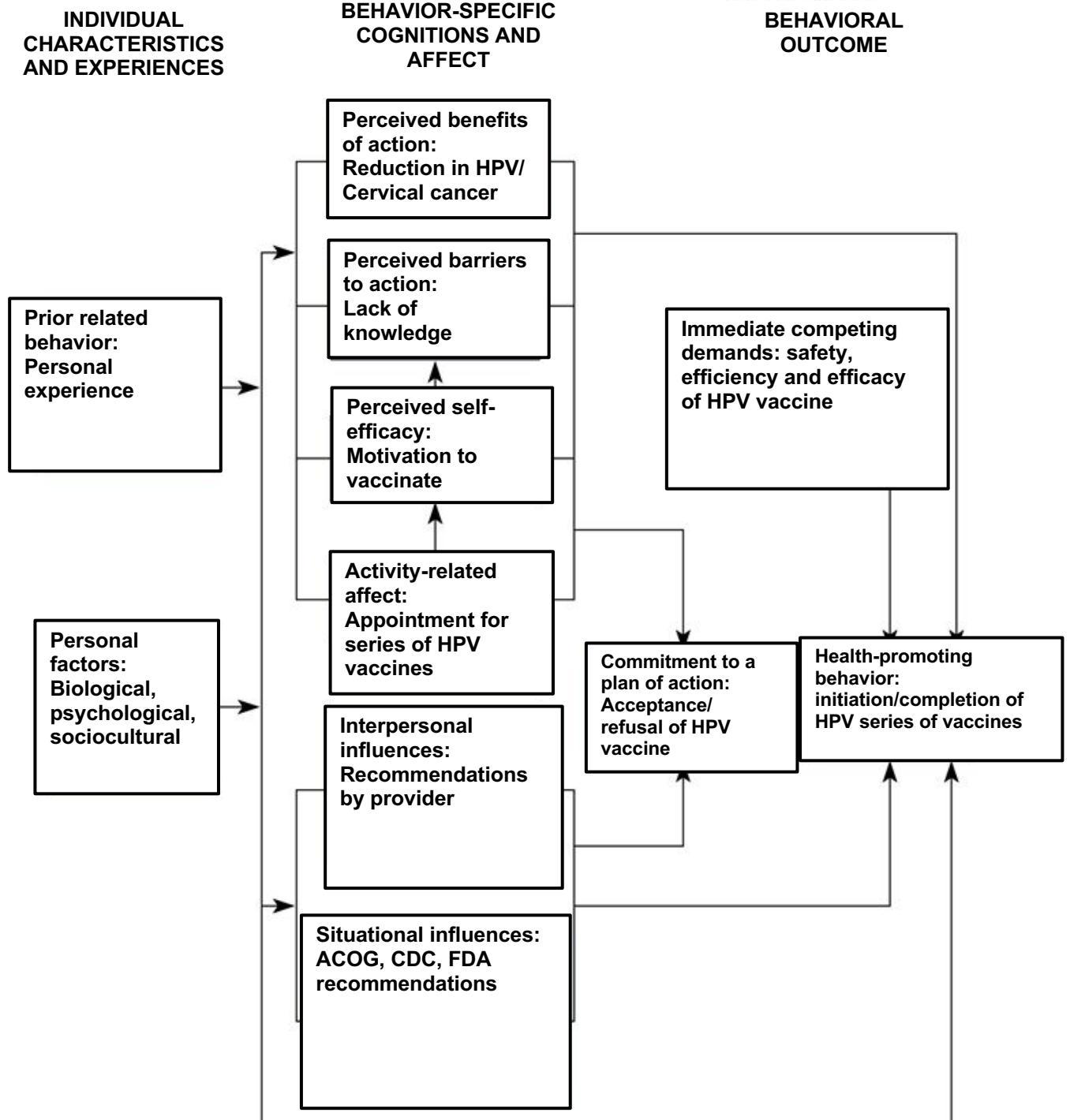
	November 2018.		<p>ethnic group in South Africa</p> <p>The mean age was 41 years.</p> <p>N= 1546 respondents</p>	<p>that more needs to be done to raise awareness of HPV and HPV vaccination especially amongst rural poor communities. It is important that health professionals provide comprehensible information about HPV and health related diseases and screening test.</p>		
#7	<p>Gilkey, M. B. McRee, A. L. 2016</p>	<p>Systematic review that used articles with cross sectional survey and mixed method</p>	<p>101 articles were used, eligible Sample are from U.S to account for the unique practice and policy environments that influence HPV vaccination in the country.</p>	<p>Provider recommendation strength, for both quantitative and qualitative studies consistently found an association between the extent to which providers endorsed the importance of HPV vaccine and parents' positive perceptions of HPV vaccine,</p>	<p>Limitations include this review's reliance on studies that most often used relatively weak, cross-sectional designs, convenience samples, and self-reported measures of providers' recommendation behavior and adolescents' vaccination status.</p>	<p>Research Level III, Good quality.</p>

#8	Marshall, S. Fleming, A. Moore, A. C. Sahm, L. J. 2019	Systematic review of qualitative data.	Articles from 14 countries representing all the continent. 33 studies used N=1280 parents/guardians	Healthcare providers can reinforce the importance of HPV immunization and reiterate the rationale behind vaccination recommendations, by providing unambiguous information.	Limitation is inadequate researcher reflexivity, where the relationship between researcher and participants had not been adequately considered.	Research Level III, Moderate-High quality.
#9	Rosen, B. L. Shepard, A. Kahn, J. A. 2018	Systematic review that used Quantitative and Qualitative studies.	60 articles used in all; the studies were conducted in US. 48 quantitative and 12 qualitative studies. The range of publication dates included 2008 through 2016	Clinicians' recommendation for the human papillomavirus (HPV) vaccine appears to be an important driver of parental decisions about vaccination.	Most studies of clinician practices were self-reported, and data were not validated also, studies were cross-sectional, precluding an understanding of changes in attitudes and practices over time	Research Level III, Good Quality.
#10	Centers for Disease Control and Prevention. 2019	Clinical Trials, RCTs Led to the clinical recommendation of HPV vaccine to women 27-	3819 Women 27-45 years of age were included in the Trial in the US.	Acceptability was higher when the vaccine was assumed to be free and/or a health care provider made a	Level of uncertainty remains unclear.	Guideline Level IV, High quality

		45 years of age.		recommendation		
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Appendix C

Pender Health Promotion Model



Adapted from: https://www.researchgate.net/publication/322479619_Theory_analysis_for_Pender's_health_promotion_model_HPM_by_Barnum's_criteria_A_critical_perspective

Appendix D

Letter of Invitation

Atinuke Asaolu
32 Calumet Avenue,
Rockaway, NJ 07866

Dear Dr.:

I would be honored if you could attend the presentation of my quality improvement project proposal "Improving Provider Recommendation of Gardasil Vaccination in Women 27-45 years of Age" being presented on August 18, 2020 at 2:00pm in Education Room or via internet. The work being proposed concerns improving uptake of Gardasil in compliance with the new guidelines of October 2018.

I am a DNP student in Nursing Midwifery and Women's Health at Rutgers, The State University of New Jersey working with Dr. Michell Troope. I will be looking forward to seeing you because your experience and opinion will be greatly appreciated.

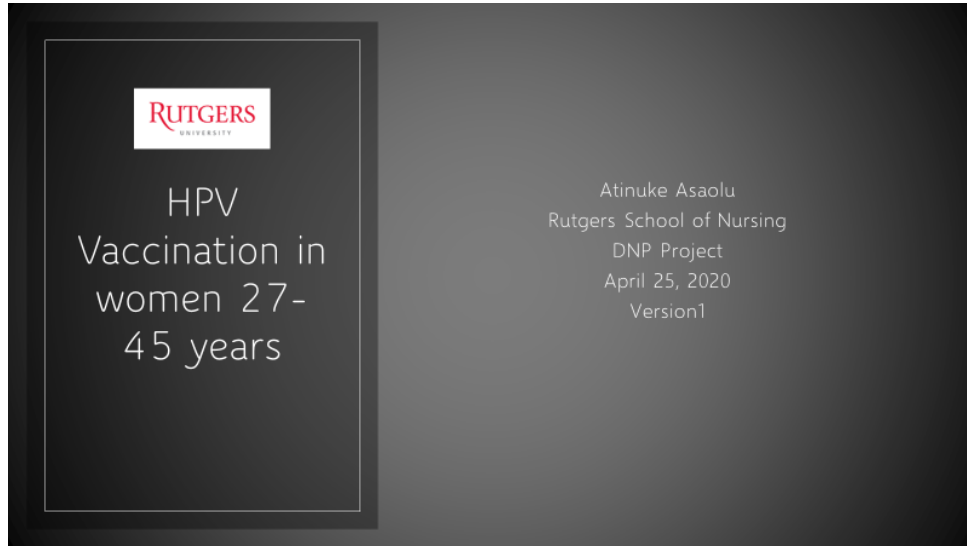
Sincerely,

Atinuke Asaolu
Aoa86@sn.rutgers.edu

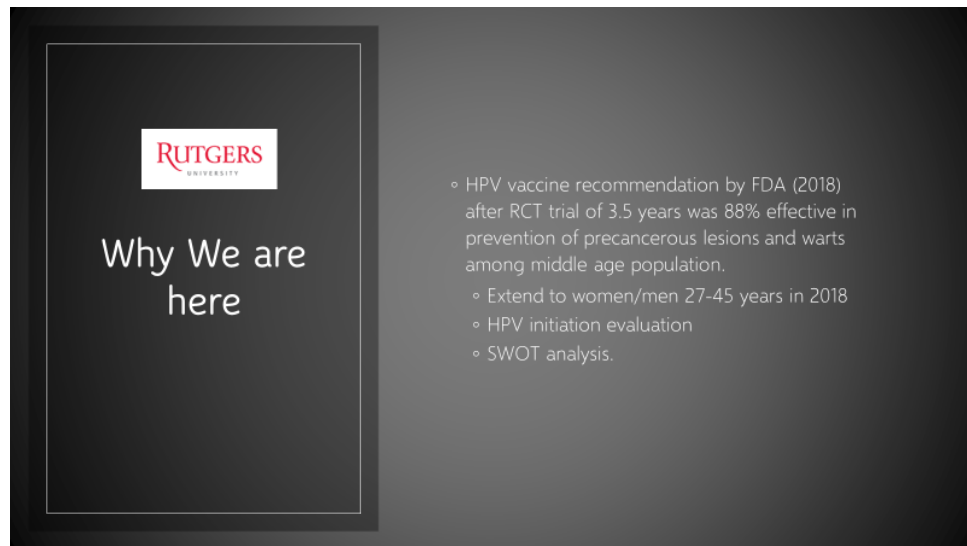
Version 1 May 06, 2020.

Appendix E

Provider's Education Power Point Presentation




This slide features the Rutgers University logo in the top left corner. The main title is "HPV Vaccination in women 27-45 years". On the right side, the presenter's information is listed: "Atinuke Asaolu, Rutgers School of Nursing, DNP Project, April 25, 2020, Version1".




This slide features the Rutgers University logo in the top left corner. The main title is "Why We are here". On the right side, there is a bulleted list of points:

- HPV vaccine recommendation by FDA (2018) after RCT trial of 3.5 years was 88% effective in prevention of precancerous lesions and warts among middle age population.
- Extend to women/men 27-45 years in 2018
- HPV initiation evaluation
- SWOT analysis.




HPV Diseases

- 14 million new cases of HPV infection annually in the U.S. (American Sexual Health association, 2020)
- Over 150 strains of HPV
- 99% cause of cervical cancer
- 70% cause of vaginal and vulva ca.




Effect of Vaccination

- History of pap smear
- Effect of screening
- Reduction by 50% incidence of cervical ca in U.S. in the last 3 decades due to
 - Widespread screening/vaccination
- Around the world, cervical cancer is the 3rd leading cause of malignancy and 2nd cause of mortality rate in developing countries. Not listed among the top 10 in the U.S.




Associated cost of HPV related screening and treatment

- According to ACOG (2016) Estimated total annual cost of cervical cancer screening/Treatment is 8 billion dollars.
- 52 million estimated annual cost of screening.
- 1.2 billion cost of treatment and false positive follow up in 2012.
- Cost of screening vs cost of treatment highlights the importance of vaccination.



HPV Vaccination rate

- Despite the growing evidence of efficacy, effectiveness and significance of HPV vaccine, uptake is less than satisfactory (Doherty et al., 2018).
- Department of health and human service report
 - Healthy people 2020 HPV uptake goal of 80%
- Nation wide uptake is 40%
- New Jersey uptake rate of HPV vaccine is 39.1% data of 2017
- Rutgers today (2015) reports 24.7 uptake rate in the city of Newark.



Call to Action by Healthcare Providers

- Improving provider communication/recommendation is one of the most highly prioritized goals in the national movement to increase HPV vaccination coverage (Gilkey and McRee, 2016).
- Recommend HPV vaccine with same strength used in recommending TDAP.
- Educate on HPV and HPV vaccine
- Be ready to answer questions clearly devoid of ambiguity.

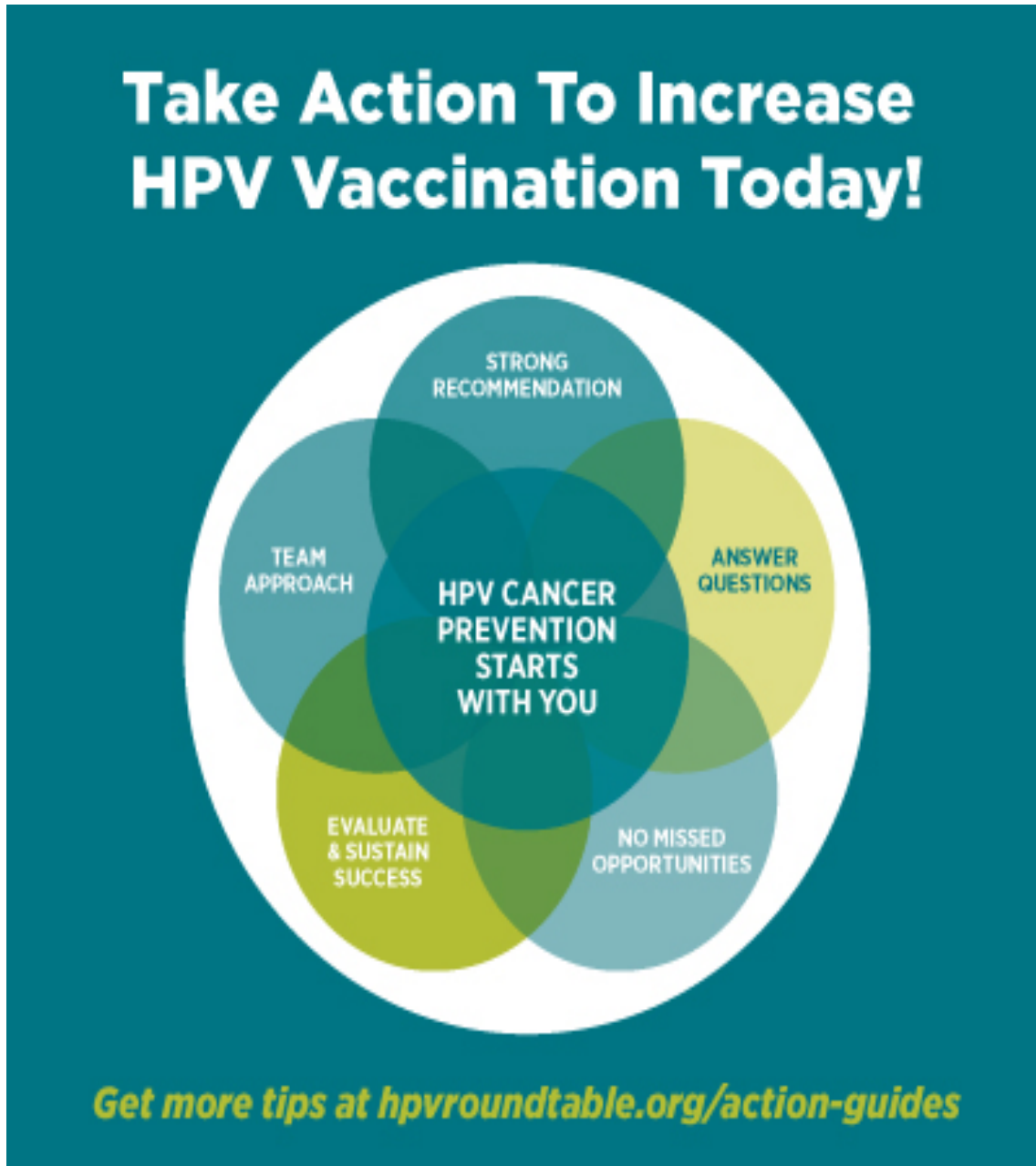


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Appendix F

HPV Vaccine Signage



<https://hpvroundtable.org/resource-library/2019graphics/>

Version 1 May 01,2020

Appendix G

Appendix I**Project Budget**

Expense	Cost	Total Cost
Signage	20 @\$ 4.4	\$88.00
Statistician consultant	\$80/hour x 4HR	\$320.00
Dissemination	\$75	\$75.00
Total Budget		\$483.00