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# A Multi-Modal Intervention to Decrease HPV Vaccine Hesitancy and Increase Uptake in Young Adult Women

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# A MULTI-MODAL INTERVENTION TO DECREASE HPV VACCINE HESITANCY AND INCREASE UPTAKE IN YOUNG ADULT WOMEN

by

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## DEDICATION

First and foremost, I would like to dedicate this project to my parents, Al and Wendy Cookerly; you instilled in me from a young age the importance of hard work and education. Without your guidance and wisdom, I would not be where I am today. To my husband, Kyle Cartales; you are my rock through every daily trial and tribulation that I encounter, and I thank you for showing up for me in any way that I needed during this project. To my incredible peers who I would not have made it through this program without; thank you for your constant encouragement and responding to my daily texts. And last but certainly not least; I dedicate this project to my grandma, Gwen Stocks, who unfortunately lost her courageous battle against ovarian cancer. You are my inspiration to keep on going.

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## ABSTRACT

Human Papillomavirus (HPV) is the leading cause of cervical cancer worldwide and the most common sexually transmitted disease, yet hesitancy towards the HPV vaccine remains high and uptake of the HPV vaccine remains remarkably low (CDC, 2021b). The purpose of this evidence-based practice (EBP) project was to determine if the implementation of a multimodal intervention including a motivational interview, strong provider recommendation, and educational materials will decrease HPV vaccine hesitancy and consequentially increase uptake of the vaccine. Eleven young adult women ages 18-26 from a rural outpatient Obstetrics and Gynecology (OBGYN) clinic in Indiana participated in this project. After agreeing to participate, each woman filled out a vaccine hesitancy scale (VHS) and a demographic form prior to the intervention. The intervention was then carried out and consisted of a motivational interview with a provider regarding the HPV vaccine, as well as a strong recommendation to get vaccinated and educational materials about HPV to take home. Following the intervention, each woman was offered the HPV vaccine. Vaccine hesitancy was measured using their pre-intervention vaccine hesitancy scores and their vaccination status post-intervention. Data on HPV vaccination rates at the clinic were collected in the time period before, during, and after the intervention. Data regarding vaccine hesitancy were analyzed using a Fisher's exact test and it was found that individuals in the post-intervention period were 10% more likely to get the HPV vaccine, however there was not a statistically significant decrease in vaccine hesitancy post-intervention. Overall, the HPV vaccination rate at the clinic increased from the time period before the project to the time period during the project and after the project.



*Keywords:* Human papillomavirus (HPV), HPV vaccine, hesitancy, uptake, refusal, intervention, strategy

# CHAPTER 1

# INTRODUCTION

## Background

Human papillomavirus (HPV) is the most common sexually transmitted disease worldwide, affecting about 13 million Americans annually (Centers for Disease Control and Prevention [CDC], 2023a). Some HPV infections clear by themselves, but others can lead to cancers of the cervix, vagina, vulva, penis, anus, and oropharyngeal area (CDC, 2022). It is often a silent infection, as individuals might not have any signs and symptoms but can still pass it along to others through skin-to-skin contact. It is so prevalent that by the age of 50, four out of every five women will have been infected with HPV at some point in their lifetime (CDC, 2022). More than 40 different strains of HPV can infect the genital areas of men and women (CDC, 2022). In the United States (U.S.) alone, HPV causes about 36,000 cases of cancer annually in both men and women (CDC, 2023b).

In 2006, the first HPV vaccine, Gardasil, was released in the U.S. Currently, there are three vaccines for HPV: Gardasil, Gardasil 9, and Cervarix, however Gardasil 9 is the only HPV vaccine distributed in the U.S. since late 2016 (CDC, 2021a). All three of these vaccines are recommended in a two-dose series starting at the age of 11 up to 26 years of age (CDC, 2021a). However, they can be administered as early as nine years old (CDC, 2021a). The HPV vaccine can also be given to adults aged 27 through 45 years of age, but a conversation with a healthcare professional is recommended prior. If initiating the series past 15 years of age, or for younger individuals 9-14 who are immunocompromised, a three-dose series is recommended instead of two (CDC, 2021a). If given as a two-dose series, the vaccine is recommended 6-12 months apart, and if given as a three-dose series, the second dose is recommended one to two months after the first and the third dose is recommended six months after the first (CDC, 2021a). Human papillomavirus types 16 and 18 cause the most HPV cancers, and all three

vaccines cover for these strains and are licensed and approved by the Food and Drug Administration (FDA)(CDC, 2021a). Gardisil-9 protects against nine different HPV types: 6, 11, 16, 18, 31, 33, 45, 52, and 58, and is the vaccine currently used in the U.S. (CDC, 2021a). The Centers for Disease Control (CDC), The American Academy of Pediatrics (AAP), The American Cancer Society (ACS), and the American College of Obstetricians and Gynecologists (ACOG) recommend the HPV vaccine. The vaccine went through extensive safety testing, and more than 100 studies including millions of people have proven its safety (ACS, 2020). Additionally, the majority of insurance plans worldwide cover the vaccine for little to no cost (CDC, 2021a). Despite the facts that the vaccine is safe, affordable, prevents cancer, and is backed by many credible organizations, the vaccination rates across the U.S. remain low. The HPV vaccination coverage is significantly lower than many other routine vaccines (CDC, 2021b). Because the statistics show hesitancy towards the vaccine, many studies are being conducted to explore why people are hesitant to get vaccinated with the HPV vaccine, and what strategies might be effective to encourage those who are unvaccinated to get vaccinated.

Regarding HPV, the Healthy People 2030 goal is for 80% of 13 to 15-year-olds in the U.S. to be vaccinated (Harper et al., 2023). This age group has historically been the focus of research because vaccination is optimal prior to sexual intercourse, however recent research has shown that administering the vaccine to the “catch-up” group, or individuals 18-26, can still be extremely effective (Harper et al., 2023). The catch-up population is individuals 18-26 who did not receive the HPV vaccine during adolescence. The catch-up population vaccination rates are extremely low, as an estimated 35% of women 18-26 years of age in the U.S. are fully vaccinated against HPV (Harper et al., 2023). This trails behind the current adolescent vaccination coverage of 61.4% significantly (CDC, 2021b). Additionally, this population of young adult women is more at-risk for being infected with HPV, as the prevalence is significantly elevated at 59.8% of women in this age range (Harper et al., 2023). Targeting this group provides an opportunity for educating those wanting to make autonomous decisions about their

health. For these reasons, women aged 18-26 years old, also referred to as the catch-up population, are the focus of this evidence-based practice (EBP) project.

## Data Supporting Need for the Project

### Global Data

Globally, only one in eight girls are vaccinated against HPV, approximately 12.5% of the population, which has dropped an alarming 15% since 2019 (United Nations Children's Fund, 2023). This is thought to be due to the effects of the COVID-19 pandemic as there were substantial disruptions in preventive care services for a period of time (United Nations Children's Fund, 2023). Lower vaccination rates correlate with higher numbers of individuals living with some form of HPV. Because HPV is the number one cause of cervical cancer worldwide, it's no surprise that cervical cancer is the second most commonly diagnosed cancer in women worldwide in the most recent global cancer data available from 2018 (ACS, 2018b). In 2020, it is estimated that 342,000 women died from cervical cancer globally (United Nations Children's Fund, 2022). As of 2018, it is the fourth leading cause of cancer deaths in women worldwide (ACS, 2018b).

### National Data

As of 2020, it is estimated that 61.4% of women ages 13-17 are fully vaccinated against HPV in the U.S., which drops to an estimated 35% among women aged 18-26 (CDC, 2021b). This is significantly better than global data due to availability of the HPV vaccine in the U.S., however it still lags behind other routine vaccinations. Nationally, the U.S. has about 36,000 new cases of cancer caused by HPV annually (CDC, 2023b). An estimated 4,300 women die annually from cervical cancer in the U.S., with most cases attributed to HPV infection (ACS, 2018b).

### Regional Data

Narrowing in on the Midwest, Indiana's vaccination rate against HPV is lower than its neighboring states, as well as the national rate (United Health Foundation, 2023). Majority of

states have anywhere from a 5.9-10.3 rate of cervical cancer per 100,000 women (CDC, 2023b). Glancing at the map of the U.S., the Midwest has significantly higher prevalence of cervical cancer than the western states, not coincidentally, with significantly lower vaccination rates (CDC, 2023b; United Health Foundation, 2023).

**State Data**

In Indiana, 55% of girls 13-17 are vaccinated against HPV, compared to U.S coverage of this population which is estimated at 61.4% (American Cancer Society, 2018a). Approximately 278 new cases of cervical cancer are diagnosed annually in Indiana, with 88 deaths occurring annually (Indiana Cancer Consortium, 2023).

Despite having a cancer prevention vaccine available, HPV continues to be a health and economic burden on a global, national, regional, and state level. A limitation to this data is that global, national, regional and state databases do not have statistics on the catch-up population, which is the focus of this project.

**Clinical Agency Data**

This EBP project was implemented at a rural outpatient Obstetrics and Gynecology (OBGYN) clinic in Howard County, IN, which is part of a large healthcare organization that spans the Midwest. According to the Indiana State Department of Health, the number of eligible individuals fully vaccinated against HPV in Howard County is 5.2%, which is significantly lower than global, national, regional, and state rates (Indiana Department of Health, 2023).

The EBP project was discussed with the clinical site facilitator employed as a nurse practitioner at the clinic. The clinical site facilitator noted that the clinic as a whole has very low HPV vaccination rates, and it is something that the organization needs to improve (A. Kaylor, personal communication, April 24, 2023). Currently, there is nothing uniform that all providers do at the clinic to encourage HPV vaccination. The current electronic health record (EHR) system that is utilized at the clinic gives providers warning flags when individuals are overdue for certain vaccinations, including HPV. Providers will then remind individuals upon notice within the EHR

that they are eligible for a vaccination at the time of their visit, which is the current standard of care at this setting. After a thorough search of the literature, it was discovered that this is a problem nationally as well, and evidence-based interventions are being implemented at clinics across the U.S. to combat HPV vaccine hesitancy. A multimodal set of evidenced-based interventions that seemed feasible at this site were chosen, and the site facilitator was supportive of implementing these in an effort to decrease hesitancy and improve vaccination rates for women who receive care from their clinic.

## Purpose of the Evidence-Based Practice Project

### Purpose Statement and PICOT Question

The purpose of this EBP project was to determine if the implementation of a multimodal intervention including a motivational interview, strong provider recommendation, and educational materials will decrease HPV vaccine hesitancy. Specifically, this project will address the following PICOT question: In women in the catch-up population ages 18-26 who are unvaccinated against HPV (P), what is the effect of a multimodal intervention in the form of a motivational interview, including a strong provider recommendation and educational materials (I) compared to clinic standard of care (C), on HPV vaccine hesitancy (O) over a 12-week period (T)?

### EBP Project Description

The proposed project included implementation of a multimodal intervention in the form of a motivational interview, strong provider recommendation, and an educational handout. Eligible participants, women coming in for an appointment aged 18-26 who are not fully vaccinated with the HPV vaccine, were recruited via a chart review. Women who are pregnant or are trying to become pregnant were excluded, but women who are breastfeeding were eligible for participation as recommended by ACOG. The intervention was implemented by the student project leader and the providers at the office, including five nurse practitioners and two doctors. The medical assistants and nurses assisted in the project by providing vaccines to the

participants who wish to get vaccinated, as well as helping the student search the Children and Hoosier Immunization Registry Program (CHIRP) to see if potential participants had been previously vaccinated. The administrative staff was given a list of eligible participants by the student project leader at the beginning of each week and assisted in asking individuals if they are willing to participate in a project regarding the HPV vaccine conducted by a nurse practitioner student. If individuals agreed to participate, they were handed an educational handout from the CDC with information on the HPV vaccine, a demographic form and a Vaccine Hesitancy Scale (VHS) to fill out while waiting for their appointment. Permission to use an adapted form of the VHS for HPV was granted by the creator of the scale (Appendix B). For individuals that agreed to participate, either a provider or the student project leader conducted a motivational interview and strongly recommended the vaccine during the appointment. Following this, the individuals were offered the vaccine at the time of their recruitment and at any subsequent appointments during an eight-week timeframe. The VHS and the demographic form were collected by the student project leader at the end of the appointment. At the conclusion of the 13 weeks, the student project leader conducted a retrospective chart review to determine how many doses of the HPV vaccine, if any, the participants received. The student project leader analyzed the data and is disseminating the findings with the key stakeholders, the site facilitator, the participants and Valparaiso University.

# CHAPTER 2

# EBP MODEL AND REVIEW OF LITERATURE

## Evidence-based Practice Model

### Overview of EBP Model

Evidence-based practice is essential for advanced practice nurses and all healthcare providers to provide quality care, but changing clinical practice can be challenging and complex. Because of this, models have been developed by scholars to guide implementation of EBP. The Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBP) was chosen to guide this project. This model was originally created by a team of nurses and faculty at Johns Hopkins Hospital as a tool for nurses to apply EBP in the clinical setting (Dang et al., 2019). Because this model was created by nurses for nurses, the ease of its use is reflected in the model and is why it was chosen for this project (Dang et al., 2019).

The JHNEBP model has a linear design that begins with an inquiry related to a problem in the clinical setting (Dang et al., 2019). This curiosity about a problem initiates the Practice Question, Evidence, Translation (PET) process (Dang et al., 2019). Though linear, the PET process was designed as an open system so that nurses can continually refine the practice question, continue to seek evidence, and translate that into practice (Dang et al., 2019). If new questions arise during the process, a new EBP cycle begins to further refine the question (Dang et al., 2019). Within the three phases of the PET process, there are 18 smaller steps to further guide implementation (Dang et al., 2019). In the practice question phase, the question is refined, a leader of the project is designated and an inter-professional team is formed (Dang et al., 2019). In the evidence phase, a search is performed, evidence is screened, chosen, appraised, summarized, and ready to be translated (Dang et al., 2019). In the translation phase, a plan is created and carried out so that outcomes can be evaluated and disseminated (Dang et al., 2019).

The goal of this JHNEBP model aligns with the objective of this EBP project: to translate best evidence into clinical practice. Human papillomavirus is the most common sexually transmitted disease worldwide, and the HPV vaccine can prevent HPV related health effects, including cancer. The HPV vaccine is safe and recommended by the CDC and healthcare professionals. A Healthy People 2030 goal is to reduce infections due to HPV types prevented by the 9-valent vaccine in young adults, in order to decrease the number of young adults who contract and die from HPV-related cancers in the U.S. However, only about 35% of women in the catch-up population, ages 18-26, are vaccinated (Harper et al., 2023). College students are at a high risk for contracting HPV and its associated diseases, because of the lack of awareness, low vaccination rate, and increased number of exposures in this population. This raises the initial clinical questions: Why aren't young adults getting the HPV vaccine and how can we promote vaccine uptake among this population? The JHNEBP model will guide this project through the PET process in order to answer these practice questions.

## Literature Search

### Sources Examined for Relevant Evidence

A comprehensive search of the relevant literature was conducted by searching the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Joanna Briggs Institute (JBI) EBP database, Cochrane library, Turning Research into Practice (TRIP) medical database, Medline, and PubMed. Additionally, a hand search of the literature was performed by searching the journals Preventive Medicine Reports, American Journal of Preventive Medicine, Journal of Cancer Education, and Vaccine, as well as citation chasing previously selected articles in order to achieve adequate evidence. For all searches the date range was limited from 2018 to 2023 but included slightly different keywords and limiters. For CINAHL, the keywords included: "HPV vaccin*" OR "human papillomavirus" AND hesitancy OR uptake OR refusal AND interven* OR strategy, with the limiters scholarly peer reviewed and English language. While searching both JBI and Cochrane, keywords included: HPV AND hesitancy OR uptake OR

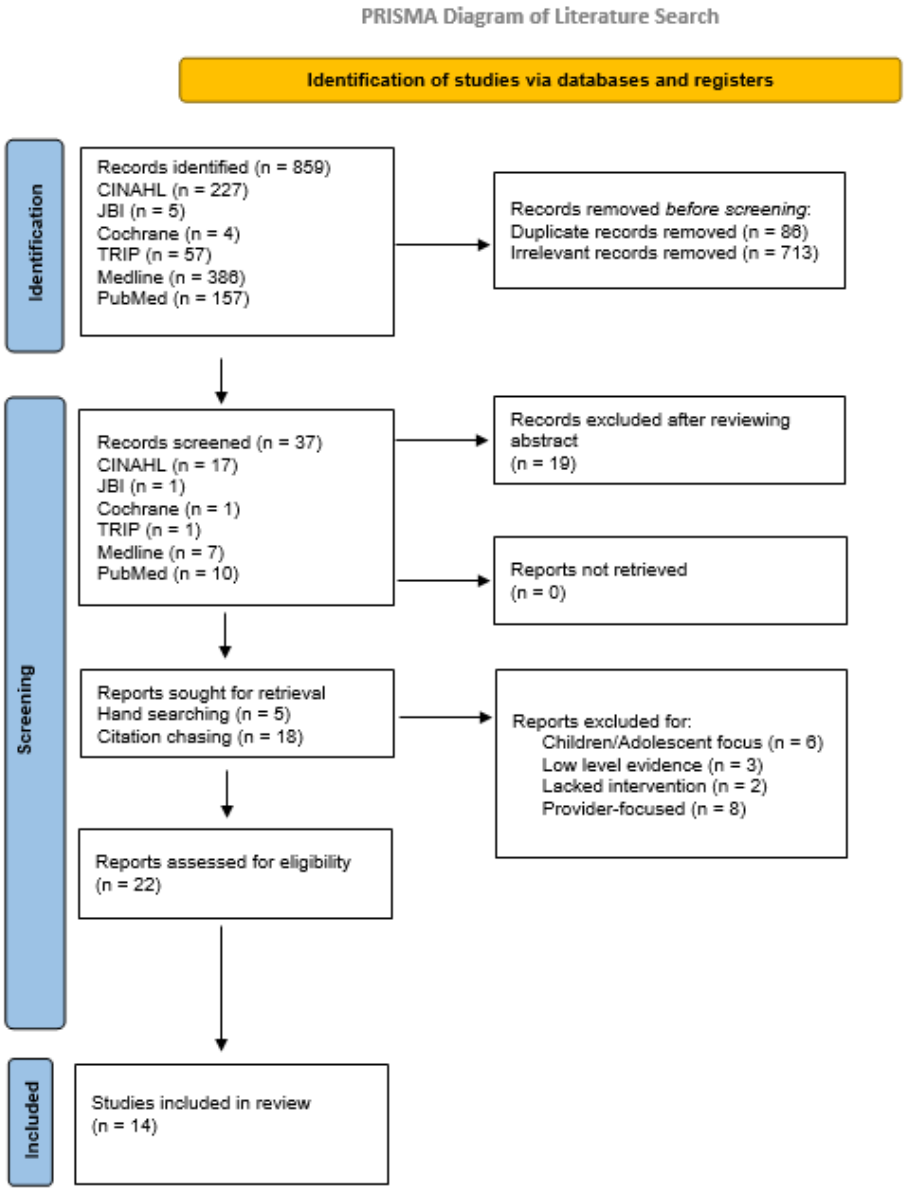
refusal with no additional limiters. While searching TRIP, keywords included: “HPV vaccin*” AND hesitancy OR uptake OR refusal while using guidelines as a limiter. A search of Medline used the keywords and phrases: MM “papillomavirus vaccines” AND hesitancy OR uptake OR refusal AND interven* OR strategy, while using scholarly peer reviewed and English language as limiters. Finally, a search of the PubMed database included the keywords: HPV AND hesitancy OR uptake OR refusal but included additional limiters meta-analysis, systematic review, randomized controlled trial (RCT), and English language. A Valparaiso University research librarian reviewed the literature search and provided feedback to ensure it was exhaustive and inclusive of the total body of evidence. In total, 859 pieces of evidence were initially abstract reviewed for relevance to this project.

After screening the titles in each database, 37 articles were selected for further evaluation using inclusion and exclusion criteria. Articles excluded were those that focused on men, providers, the pediatric population or parents of the pediatric population, those that didn’t include an intervention and those that the interventions included a mandate or changes to policy. Men were excluded because women are the only individuals that receive care at the clinical site in which this project took place. Articles that focused on providers were excluded because patients and patient outcomes are the focus of this project. The pediatric population up to 17 were excluded because of the desire to focus on the population that has the lowest HPV vaccination rates, for which the HPV vaccine is still recommended which is individuals 18-26. Articles that didn’t include an intervention were excluded because of the nature of this EBP project, and articles that contained an intervention that included mandating or changing policy were excluded because of the lack of ability to change or mandate policy for the purpose of this project. A total of 713 articles were originally excluded for these reasons, with some excluded later on in the literature search after further analysis. Articles included for review were those that included an intervention to either increase HPV vaccination uptake or decrease HPV vaccine hesitancy, included and focused on women, and included the young adult or “catch-up”

population. After evaluating the abstracts of these 37 articles, 19 were eliminated using the inclusion and exclusion criteria and 18 were selected for critical appraisal and analysis. As a result of an in-depth evaluation, 4 articles were eliminated due to being lower levels of evidence, resulting in 14 pieces of evidence selected for use in the final literature review. A preferred reporting item for systematic reviews and meta-analyses (PRISMA) diagram of the full literature search can be found below in figure 2.1.

**Figure 2.1**

*PRISMA Diagram of Literature Search*




## Levels of Evidence

Melnyk and Fineout-Overholt's (2019) rating system for the hierarchy of evidence was utilized in the critical appraisal process for this project. This tool levels evidence from I to VII, with level I being the highest and level VII being the lowest (O'Mathuna & Fineout-Overholt, 2019). Higher levels of evidence ensure confidence that similar health outcomes in similar

patient populations will result when interventions are replicated (O'Mathuna & Fineout-Overholt, 2019). All evidence used in this summary was categorized as levels I-III. Level I includes evidence from systematic reviews or meta-analysis of RCTs, or clinical practice guidelines (O'Mathuna & Fineout-Overholt, 2019). Level II includes evidence from at least one well-designed RCT, and level III includes evidence obtained from well-designed controlled trials without randomization (O'Mathuna & Fineout-Overholt, 2019). This review includes four pieces of level I evidence, eight pieces of level II evidence, and two pieces of level III evidence. See table 2.1 to view the level of each piece of evidence chosen for inclusion.

**Analysis and Appraisal of Relevant Evidence**

Following selection and leveling, each piece of evidence was evaluated for quality using the appropriate JBI critical appraisal tool (Barker et al., 2023). Joanna Briggs Institute is a global organization that promotes and supports evidenced-based decisions that improve health, and they have tools to evaluate all levels of evidence (Barker et al., 2023). These tools seek to determine the extent to which a study has addressed the possibility of bias (Barker et al., 2023). The JBI critical appraisal tools were chosen because they are reliable, accessible, and easy to use. The JBI checklist for systematic reviews and research synthesis was used to evaluate the systematic reviews, evidence summaries, and meta-analysis. The JBI critical appraisal tool for assessment of risk of bias for RCTs was used to evaluate the RCTs, and the JBI checklist for quasi-experimental studies was used to evaluate the non-randomized controlled trials. All 14 pieces of evidence included were rated as good to strong quality, and those that were low or poor quality were eliminated. The level of evidence, quality of evidence, and tool used for appraisal can be seen in table 2.1. Additionally, a table detailing each piece of evidence can be found in Appendix A.

**Table 2.1**
*Summary of Evidence*

| Author/Year | Database | Level of Evidence/Type | Quality/Tool |
|---|---|---|---|
| Barnard et al. (2019) | PubMed | II/SR | Strong/JBI |
| Constable et al. (2022) | CINAHL | I/SR | Good/JBI |
| Cory et al. (2019) | CINAHL | II/RCT | Strong/JBI |
| Cotache-Condor et al. (2021) | CINAHL | I/SR & Meta-analysis | Strong/JBI |
| Deshmukh et al. (2018) | Medline | III/NRC | Good/JBI |
| Harper et al. (2023) | CINAHL | II/RCT | Good/JBI |
| Ilozumba et al. (2021) | PubMed | II/SR | Strong/JBI |
| Lott et al. (2020) | PubMed | II/SR | Strong/JBI |
| Ou & Youngstedt (2020) | CINAHL | II/SR | Strong/JBI |
| Rani et al. (2022) | CINAHL | I/SR | Good/JBI |
| Rodriguez et al. (2019) | CINAHL | II/SR | Good/JBI |
| Sacca et al. (2023) | CINAHL | II/SR | Good/JBI |
| Valdez (2022) | JBI | I/Summary | Strong/JBI |
| Wermers et al. (2021) | CINAHL | III/NRC | Good/JBI |

*Note. NRC* = non-randomized controlled trial

## Construction of Evidence-based Practice

### Synthesis of Critically Appraised Literature

The CDC (2022), AAP (2023), National Cancer Institute (NCI)(n.d.), and ACOG (2020) recommend routine vaccination with the HPV vaccine at ages 11-12, and up to age 26. As a nation the U.S. is well below the goals for HPV vaccination among young adults, and a plethora of studies have been conducted to investigate vaccine hesitancy and if there are effective interventions to decrease hesitancy and increase vaccination uptake. Vaccine hesitancy and vaccination uptake were the two main outcomes consistent across the evidence included in this literature review. Varying types of interventions have been trialed by investigators and can be identified in the literature. The most common interventions noted within the literature reviewed include provider communication strategies, theory-based interventions that target behavioral

change, patient reminder and recall systems, educational materials, and combined multi-modal interventions.

### *Provider Communication Strategies*

There is thought that promoting the HPV vaccine at a young age has the potential to promote sexual intercourse and has driven parents to be hesitant to vaccinate their children with the HPV vaccine (Barnard et al., 2019; Constable et al., 2021; Rani et al., 2022). Because of this, health care clinicians have been hesitant to recommend the vaccine due to anticipated resistance from parents (Barnard et al., 2019; Constable et al., 2021; Rani et al., 2022). In studies exploring reasons for vaccine hesitancy, lack of strong provider recommendation has been cited consistently. Many patients have a lot of trust in their providers, so their actions and endorsement have been shown to influence decisions such as the decision to vaccinate against HPV. Therefore, it is logical that a strong provider recommendation has the ability to increase vaccination rates. A systematic review that included 22 RCTs and evaluated the effectiveness of a strong provider recommendation found a statistically significant trend of higher vaccine uptake with strong recommendation (Constable et al., 2021). A quasi-experimental study carried out at an OBGYN office employed strong provider recommendation as part of a larger bundled intervention, which resulted in a statistically significant change in the trend of women initiating and completing the HPV vaccine series (Deshmukh et al., 2018). Of note, in this study other interventions in the bundle included designating physician and nurse champions, empowering nurses to recommend immunization, pre-screening patients' charts, providing no-cost vaccinations, placing prompts in clinic note templates, and eliminating the requirement of a pre-vaccination pregnancy test (Deshmukh et al., 2018). A strong provider recommendation is the most effective provider communication strategy employed to increase HPV vaccination rates (Barnard et al., 2019; Constable et al., 2021; Deshmukh et al., 2018; Rani et al., 2022; Rodriguez et al., 2018; Wermers et al., 2021).

Another communication strategy used often is motivational interviewing, though there have been mixed results. Motivational interviewing is defined as a “collaborative communication style for strengthening a person’s own motivation and commitment to change” (Bader and Hassan, 2023). As opposed to recommendation and education alone, motivational interviewing prioritizes patient’s values and understanding by employing open-ended questions, reflective listening, understanding, affirming, and empowering the patient. This communication style has proven to be effective for a number of health-related behaviors when successfully carried out by providers (Constable et al., 2021; Wermers et al., 2021). Four studies have evaluated the effectiveness of motivational interviewing in relation to HPV vaccination and were found to be associated with increased HPV series initiation and completion, though three of the four studies were of lower quality (Constable et al., 2021). However, in those same studies, clinician acceptance was measured and motivational interviewing has been perceived by clinicians to be a successful strategy that they recommend for further implementation (Constable et al., 2021; Wermers et al., 2021). In another recent quasi-experimental study from 2019, motivational interviewing was shown to have no effect on the initiation and completion of the HPV vaccination series (Wermers et al., 2021). Though motivational interviewing has been around for a long time, the use of it to increase HPV vaccination is a newer strategy, and more research is currently recommended.

Another communication strategy that has support in the literature is the presumptive style of education, also called the announcement approach, which is essentially the opposite of motivational interviewing (Constable et al., 2021). This approach involves stating that one is due or eligible for a vaccine at the time of their visit, and that the vaccine is routine and recommended (Constable et al., 2021). This approach is often used in the pediatric population as providers are taught to educate parents at 11-year-old well child visits that their child is due for a bundle of 3 vaccines: HPV, meningococcal, and tetanus, diphtheria, and pertussis (TDAP). When bundled, the hope is to help parents understand that the HPV vaccine is routine like the

other two vaccines recommended for this age group (MVC4 and TDAP) that parents might be more familiar with. In a systematic review containing 17 studies, 16 were found to have a consistently increased vaccine uptake with the use of a presumptive communication strategy (Constable et al., 2021). Interestingly, initiation of the vaccine series was significantly higher than completion of the series using this approach, whereas motivational interviewing showed a higher rate of series completion in the same systematic review (Constable et al., 2021).

Provider communication strategies have been well-studied in the adolescent population and their parents more so than the young adult population. However, studies that have been conducted on the catch-up population have reflected results of those conducted in the adolescent population. In other words, interventions that have shown success in the adolescent population have also been successful in the less-studied young adult population. When it comes to provider communication strategies, strong provider recommendation, motivational interviewing, and presumptive communication are communication styles employed by clinicians that have potential to increase HPV vaccination uptake, with strong provider recommendation being the most effective (Barnard et al., 2019; Constable et al., 2021; Deshmukh et al., 2018; Rani et al., 2022; Rodriguez et al., 2018; Wermers et al., 2021).

### *Theory-Based Interventions*

Interventions grounded in nursing theories have also shown promising results. Advanced practice nurses (APN's) understand that theories have the ability to provide structure, organization and a systematic approach to a study or project in order to understand one concept in relation to another. Practice and theory are closely related and each can inform the other. The Health Belief Model (HBM), the Theory of Planned Behavior (TPB), and the Transtheoretical Model (TTM) are among the most common health promotion theories used to increase HPV vaccination uptake in the catch-up population, though many others have been used as well (Cotache-Condor et al., 2021; Harper et al., 2023; Ou and Youngstedt, 2022; Rani et al., 2022; Sacca et al., 2023). In a recent systematic review, each of the HBM constructs including

perceived barriers, perceived benefits, perceived severity, perceived knowledge and cues to action were significant predictors of HPV vaccination uptake (Sacca et al., 2023). The TPB constructs including subjective norms, self-efficacy, and vaccine cost were also key predictors of vaccine uptake in the catch-up population, suggesting efficacy of interventions based on the TPB (Sacca et al., 2023). In another systematic review that included both studies that had theoretical basis and ones that did not, theoretically driven interventions in general were found to be more effective that those that were not (Ou & Youngstedt, 2022). An additional RCT not included in these systematic reviews showed a significantly higher vaccine series completion rate when using a TPB based educational intervention compared to an educational intervention not grounded in TPB, 44.9% and 2.8% respectively (Harper et al., 2023). This is supported in another study in which an educational video grounded in the behavioral health theory led to a significant increase in vaccine series completion in the intervention group compared to the control (Rani et al., 2022). However, a level I systematic review and meta-analysis of 20 RCT's conducted in 2022 found that applying a theoretical framework to HPV vaccine uptake was associated with an odds ratio (OR) of 1.60, however this was not statistically significant at the 95% confidence interval (Cotache-Condor et al., 2021). This same review found that the HBM was the most successful framework among the catch-up population (Cotache-Condor et al., 2021). Health promotion theories provide guidance when designing and implementing HPV vaccination interventions, but results of theoretically based interventions are mixed and therefore more research is needed.

### *Patient Reminder and Recall Systems*

An additional strategy that has merit for increasing HPV vaccination uptake in the young adult population is simply reminding patients that they are due for the vaccine, whether that is by text-messaging, email, phone call, voice mail, mail, or even in person (Barnard et al., 2019; Ilozumba et al., 2021; Lott et al., 2020; Valdez, 2022). An evidence summary conducted in 2022 found that current best practice in primary care is to recommend patient reminder and recall

systems be implemented to improve immunization coverage (Valdez, 2022). Telephone reminders and letter reminders are preferred; however, interventions should be tailored to each office and the feasibility of implementing the reminder system (Valdez, 2022). An additional systematic review found that text messaging and telephone reminders increase vaccination uptake, with the majority of studies in this review showing statistical significance (Ilozumba et al., 2021). This is echoed in an additional review in which studies with a reminder component were associated with an increase of 3.7-37.4% series completion, however only one of these studies evaluated a reminder system alone (Lott et al., 2020). A systematic review that focused on specifically college students found that the intervention with the highest vaccination rates included monthly reminders to students (Barnard et al., 2019). An obvious limitation to this intervention in all of these pieces of evidence is that recall and reminder systems are rarely evaluated alone (Barnard et al., 2019; Ilozumba et al., 2021, Lott et al., 2020; Valdez, 2022;). However, they have shown statistically significant increases in vaccination uptake when compared to interventions without reminder systems, and therefore are recommended if bundling interventions to increase HPV vaccination uptake in the young adult population.

***Educational Materials***

The HPV vaccine is newer in comparison to many other routine vaccinations recommended by the CDC, and therefore many parents and young adults aren't well educated on the need, risks, and benefits of the vaccine. Majority of the studies included in this review have an educational component to them, because studies have shown that lack of knowledge is a barrier to vaccination (Barnard et al., 2019; Cory et al., 2019; Harper et al., 2023; Lott et al., 2020; Ou & Youngstedt, 2022; Rani et al., 2022; Rodriguez et al., 2018; Sacca et al., 2023). Educational materials are often provided in combination with a theoretical model, which have been more effective than those that use education alone (Harper et al., 2023; Ou & Youngstedt, 2022; Rodriguez et al., 2018; Sacca et al., 2023). For the studies that use education not based in a behavior-change theory, educational materials often come in the form of a video at

community events, or handouts at individuals appointments with provider education and recommendation during appointments (Barnard et al., 2019; Cory et al., 2019; Lott et al., 2020; Rani et al., 2022). Community intervention studies that take place at either community events or schools and colleges have shown that peer and expert led educational interventions have more of an increase on HPV vaccination uptake than expert led educational materials alone, especially in the young adult population (Barnard et al., 2019; Rani et al., 2022; Rodriguez et al., 2018). This phenomenon has been cited over and over in the young adult population even in the lower levels of evidence that were not included in this review, as peer acceptance is a big factor for young adults (Barnard et al., 2019; Rani et al., 2022; Rodriguez et al., 2018). Educational materials are an important part of any intervention regarding intent to increase HPV vaccination uptake in the young adult population.

***Combined Multimodal Interventions***

When reviewing the literature for this review, multimodal interventions or combined interventions using two or more strategies for uptake is currently cited for current evidence-based practice, though again more evidence exists to support this in the 11-18 year old population (Barnard et al., 2019; Ilozumba et al., 2021; Rani et al., 2022; Valdez, 2022; Wermers et al., 2021). Two studies included in this review cite multimodal interventions as best practice for increasing HPV vaccination uptake (Deshmukh et al., 2018; Rodriguez et al., 2018), while majority of others cite a combination of at least two interventions being the most successful in their reviews or studies (Barnard et al., 2019; Ilozumba et al., 2021; Rani et al., 2022; Valdez, 2022; Wermers et al., 2021). Two studies used a combination of peer and expert recommendations (Barnard et al., 2019; Rani et al., 2022). Three studies used a combination of education, either from a provider or in the form of educational materials, and reminders, either through text-messaging, calls, or mailing (Deshmukh et al., 2018; Ilozumba et al., 2021; Rodriguez et al., 2018). Two studies that used both patient and provider reminders were also effective at increasing vaccination uptake (Deshmukh et al., 2018; Valdez, 2022). The literature

suggests a combination of interventions because different offices face different barriers to uptake, and a combination of interventions that target site-specific barriers might be most effective.

**Recommendation for Best Practice**

Based on the synthesis of evidence, current best practice for increasing HPV vaccination uptake in the young adult population is a combination of interventions targeting barriers to uptake (Barnard et al., 2019; Deshmukh et al., 2018; Ilozumba et al., 2021; Rani et al., 2022; Rodriguez et al., 2018; Valdez, 2022; Wermers et al., 2021). A strong provider recommendation is essential for increasing uptake in this population, using either a motivational interview or presumptive style of communication (Barnard et al., 2019; Constable et al., 2022; Deshmukh et al., 2018; Rani et al., 2022; Rodriguez et al., 2018; Wermers et al., 2021). Educational materials should be included as lack of education is the biggest barrier in this age group (Barnard et al., 2019; Cory et al., 2019; Harper et al., 2023; Lott et al., 2020; Ou & Youngstedt, 2022; Rani et al., 2022; Rodriguez et al., 2018; Sacca et al., 2023). Reminder and recall interventions can be included if feasible, as they have shown success when combined with other strategies but not alone (Barnard et al., 2019; Ilozumba et al., 2021; Lott et al., 2020; Valdez, 2022). Similarly, theoretical based interventions have mixed results and are not necessary to include in interventions but may pose some benefits when implementing strategies for HPV vaccination uptake. Because many different types of interventions have merit in terms of increasing HPV vaccine uptake, a combination of any of these interventions is recommended based on the obstacles that each site faces regarding low HPV vaccination rates.

# CHAPTER 3

# IMPLEMENTATION OF PRACTICE CHANGE

This EBP project included implementation of a multimodal intervention consisting of a motivational interview, strong provider recommendation, and educational handout in order to decrease HPV vaccine hesitancy. This project was implemented by the student project leader with the help of the site facilitator and providers. Results of the EBP project were recorded, analyzed, and disseminated with the clinical site as well as Valparaiso University.

## Participants and Setting

This project was implemented in a rural outpatient OBGYN clinic in Howard County, IN, which is part of a large healthcare organization that spans the Midwest. Along with the student project leader, stakeholders that participated in implementation of the practice change included three nurse practitioners with 4-15 years of experience, three medical assistants, and the office manager. Participants who were recruited include women aged 18-26 presenting for any type of visit already scheduled at the clinic who were not pregnant or trying to become pregnant women and had not been fully vaccinated with the HPV vaccine. This was determined by a chart review in the EMR. Women who are breastfeeding were eligible to participate. Participants were recruited by the doctor of nursing practice (DNP) student with help from the staff.

### Pre-Intervention Group Characteristics

Pre-intervention group characteristics were collected using the demographic form and additional chart review if needed. The demographic form can be found in Appendix D. Information collected on the demographic form includes name, age, level of education, ethnicity, health insurance status, sexual intercourse, number of sexual partners, protection from STIs, marital status, compliance with other routine childhood vaccines, and previous HPV vaccine history. The average age of participants was 23.5, and majority of participants were white. About half of the participants had achieved a high school diploma as their highest level of

education, whereas half had achieved an associate's or bachelor's degree. All participants had health insurance, and all participants had been sexually active before. All participants only had 1 sexual partner in the past year with the exception of one participant that did not respond, and the method of protection from STIs varied. About half of the participants were dating or married, whereas the other half were single. Overall, this was a demographically homogeneous sample.

## Intervention

At the beginning of project planning, the student project leader met with the site facilitator, a key stakeholder, regarding project ideas based on what improvements are needed in patient care at this healthcare facility. Together, the student leader and site facilitator brainstormed some ideas and eventually settled on HPV vaccine hesitancy, based on the extremely low rates of vaccination at the clinic as previously mentioned. The student project leader searched the literature to find best practice and took this information back to the site facilitator to discuss how the intervention could be implemented in the office. The clinical workflow of the office was evaluated, and a plan for implementation aligning with the Valparaiso University calendar was created. The project was composed of implementation of a multimodal intervention consisting of a motivational interview, strong provider recommendation, and an educational handout.

The site facilitator wanted all providers to be involved in implementing the intervention, and assured the student that the administrative staff were willing to help with recruitment as well. Just prior to the project starting, the student project leader educated key stakeholders on the project and Motivational Interviewing using a PowerPoint. This PowerPoint can be found in Appendix J. Educational handouts about motivational interviewing were given to the providers for reference throughout the project if needed and can be found in Appendices F through I. Contact information of the student project leader was given to everyone participating in the project as well. The student project leader created a list each week of eligible participants to give to the staff. If the participant agreed to participate in the project, they were handed two

forms to fill out: a vaccine hesitancy scale and a demographic form, as well as a CDC informational handout on HPV on the HPV vaccine. These were collected by the provider performing the intervention. At some point during the appointment, the provider conducted a motivational interview and strongly recommended the vaccine to the participant. The participant was then offered the HPV vaccine. Each participant's name was collected on their forms and their forms were kept in a locked cabinet at the clinical site. In late January about six weeks after the end of the project, the student project leader went back through charts to see if any participants went back to receive the vaccine in the month following the appointment.

The two forms that participants were given to fill out include a vaccine hesitancy scale, which measured their hesitancy prior to the intervention, and a demographic form created by the student project leader. The Vaccine Hesitancy Scale (VHS) is the most widely used, credible and reliable scale to measure vaccine hesitancy, though many exist (Szilagyi et al., 2020). A modified version of this scale was created by Szilagyi et al. (2020) to assess HPV vaccine hesitancy specifically. Permission was granted by the corresponding author, Peter Szilagyi, to use this scale in this project, adapted for young adults. This scale can be found in Appendix C. This email correspondence can be found in Appendix B. The second form, the demographic form, was created by the student project leader and includes demographics that were collected in evidence from the literature search. These demographics include age, highest level of education, ethnicity, health insurance status, sexual intercourse, number of sexual partners in the past year, protection against STIs, and marital status. These demographics are important to collect because they have shown correlation with uptake or lack thereof in previous studies included in the literature review. This demographic form can be found in Appendix D.

## Comparison

The comparison group were women 18-26 years old who visited the clinic in the 13 weeks before implementation of the intervention. These participants were receiving routine standard of care for the clinic regarding the HPV vaccination, which was simply offering the HPV

vaccine if a reminder populated on the EHR and the patient was not vaccinated. The number of persons vaccinated during the 13 weeks prior to the intervention acted as a comparison for the intervention group, which was 27 patients. In the literature, it is estimated that 35% of women in the 18-26 year age group are fully vaccinated against HPV (Harper et al., 2023).

## Outcomes

The primary outcome evaluated was vaccine hesitancy. This was measured using scores from the VHS obtained prior to the intervention, and a chart review of participants who received the vaccine and those who did not following the intervention. The goal of the project was to decrease HPV vaccine hesitancy, both in the participants and in the population overall at the clinic. Data was collected on the HPV vaccination rate at the clinic prior to starting the project and was compared to the vaccination rate during the project, though this is a secondary outcome. At the completion of the project, the student project leader analyzed the data collected. This data was analyzed using descriptive statistics and a Fisher's exact test to measure if there was a decrease in vaccine hesitancy.

The original vaccine hesitancy scale (VHS), from which the vaccine hesitancy scale for HPV was adapted, was created by the World Health Organizations Strategic Advisory Group of Experts (SAGE) on immunizations. The original VHS has been adapted for many different vaccines, most recently the COVID-19 vaccine. The validity and reliability of the instrument has been tested repeatedly among different vaccines it is adopted for as well as in many different countries. In the most recent assessment of the scale by Shapiro et al. (2018), it was found to have two factors that have construct and criterion validity in identifying vaccine hesitancy. In another study evaluating the reliability and validity of the scale, the intra-class correlation coefficient (ICC) was .8, meaning there is acceptable reproducibility (Ledda et al., 2022). The internal consistency ranged from .7-.95, which was calculated using a Cronbach's alpha coefficient test, also showing good internal consistency (Ledda et al., 2022). The scale content of validity index was .90, indicating good validity of the tool (Ledda et al., 2022). Despite the lack

of investigation of the reliability and validity of the VHS scale adapted to the HPV vaccine, the widespread use of the scale along with the previously tested reliability and validity measures makes it a trusted choice to measure vaccine hesitancy. Once the VHS and demographic forms were collected by the provider and placed in the locked filing cabinet, they were retrieved and analyzed by the student project leader prior to running statistical tests.

### Time

Implementation of the project started August 30st, 2023 and enrollment of participants continued through November 30, 2023. Participants were enrolled for a total of 13 weeks. The start date was chosen because it was the first full week in which the student was allowed to start implementing the project. Additionally, it was after the meeting in which the student project leader educated providers about the project. Refer to Appendix K for a timeline of implementation.

## Protection of Human Subjects

Protection of participants and their data were a priority throughout the entirety of the project. Research ethics training was completed by the student project leader on March 27, 2023 through the Collaborative Institution Training Initiative (CITI) as required by Valparaiso University. The course completed was titled Social Behavioral Educational Researchers, and a copy of this course completion certificate can be found in Appendix E. Additionally, the Valparaiso University Human Subjects Research Determination form was filled out by the student project leader, and it was determined that this project is exempt from institutional review board (IRB) approval. This project did not require IRB approval through Ascension St. Vincent, and this exemption form can be found in Appendix L. As mentioned, all patient information was kept in a locked cabinet and a password protected excel sheet in order to protect patient health information. Once data was aggregated together, all patient health information on paper was shredded and disposed of, and all patient health information on the computer was deleted at the end of the project. All data reported is in aggregate format and no identifying information will be

shared when disseminating findings. Participants were informed of potential allergic reactions to the vaccine prior to vaccination, what to do if they have symptoms, and where they can report adverse reactions including the Vaccine Adverse Event Reporting System (VAERS) and the National Vaccine Injury Compensation Program (VICP).

# CHAPTER 4

# FINDINGS

This EBP project was created to determine the effect of a multimodal intervention on HPV vaccine hesitancy for young adult women. This project also evaluated the overall vaccination rates at the clinic prior to, during, and after implementation of the intervention to determine if the project had an effect on HPV vaccination rates. Following the literature search, it was determined that motivational interviewing, education, and strong provider recommendation were effective interventions to decrease vaccine hesitancy, but the efficacy of these interventions had not been tested on the young adult population compared with the adolescent and parental populations. Average vaccine hesitancy scores were compared to participants' vaccination status post-intervention to determine if vaccine hesitancy decreased. A statistical analysis was performed on the project outcomes to determine the significance of the results.

## Participants

A total of 11 participants participated in this project. Because the intervention did not require any follow-up, no participants were lost to attrition. The majority of participants in this project were Caucasian (90.9%) and the mean age was 23.4 years. All demographic information of participants can be found below in Table 4.1. Demographic information was unable to be collected on women at the clinic as a whole prior to the intervention due to the nature of the EHR as well as privacy concerns from the Ascension IRB approval team, so it is unknown if this sample is representative of the entire clinic patient population.

Providers involved in the project included three nurse practitioners, three medical assistants, and one office manager. One of the nurse practitioners was heavily involved in assisting with the development of the project and any changes that needed to be made. The medical assistants were helpful in recruiting participants. The office manager was helpful in

getting access to the EMR, obtaining IRB exemption, and providing clinic data to assist in determining clinical significance. Two providers at the office did not participate in the project for multiple reasons: they were not available when training for the project took place, the student project leader was not at the clinic on days that they were present to encourage participation, and they had too many commitments that prohibited them from participating.

**Table 4.1**
*Participant Demographic Data*

| | Level | Overall |
|---|---|---|
| Age (mean (SD)) | | 23.4 (2.02) |
| Education (%) | High School Diploma | 6 (54.5) |
| | Associate's Degree | 2 (18.2) |
| | Bachelor's Degree | 3 (27.3) |
| Ethnicity (%) | White | 10 (90.9) |
| | African American/Black | 1 (9.1) |
| Health insurance (%) | Yes | 10 (100) |
| Sexual intercourse (%) | Yes | 10 (100) |
| Number of partners (mean) | | 1 |
| Use of condoms (%) | Yes | 6 (54.5) |
| | No | 5 (45.5) |
| Monogamy (%) | Yes | 4 (36.3) |
| | No | 7 (63.6) |
| Long-term relationship (%) | Yes | 5 (45.5) |
| | No | 6 (54.5) |
| Any method of protection (%) | Yes | 8 (72.7) |
| | No | 3 (27.3) |
| Marital status (%) | Single | 6 (54.5) |
| | Dating | 3 (27.3) |
| | Married | 2 (18.2) |
| Childhood vaccines (%) | Yes | 9 (81.8) |
| | No | 2 (18.2) |
| Previous HPV vaccine (%) | No | 5 (45.5) |
| | Unsure | 6 (54.5) |

## Changes in Outcomes

The primary outcome collected was vaccine hesitancy, which was measured using scores from the VHS prior to the intervention and comparing these to each participant's vaccination status post-intervention. The VHS used can be found in Appendix C and includes nine statements that participants scored on a likert scale from the following options: strongly agree, somewhat agree, somewhat disagree, and strongly disagree. Each of these answers were given a score and the average of all scores was determined. It was determined by the creators of the scale that an average score above 3 correlated with being vaccine hesitant (Szilagyi et al., 2020). If the participant received the vaccine post-intervention, they were no longer vaccine hesitant. However, if they did not receive the vaccine, they were still deemed to be vaccine hesitant. The averages of these scores can be seen below in Table 4.2. A Cronbach's alpha was calculated for the VHS to determine the level of internal consistency for the scale. It was found that the Cronbach's alpha was .714, indicating that the adapted version of the VHS used in this project had high reliability and internal consistency. When the version of this scale that was not adapted for adults but rather used for parents of children was tested using Cronbach's alpha, the internal consistency ranged from .7-.95, aligning with the Cronbach's alpha calculated for this project. Demographic information included in Table 4.1 was originally collected to determine if any of the demographic variables had any correlation to vaccine hesitancy; however, this was not able to be determined as not enough individuals participated in the project.

**Table 4.2**
*Participant Vaccine Information*

| | Level | Overall |
|---|---|---|
| Vaccine hesitancy score (mean (SD)) | | 2.1 (.56) |
| Vaccine hesitant (%) | No | 1 (9.1) |
| | Yes | 10 (90.9) |
| Vaccinated post-intervention (%) | No | 9 (81.8) |
| | Yes | 2 (18.2) |

## Statistical Testing and Significance

For data entry and statistical analysis, SPSS software was utilized. The statistical test used to determine if there was a statistically significant decrease in vaccine hesitancy from pre to post intervention was a Fisher's exact test. This is an extension of Pearson's Chi square test, but Fisher's exact is often used for smaller sample sizes. Additionally, a Cronbach's alpha was calculated to determine the reliability and internal consistency of the VHS. Finally, basic descriptive statistics were used to determine the percent increases in the number of individuals vaccinated during the pre, intervention, and post-intervention phases.

## Findings

The primary outcome of this project was vaccine hesitancy. Pre- and post- intervention data were evaluated and were not found to be statistically significant. The secondary outcome of interest was vaccination rates at the clinic during and after the project.

### *Primary Outcome*

**HPV Vaccine Hesitancy.** Using the Fisher's exact test, it was found that patients in the post-intervention period are at 1.1 times more likely (95% CI of 0.79 to 1.54) to receive a vaccine as patients in the preintervention period, however this was not statistically significant (P-value=1.000; Fisher's exact test). The number needed to treat (NNT) was 12 patients, meaning that 12 patients must be "treated" with the intervention rather than not receive the intervention

for one additional patient to benefit. Ninety-one percent of the participants (n=10) were hesitant to be vaccinated with the HPV vaccine prior to the intervention as measured by the VHS. After the intervention, two participants (18%) were vaccinated. Statistics for the primary outcome can also be viewed below in table 4.3.

**Table 4.3**
*Statistical Testing*

| | Level |
|---|---|
| P value | 1.00 |
| Confidence interval | .79 to 1.54 |
| Number needed to treat | 12 |

### *Secondary Outcome*

**Vaccination Rates.** The overall vaccination rate of individuals who participated in this project was 18%. However, during the 13-week implementation of this project, there were a total of 31 individuals vaccinated with the HPV vaccine. In the 13 weeks prior to the project, there were a total of 27 individuals vaccinated with the HPV vaccine. This is a 14.8% percent increase from prior to the project. In the 13 weeks after this project, there were a total of 33 individuals vaccinated with the HPV vaccine. This is a 6.5% percent increase from during the project. Overall, there was a 22% percent increase from the period before to the period after the intervention. Because of these increases in HPV vaccination in the clinic during and after implementation, it was determined that this project was clinically significant. Long-term sustainability of the interventions will be discussed later on. Statistics for the secondary outcome can also be viewed below in table 4.4.

**Table 4.4**
*Vaccination Rates*

| | n | Percent increase from prior period (%) |
|---|---|---|
| 13 weeks prior | 27 | |
| 13 weeks during | 31 | 14.8 |
| 13 weeks after | 33 | 22 |

# CHAPTER 5

# DISCUSSION

The purpose of this EBP project was to explore and implement evidence-based interventions for decreasing HPV vaccine hesitancy to see if they were effective in the population of young adult women aged 18-26. Additionally, demographics were collected on these patients to determine if any certain demographic had an effect on vaccine hesitancy; however, this was not able to be determined as not enough individuals participated in the project and the data collected did not meet the assumptions necessary to run the statistical tests. Ideas for demographics to collect that might have an impact on vaccine hesitancy were taken from similar studies in the review of literature. This chapter will discuss and interpret the primary and secondary outcomes of the project, identify its strengths and limitations, as well as draw any potential connections to studies in the review of literature. Additionally, the relevance and use of the EBP model used to guide this project will be discussed. Finally, sustainability of the practice change and suggestions for future research and education will be outlined.

## Explanation of Findings

Overall, this project supports the use of a multi-modal intervention including educational materials, strong provider recommendation, and motivational interviewing as a means of decreasing HPV vaccine hesitancy in the young adult population. Though results from the Fisher's exact test did not show statistical significance, clinical significance can be deduced from secondary outcomes. As a reminder, many different strategies have been trialed in the literature including provider communication strategies like strong provider recommendation, motivational interviewing, and presumptive communication styles; theoretical based interventions such as those based on The Health Belief Model (HBM), the Theory of Planned Behavior (TPB), and the Transtheoretical Model (TTM); reminder and recall interventions such as text-messaging, email, phone call, voicemail, mail, or even in person reminders; educational

interventions, and a combination of multiple types of interventions used in the same study. The interventions in this project were chosen based on the effectiveness in the literature, as well as discussions with the clinic staff about what was most feasible in their office.

**Primary Outcome**

Overall, individuals were highly hesitant to get vaccinated with the HPV vaccine, as evidenced by their scores on the VHS as well as their dialogue from the motivational interviews. There was a 10% decrease in individuals who were vaccine hesitant before and after the intervention, though both numbers were still high at 90.9% and 81.8% respectively. This did not come as a surprise as it is known that the area the clinic is in is a highly vaccine hesitant area in general. Though the overall HPV vaccination rate for the U.S is 61.4%, this number drops to 55% for Indiana, and an astounding 5.2% for Howard County, which is the area in which the project took place. Of note, one of the individuals that received the HPV vaccine immediately after the intervention was not vaccine hesitant prior to the intervention, while the other individual who got vaccinated was highly vaccine hesitant prior.

The purpose of this project was not to find out why individuals are so hesitant to get vaccinated but more so to explore efficacious interventions to decrease hesitancy. However, dialogue from motivational interviews as to why individuals are hesitant to get vaccinated were collected and can help contribute to future research. Multiple individuals that participated and were interviewed do not feel they are at high risk of contracting HPV now or in the future and therefore did not see benefit in receiving the vaccine. Many individuals were unsure if they had previously received the vaccine and therefore did not want to get an additional dose if they already had. These individuals did not follow up at the clinic in the post-intervention period. Some individuals voiced skepticism about what is really in the vaccine and that prevented them from getting vaccinated. One individual mentioned she had friends who got dizzy from the vaccine which was the reason why she did not want to get it. Finally, many mentioned that they

would think about getting it but were not ready to get it immediately following the interview because they needed to do more research on their own.

**Secondary Outcome**

Though individuals were 1.1 times more likely to get the vaccine after the intervention, uptake of the vaccine immediately following the intervention for participants was not high. Only two individuals decided to get the vaccine immediately after the intervention, or in the 13-week period after the intervention in which a chart review was conducted. It is suspected that this is due to a multitude of reasons. First, there was no follow-up included in this project. This was chosen because it aligned with the literature that reminder and recall interventions typically didn't decrease HPV vaccine hesitancy and increase uptake at a statistically significant level (Ilozumba et al., 2021; Lott et al., 2020). However, after talking with providers at the office, that might have increased uptake in this population. Second, many individuals voiced their apprehension after the education and interview and mentioned that they would like to do more research on their own prior to deciding if they want to get vaccinated. Third, many individuals were unsure if they had been previously vaccinated with the HPV vaccine, given that the recommended age for vaccination is between 11-12 years. All participants responded "no" or "unsure" when asked if they had ever been previously vaccinated with an HPV vaccine. As mentioned earlier, CHIRP is an Indiana vaccine registry that was searched for each participant prior to enrolling them in the project. However, participants still wanted to verify their vaccination status prior to getting vaccinated. Furthermore, following the education and interview, many individuals enrolled in the project believed they were not at high risk after learning about the high-risk populations and therefore did not think the vaccine would benefit them. Of note, 45.5% of participants responded that they were in a long-term relationship and the average number of sexual partners for each participant was one. A combination of these factors is believed to have contributed to the low uptake of the vaccine in the post-intervention period.

Regardless of the small number of individuals that received the vaccine immediately following the intervention, uptake of the vaccine at the office as a whole since introduction of the project has been on the rise. There were five more individuals vaccinated in the 13 weeks during the intervention as compared to the 13 weeks prior to the intervention. Similarly, there were two more individuals vaccinated in the 13 weeks after the intervention as compared to the 13 weeks during the intervention. Though slow and steady, a rise is a sign of a positive response to the project. Not all individuals that received the vaccination during the project period were enrolled in the project. The student project leader was not present every day due to competing responsibilities, and not all providers made it a priority to enroll these patients as participants in the project. Regardless, more patients were still vaccinated with the HPV vaccine, which was the ultimate goal.

As a reminder, the standard of care prior to the start of the project was a reminder on the EHR for each patient that is overdue for the HPV vaccination. This red flag is present on their chart and able to be seen at each visit. However, if they have previously declined the HPV vaccine, the flag can be “silenced” and some providers will not ask them if they would like to receive it again, while some will. It is thought that this project heightened awareness to the high HPV vaccine hesitancy and low uptake in the clinic and in the area in general. If this is the case, providers were more likely to remember to offer the HPV vaccine to unvaccinated individuals, therefore increasing the chances of patients getting vaccinated. This is a potential confounding variable.

This project aligns with many studies evaluated in the review of literature in that despite a lack of statistical significance, clinical significance supports an overall positive evaluation of the project. Because the interventions in this EBP project were bundled and not evaluated separately, it is not possible to tell if any single intervention in the bundle had more of an effect on individuals than another. As mentioned, many studies in the review of literature did not reach statistical significance. Vaccine hesitancy and vaccination uptake were the two main outcomes

consistent across the evidence included in the literature review, which were the primary and secondary outcomes of this project. A strong provider recommendation was the provider communication strategy included in this project, which was the most supported provider communication strategy and shown to have the most effect on increasing vaccination uptake in the review of literature (Barnard et al., 2019; Constable et al., 2021; Deshmukh et al., 2018; Rani et al., 2022; Rodriguez et al., 2018; Wermers et al., 2021). Motivational interviewing was another provider communication strategy included in this review. In the review of literature, four studies had evaluated the effectiveness of motivational interviewing in relation to HPV vaccination and were found to be associated with increased HPV series initiation and completion, though three of the four studies were of lower quality (Constable et al., 2021). However, this strategy was still chosen because many providers at the office voiced their interest in the use of motivational interviewing. Additionally, motivational interviewing is gaining a lot of popularity in the literature not just for improving HPV vaccination rates, but for many health promoting behaviors such as smoking cessation and improving vaccination rates of other vaccines. The last component of the intervention, education, is at the cornerstone of every intervention in the review of literature. This is likely because lack of knowledge about the HPV vaccine is the most common reason for individuals not becoming vaccinated, as well as the vaccine being relatively new compared to other recommended vaccines. Education in this bundled intervention came in multiple forms as individuals received documents with information about the vaccine, as well as education from the healthcare provider during the motivational interview. In the review of literature, education was found to be more effective when combined with other interventions (Harper et al., 2023; Ou & Youngstedt, 2022; Rodriguez et al., 2018; Sacca et al., 2023). Though not known for sure, the same is suspected to be true in the bundled intervention used in this project.

A current search of the major databases used in the review of literature including PubMed, CINAHL, Medline, and JBI revealed one new systematic review and meta-analysis

published in 2023 that would have likely been included in the review of literature due to its quality, focus on an intervention, and inclusion of young adult women. Though many other studies have been published regarding the HPV vaccine and vaccine hesitancy in this time period, they did not focus on the young adult population or interventions to combat hesitancy. Instead, the main focus was on adolescents and parents of adolescents. This study conducted by Chandeying and Thongseiratch (2023) compared educational and reminder digital interventions for promoting HPV vaccination update. Five different types of interventions were compared in this study including client reminder, client education plus reminder, provider education, provider reminder interventions, and client education interventions (Chandeying & Thongseiratch, 2023). The first four interventions had statistically significant improvements in HPV vaccine uptake, while client education interventions did not (Chandeying & Thongseiratch, 2023). This was the first study that evaluated solely digital interventions. This study does align with the rest of the review of literature that client education alone is not enough to have a significant impact on HPV vaccine hesitancy or uptake (Chandeying & Thongseiratch, 2023).

## Strengths and Limitations of the DNP Project

### Strengths

There were many strengths to this project. First, a thorough review of literature was conducted both before and after the intervention period. A thorough review of literature allows the most quality and current pieces of evidence to guide the interventions chosen. Second, the project site coordinator was very supportive and engaged throughout the entirety of the project. This support was essential to the success of the project when roadblocks were encountered. Many small changes were required from the planning phase to the implementation phase, and communicating with the project site coordinator whether or not she was on site was essential to ensuring implementation continued to go smoothly. Additionally, the willingness of other staff members, especially the medical assistants, to help with the recruitment process was extremely helpful to the student project leader. Their enthusiasm to contribute to this project was essential

to recruiting enough participants. Furthermore, the simplicity of the project and intervention chosen made it easy for all staff members to understand and implement. Simplicity of an intervention is an important aspect for an EBP project to possess as it lends itself to future sustainability. Finally, statistical evaluation of the project was done in conjunction with a statistician, ensuring the proper tests were performed for data collected. This was also helpful to the student project leader in understanding the correct interpretation of each statistical test.

**Limitations**

There were also limitations to this project. First and foremost, recruitment at the clinical site was quite difficult. This did not come as a complete surprise knowing the level of vaccine hesitancy that exists in the area. This clinic has a high rate of no-shows, and many of the individuals that fit the inclusion criteria and were selected to approach for participation in the project were no-shows. Additionally, the majority of the visits at this clinic were pregnant women which immediately excluded them from the project. Of the patients that were not pregnant, the majority of them were over 26, which also excluded them from the project. Because of this, the pool of individuals to approach for recruitment was rather small. However, of those individuals that were approached, only one declined participation in the project. As mentioned earlier, if the student project leader was able to be at the clinical site every day during implementation, it is likely that by chance more individuals would have participated in the project. Not all providers at the clinic that were originally educated on the intervention were active participants in the project, though supportive of it. Because more time would have allowed for more participation, lack of time to implement the project was also considered a limitation. Additionally, it was not possible to find pre-intervention group characteristics to compare to the post-intervention group characteristics due to the nature of the EHR as well as privacy concerns from the Ascension IRB approval team. Finally, a lack of follow-up or reminder after the initial intervention made it difficult to track if participants received the vaccine anywhere else besides the OBGYN office.

## Sustainability

This project was planned with sustainability in mind so that if it were successful and the staff members liked the change, it would be easy to implement into their current workflow. Currently at the office, there is no structured intervention to increase HPV vaccination, perhaps because there are many outcomes that need improvement, and it is difficult to give so much time and effort to one outcome. Because their current standard of practice already involves providing basic education about the vaccine, taking on this aspect of the intervention would be easy. Some of the providers already gave patients the CDC educational handouts that were provided to them as part of this intervention. There is no current plan to make it mandatory for all providers to offer these handouts when educating their patients. All providers at the office do recommend the vaccine to their patients, but the inconsistency lies in how often it is offered or how strongly their recommendation is. Unfortunately, this is a hard intervention to monitor and collect accurate data on. Motivational interviewing is the third aspect of the intervention that will likely not be sustained at the site. Analysis of this intervention did not show statistically significant outcomes, and not enough providers participated in the intervention to allow them to understand and appreciate its effectiveness. With that being said, the site overall has had an increased awareness of the poor HPV vaccination rates and have made it a priority to identify and educate those that are not vaccinated, which is reflected in the increased vaccine uptake over the past couple of months. Provided the opportunity to redo the project, the student project leader would talk to all providers in the clinic about their willingness to participate in the project before choosing a topic and a project site to ensure active participation to reach the best possible outcomes.

## Relevance for EBP Model

The Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBP) was chosen to guide this project. This model is a tool that individuals can use to help translate EBP into practice (Dang et al., 2019). The central part of this model involves the PET process, which

consists of creating a practice question, searching for evidence, and translating that evidence into practice. The important part of this model and why it was chosen by the student project leader is that it is not a linear process, but rather a cyclic process in which you might have to go back and repeat some steps once you learn more information. This was certainly true when collecting evidence as one new piece of evidence would lead to more evidence, and it was necessary to go back and create new searches to ensure all current evidence available was being considered. This is not easy to do once you are making progress and moving forward, but the model reminds you that it is an essential part of the process. Not only do you have to embrace the cyclic nature of the model when collecting evidence, but also when implementing the best practice intervention into practice. In an EBP project, you are inevitably going to face roadblocks and it will be necessary to adapt the evidence to the setting you are in. The JHNEBP model was helpful in reminding the student project leader that EBP implementation is not a linear process, and one that requires frequent reflection. The student project leader would not recommend making any changes to the model based on this project.

## Recommendations for the Future

Findings from this EBP project contribute to the body of knowledge that exists regarding strategies to decrease HPV vaccine hesitancy and increase uptake. This section will discuss how findings from this project can be used to guide future research and education. These recommendations can be considered for all who choose to research the best evidenced-based strategies for improving HPV vaccination uptake.

### Research

More research is necessary to establish the efficacy of a combined multimodal intervention consisting of education, strong provider recommendation, and a motivational interview. Within the literature, a lot of evidence exists that suggests reasons why individuals are hesitant to receive the HPV vaccine. Some individuals are concerned about the safety of the vaccine and its side effects given that its new compared to other CDC recommended vaccines,

while others believe that it might encourage early sexual intercourse given that it is recommended in the pre-teen years (McKenzie et al., 2023). Others really don't know much about the vaccine at all, which was the most common response from participants in this EBP project. However, not as much research has been done on ways to combat this hesitancy until the past few years. Many different types of interventions have been trialed, and the literature search that took place during this project revealed that current best practice is a combination of interventions targeting barriers to uptake (Barnard et al., 2019; Deshmukh et al., 2018; Ilozumba et al., 2021; Rani et al., 2022; Rodriguez et al., 2018; Valdez, 2022; Wermers et al., 2021). Because of the wide range of interventions that have been trialed in a wide range of settings, not one intervention has proven superior to another. As mentioned above, the multimodal intervention implemented in this project was not statistically significant, suggesting more research is needed to determine if it is efficacious. Though multimodal interventions have shown the most promise in the literature, it might be easier to decipher the most effective interventions when carried out alone. Additionally, more research is needed specifically on the young adult, catch-up population. Going forward, interventions implemented should include a follow-up period after the initial intervention in order to remind and potentially continue to re-educate individuals after an initial interaction.

**Education**

This project provided many opportunities for education. First and foremost, it is important to remember as any healthcare provider, whether a nursing student, nurse, nurse practitioner, etc., to use any face-to-face opportunity possible to educate patients. There are many opportunities for education, and repetition is extremely helpful when educating patients on complex topics such as HPV and its risks. If including educational interventions in future projects, it is recommended to assess for patient understanding to evaluate for effectiveness of the intervention. It is also important to remember that despite our best efforts, patients will ultimately make the decision to do what is in their best interest.

## Conclusion

The HPV vaccine is a safe, effective vaccine that is recommended by the CDC for all individuals starting at age 11 and up to age 45. The vaccine has reduced the worldwide burden of HPV related cancers; however, there is still a great amount of hesitancy that exists regarding the HPV vaccine today. This hesitancy is alarming because there is a high burden of cancer as a result, which is preventable with vaccination. The catch-up population has the highest burden of HPV related cancers and deaths, and therefore was the focus for this project. Research has been conducted to determine why HPV vaccine hesitancy is so high and many theories have resulted. Overall, it is believed that individuals are in need of more education directly from healthcare professionals about HPV and the risks and benefits of vaccination. Further research has been conducted to determine the best approach to decreasing HPV vaccine hesitancy and increasing uptake. This was the purpose of this EBP project. A multimodal intervention that consisted of current best practices was implemented at an OBGYN clinic to determine if a combination of education, motivational interviewing, and a strong provider recommendation decreased hesitancy and increased uptake.

Despite the lack of statistical significance that resulted from this intervention, findings from this EBP project can guide future research. Though vaccine hesitancy did not significantly decrease from before to after the project, data was collected that show individuals are in need of more education regarding HPV and HPV vaccination, especially at an earlier age. Additionally, vaccination rates at the clinic improved during and after the project from prior, suggesting that focusing on educating patients about the HPV vaccine has the ability to increase vaccination rates. This increase also suggests that healthcare providers can have a significant impact on patients when recommending the vaccine, which is also supported in the literature. Findings from this project emphasize the high level of HPV vaccine hesitancy that exists and demonstrate the need for more research regarding effective interventions to decrease HPV vaccine hesitancy.

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## BIOGRAPHICAL MATERIAL

Mrs. Cartales graduated Summa Cum Laude from Valparaiso University with her Bachelor of Science in Nursing in 2021. During her undergraduate studies, she played volleyball for the University and earned numerous academic and athletic awards. Some notable awards that she achieved include two-time Missouri Valley Conference (MVC) Scholar Athlete of the Year, two-time MVC Libero of the Year, Midwest Region National Freshman of the Year, two-time Female Athlete of the Year for Valparaiso University, and on the last game of her career moved up to second all-time in NCAA Division 1 history in digs. However, the award that she is most proud of is becoming the first player in program history to be a Division 1 First Team Academic All-American. During this time, she was also a member of the Sigma Theta Tau International Honor Society of Nursing, participated in undergraduate research with the nursing program, and enjoyed serving the community with her teammates and members of St. Teresa of Avila Catholic Church. After graduating with her bachelor's degree, she began working at St. Vincent Hospital in Indianapolis as a medical-surgical nurse where she currently serves as a preceptor to new nurses and has recently taken on the role of charge nurse. Driven by her love of learning and serving, she immediately decided to further her education and enroll in the doctor of nursing practice (DNP) program at Valparaiso University. She is currently a member of Coalition of Advanced Practice Registered Nurses of Indiana (CAPNI) and was invited to present her EBP project at their annual conference in February. Mrs. Cartales is set to graduate in May of 2024 and is open to any opportunity that will allow her to use her knowledge and skills to serve her community as a family nurse practitioner (FNP).

## ACRONYM LIST

AAP: The American Academy of Pediatrics

ACOG: American College of Obstetricians and Gynecologists

ACS: The American Cancer Society

APN: Advanced Practice Nurse

CDC: Centers for Disease Control

CINAHL: Cumulative Index to Nursing and Allied Health Literature

CITI: Collaborative Institution Training Initiative

DNP: Doctor of Nursing Practice

EBP: Evidence-Based Practice

EHR: Electronic Health Record

FDA: Food and Drug Administration

HBM: Health Belief Model

HPV: Human Papillomavirus

ICC: Intra-Class Correlation Coefficient

IRB: Institutional Review Board

JBI: Joanna Briggs Institute

JHNEBP: Johns Hopkins Nursing Evidence-Based Practice Model

NCI: National Cancer Institute

OBGYN: Obstetrician Gynecologist

OR: Odds Ratio

PET: Practice Question, Evidence, Translation

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

RCT: Randomized Controlled Trial

SAGE: Strategic Advisory Group of Experts

TDAP: Tetanus, Diphtheria, and Pertussis

TPB: Theory of Planned Behavior

TRIP: Turning Research into Practice

TTM: Transtheoretical Model

U.S.: United States

VAERS: Vaccine Adverse Event Reporting System

VICP: National Vaccine Injury Compensation Program

VHS: Vaccine Hesitancy Scale

# APPENDIX A

## Evidence Table

| Lead Author/ Year/Quality | Purpose/ Design/Sample | Interventions | Measurement/ Outcomes | Results/ Findings | Strengths/ Limitations |
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| Level I Evidence | | | | | |
| Constable et al. (2022)/Good | To establish which strategies had the best evidence for improving uptake of the HPV vaccine and thus which strategies clinicians should use and which merit further study<br><br>Systematic review of 46 RCT's | Health care clinician communication strategies | HPV vaccine uptake | The communication strategy with the best evidence for promotion HPV vaccine uptake is strong provider recommendation, as supported in 20 of 46 studies included in this review. Presumptive communication was the second most effective strategy, supported in 16 of the 46 studies. There is weak evidence to support other communication strategies increasing HPV vaccine uptake including motivational interviewing, in-depth discussion, emphasizing favorable risk/benefit profile. And personal recommendation. | Strengths:<br>In-depth systematic literature search across 6 databases. Search followed two-stage methodology as suggested by Cochrane handbook and used Covidence software for study selection, and a third reviewer evaluated the final set of included studies independently. Quality assessment of each study was performed using The Mixed Methods Appraisal Tool (MMAT)<br><br>Limitations:<br>Majority of included studies were observational. Several |

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| | | | | | different measures of vaccine uptake were used among studies. Some studies took place in clinics that have high rates of uptake. |
| Cotache-Condor et al. (2021)/Strong | To assess the influence of of theoretical models and frameworks to HPV vaccination interventions<br><br>Systematic review and meta-analysis of 20 RCT's | Model and theory-based HPV vaccination interventions based on the Health Belief Model (7), Motivational Interviewing (3), Theory of Planned Behavior (2), Information-Motivation-Behavior skills (2), or a combination of these | Intention, attitude, and hesitancy towards HPV vaccine, HPV vaccination uptake, HPV vaccination completion | Pooled analysis results from the meta-analysis indicate that applying theory to HPV vaccine uptake had an OR of 1.60 at a 98% confidence interval, however not statistically significant. Therefore, this review and analysis found that the use of theoretical frameworks to educate patients about the HPV vaccine improved odds of vaccine uptake, but results were not statistically significant. Majority of the studies were rated high (60%) in regards to applicability of the theoretical frameworks. Theoretical frameworks are more effective at targeting individuals rather than communities at large. The Health Belief Model is the preferred method to use among the 18-26 year-old population. Motivational | Strengths:<br>First systematic review that exclusively evaluates HPV vaccination intervention from a theoretical perspective. Contained an in-depth literature review. Risk of bias was assessed using the EPHPP (Effective Public Health Practice Project) quality assessment tool for quantitative studies, which was carried out by both the researcher and a senior investigator.<br><br>Limitations:<br>Only 33% of theoretical frameworks in this review addressed HPV vaccine uptake, and only 14% addressed HPV vaccine |

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| | | | | interviewing was preferred to be applied in healthcare settings. Overall, the association of increased vaccine uptake and theory were not supported by this review, therefore suggesting more research is needed in regards to theory-based HPV interventions. | completion. Only 4 theories were applied to measure HPV vaccine completion. Authors report a high amount of clinical heterogeneity between studies. Lack of statistical significance in the meta-analysis could be due to small sample size. |
| Rani et al. (2022)/Good | To systematically review the literature on the impact of public education on HPV vaccine uptake.<br><br>Systematic review of 30 RCT's, 8 of which focused on young adults exclusively | Educational video grounded in behavioral health theory, randomized messengers delivering narrative HPV information to college women, HPV vaccine educational and reminder electronic messages, computer-delivered interactive HPV educational intervention, loss/gain/control-framed video message, motivation behavior theory-based educational intervention, mailed packets containing HPV fact sheet and reminder letter, pharmacist led | HPV vaccination uptake | Studies that included young adults and were delivered by experts let to increase in HPV vaccination rates. Findings from this systematic review suggest interventions delivered by authoritative sources about HPV-related education and include parents are most effective in increasing HPV vaccination rates. Combined peer-expert interventions were most effective in increasing vaccine uptake in the young adult population. | Strengths:<br>Broad search strategy, manually reviewed references, "clinical outcome" was an inclusion criteria<br><br>Limitations:<br>Convenience sampling was used in majority of studies, PubMed was the only database searched, studies using a multi-component approach did not report the effectiveness of individual components |

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| | | educational intervention, website intervention based on culture-centric theory | | | |
| Valdez (2022)/Strong | To explore the best evidence regarding patient recall and reminder interventions in regards to improving immunization rates<br><br>Evidence summary of 2 systematic reviews, 3 RCT's | Immunization reminder person-to-person telephone calls, reminder or recall letters to patients or parents, reminder or recall postcards, text messages, auto dialer interventions, emails | Immunization rates | Patient reminder and recall systems should be implemented in primary care to improve immunization coverage, interventions should be tailored to specific practice or provider, letter or telephone reminders are preferred over combination interventions, tailoring billing systems to function as reminder and recall systems should be considered by practitioners | Strengths:<br>Includes high-level evidence (2 level I, 3 level II)<br><br>Limitations: Not specific to HPV, not specific to young adults |
| Level II Evidence | | | | | |
| Barnard et al. (2019)/Strong | To summarize best evidence-based practice interventions in the unvaccinated college population to increase HPV vaccination uptake<br><br>Systematic review of 8 RCT's | Tailored messages on website, gain and loss-framed video messages, stigmatizing and fear-oriented messages to enhance reminder systems, peer and medical expert-led video, information leaflet, monthly health education and reminder prompts | HPV vaccination uptake | There was a wide variation in the rate of HPV vaccination and completion across studies in this review, ranging from 5-53%. The highest uptake and the only intervention in this review that significantly increase HPV vaccine uptake was an intervention that combined peer and expert led information using an educational video | Strengths:<br>Comprehensive literature search using 3 authors independently. Clear inclusion and exclusion criteria<br><br>Limitations:<br>There are a small number of studies that evaluate HPV vaccine uptake among college students following an |

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| | and 1 single-arm pre-post study | | | | intervention. There are also a small number of studies that included male participants. Several studies had a short follow-up period |
| Cory et al. (2019)/Strong | To estimate whether targeted educational interventions can increase HPV vaccine acceptability and knowledge in young women<br><br>Randomized controlled trial of 256 women aged 12-26 divided into two intervention groups (educational video and educational handout) and a control group | Educational video, educational handout, control group | HPV vaccine acceptability, HPV vaccine knowledge | Results from this study indicate that the educational video was the most effective at increasing vaccine acceptability, as 51.7% of participants reported willingness to accept the vaccine compared to 33.3% in the handout group and 28.2% in the control group. Both educational groups had high HPV vaccine knowledge scores compared to the control group. | Strengths:<br>Randomized control design. Study included a large number of minorities of low socioeconomic status, which are a high-risk group for HPV infection and lack of HPV vaccination. Initial exploratory phase of the study was conducted prior to carrying out the RCT to determine potential acceptance and barriers to HPV vaccine.<br>Limitations:<br>Did not assess vaccine uptake and completion, just acceptability and knowledge meaning that more studies are needed on the impact of this intervention on uptake. Potential for selection bias. Lack of generalizability. |

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| Harper et al. (2023)/Good | To use the Theory of Planned Behavior (TPB) to enhance an education-based intervention and increase catch-up group HPV vaccination<br><br>Randomized controlled trial of 3 groups (TPB-informed psychosocial intervention, education only control group and no-intervention control group) totaling 111 participants 18-26 years who denied HPV vaccine uptake on a pre-screen questionnaire. Design included a pre-test, 1-week post-test, 3-month follow-up, and 6-month follow-up | Psychosocial intervention based on TPB, educational intervention, control group (no intervention) | HPV knowledge, HPV vaccine knowledge, attitudes, subjective norms, vaccine intention, vaccine uptake | The psychosocial intervention group guided by TPB principles increased knowledge of HPV and levels of TPB variables more so than the education only intervention group. At 6-month follow up, 44.9% of the psychosocial intervention group had initiated the vaccine series, with 16.7% completing the series. Of the educational intervention group, only 2.8% of individuals indicated any vaccine uptake. None of the individuals in the no-intervention group had received any dose of the vaccine at the 6-month follow-up. College students in this sample had large deficits in HPV-related knowledge, which has been associated with vaccine intent and uptake. This is consistent with the previous literature on this catch-up population | Strengths:<br>Randomization, theory-guided intervention, intervention can be easily adapted and disseminated, in-depth statistical analysis including use of ANOVA to account for test group differences over time<br><br>Limitations:<br>Small sample size, considerable attrition between pretest and 6-month follow up, lack of peer influence during intervention, limited sexual activity of participants therefore causing many participants to view themselves as low susceptibility/need for the vaccine |
| Ilozumba et al. | To summarize existing evidence on mobile health | Phone calls, text messages, and interactive voice | HPV related knowledge, HPV vaccination | Nine out of ten studies that used text messaging reminders reported an | Strengths:<br>In-depth literature review across multiple |

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| (2021)/Strong | interventions tailored to improve HPV vaccination intent, knowledge and uptake<br><br>Systematic review of 19 studies including 11 RCT's and the other 9 were variations of non-randomized pre-post designs with control groups | recordings and software on tablets | intent, HPV vaccination uptake | increase in vaccination rate, and five of these reported high series completion rates. In a study comparing text message vs education-only, text messaging was 15.5 times more likely to result in completion of the vaccine series. In a study comparing regulatory vs motivational text messages, HPV vaccine uptake was higher in the motivational group. Telephone reminders were also found to increase HPV vaccination uptake (62.5% compared to the control group at 6.9%, although not statistically significant). A study that provided mobile tablets to patients in waiting rooms resulted in an increase in HPV uptake (78%) compared to the control (52.8%). Overall, this review found that mobile health interventions can be successful to improve HPV vaccination uptake in the short term. | databases, PRISMA was used to guide this review, clear inclusion and exclusion criterion, two authors independently reviewed articles with a third to settle any discrepancies, risk of bias was assessed using Cochrane risk-of-bias tool and JBI critical appraisal tool, included studies that reported no improvements in the intervention group<br><br>Limitations:<br>Poor geographical representation, publication bias because majority of studies reported positive, significant findings, majority of studies could not be conclusively considered low risk of bias, lack of theory-based interventions |
| Lott et al. (2020)/Strong | To analyze the effectiveness of interventions | Educational interventions, vaccination | HPV vaccine series initiation and completion | Though some evidence supports educational interventions and | Strengths:<br>Detailed search-strategy, clear |

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| | aimed at increasing HPV vaccine uptake among the 9-26 year age group that are an ethnic, racial, sexual, or gender minority<br><br>Systematic review of 9 studies, including 8 RCT's and 1 non-randomized study | appointment invitations and reminders, referrals and patient navigation services, brief negotiated interviews to identify and overcome barriers to vaccination | | vaccination reminders, there is limited evidence to suggest these interventions are effective at improving HPV vaccine initiation and completion in minority populations, but this may be limited by short follow-up length of many studies included. Both educational and reminder interventions have been described by previous reviews as efficacious at improving HPV vaccination initiation and completion in non-diverse populations, therefore more research is needed among diverse populations. | inclusion and exclusion criteria, consultation with a medical librarian for a thorough literature review which was performed in pairs, authors of eligible studies were contacted for additional information as needed, risk of bias was assessed for all peer-reviewed studies using Cochrane Collaboration tools, protocol for the review was registered with International Prospective Register of Systematic Reviews prior to conduction, findings reported according to PRISMA guidelines<br><br>Limitations: Insufficient evidence on HPV vaccination interventions in minority populations, heterogeneity of study characteristics, varying quality of studies included, exclusion of studies |

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| | | | | | carried out in non-U.S. high income countries |
| Ou & Youngstedt (2020)/Strong | To synthesize evidence regarding interventions promoting HPV vaccine uptake in the college-aged population, as well as feasibility and acceptability of interventions in order to inform policy and practice<br><br>Systematic review of 10 pieces of evidence (1 cross-sectional analysis, 3 quasi-experimental designs, 6 RCT's) | Theory based interventions using educational, cognitive, and behaviors change components, follow-up reminders, web pages with educational materials including educational videos, computer-tailored interventions, and electronic text messages | Awareness of HPV-related infections, HPV vaccination intentions, and vaccine uptake rates | Theoretically driven interventions were found as the most effective strategies for increasing vaccine intention and uptake. Perceived severity of an HPV infection, susceptibility to the HPV infection, and benefits of the vaccine were the factors that most positively affected the participants intentions to get vaccinated. Gender was the biggest predictor of HPV vaccination completion as females were 2.35 times more likely to complete the HPV vaccine series | Strengths: Systematic literature review following a PRISMA checklist, critical appraisal of each study using the GRADE approach<br><br>Limitations: Only 3 studies included up to a 6-month follow-up period, making it hard to measure long-term effects of interventions. Most interventions were completed in a one-time-only session. The overall quality of the evidence was moderate |
| Rodriguez et al. (2019)/Good | To evaluate the effectiveness of interventions targeting HPV vaccine completion and initiation among the 9-26 year age- group<br><br>Systematic review of 30 | Interventions were split into three categories for evaluation: behavioral, environmental, informational. Behavioral included message framing, peer or expert education video, evidence-based pamphlet. | HPV vaccination initiation and completion | Behavioral and informational interventions doubled HPV vaccine initiation, while behavioral interventions increase completion by 68%. Studies implementing a combination of strategies were also effective at improving HPV vaccine uptake. Interventions targeting a behavioral | Strengths: In-depth literature review and evaluation of evidence, adds to the literature by incorporating studies not previously included, novel sites, all ages, and both sexes. Study quality was evaluated independently by 3 |

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| | studies (14 RCT's, 13 cohort studies, 3 quasi-experimental studies) and meta-analysis of 17 studies (15 RCT's, 2 quasi-experimental studies) | Environmental strategies included decreasing financial barriers or providing vaccine sites at schools and in the community. Informational strategies aimed to increase awareness but did not intend to change a behavior. If interventions did not fall strictly into one of these three categories, they were considered combined | | change are the most effective for increasing HPV vaccine initiation and completion. The most effective strategy to change vaccination behavior is multi-faceted, creates positive beliefs and attitudes about the vaccine, uses prompts/reminders, and improves access. | reviewers using the EQUATOR reporting guidelines<br><br>Limitations:<br>New studies have not been published to assess the impact of the new two-dose schedule, the studies included varied in design and quality, interpretation of results is challenging due to the heterogeneity of methods, cultural appropriateness was not assessed |
| Sacca et al. (2023)/Good | To identify limitations to HPV vaccination interventions, identify lessons learned from interventions, and examine health promotion theories that have been effective in improving HPV vaccination rates among college students<br><br>Systematic review of 21 | Educational in nature aiming to increase HPV vaccination rates by addressing college students perceptions, knowledge, and perceived barriers to HPV vaccination | Knowledge of HPV vaccine, perceived risk, intent to vaccinate, vaccination rates | The majority of theory-based interventions reported positive outcomes by the end of the intervention. Specifically, interventions grounded in the health belief model, while the theory of planned behavior is a close second, were the most successful. However, these models have been found to be associated with higher intention to vaccinate and further studies with longer follow up are needed in this | Strengths:<br>Review team consisted of experts in HPV vaccine research. The lead author initiated the search strategy, and the coauthors carried out a blinded secondary screening of the articles independently. The PRISMA-Scr was used as a reference checklist and the Arksey and O'Malley framework methodology guided |

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| | studies (9 RCT's, 4 pilot studies, 6 quasi-experimental studies, 1 feasibility study and 1 quality improvement intervention study) | | | population to see if there is an association with vaccine completion. | the review. Clear inclusion and exclusion criteria. Key stakeholders were identified and used.<br><br>Limitations:<br>The review did not include a search of gray literature or reference lists of included studies. Lack of assessment of the quality of included studies. Authors reported limitations of each study in the form of a table. Logistical issues and generalizability issues of the evidence included were the two most commonly reported limitations. |
| Level III Evidence | | | | | |
| Deshmukh et al. (2018)/Good | To determine the impact of a clinical intervention bundle on the rate of missed opportunities and uptake of the HPV vaccine | Intervention bundle including physician and nurse champions, pre-screening patients' charts, empowering nurses to recommend immunization, providing no-cost vaccinations, placing | Uptake of HPV vaccine | After implementation of the bundle over the 17-month period, there was a statistically significant change in the trend of women who had both initiated and completed the series. The monthly rate of rise was 3.76 higher for initiating the | Strengths:<br>Sequentially introduced intervention that was multidimensional and based on previous efficacious research findings. Ability to analyze impact of interventions on race, |

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| | among young adult women<br><br>Quasi-experimental design of an intervention bundle carried out at an urban, hospital-based OBGYN clinic including 6,463 eligible non-pregnant women aged 11-26 during the 17 month timeframe | prompts in clinic note templates, eliminating requirement for pre-vaccination pregnancy test | | series and 2.71 times higher for completing the series. The proportion of women in the last month of the study that completed or initiated the vaccine series was over twice as large as the first month of the study. This evidence-based multi-component intervention bundle successfully increased HPV vaccine uptake and reduced the amount of missed opportunities in a clinic that serves predominately low-income, Hispanic, and black women | ethnicity, insurance and language due to the setting.<br><br>Limitations: Retrospective study that required accuracy of an EMR. Lack of generalizability due to taking place at a single healthcare center and lack of randomization. |
| Wermers et al. (2021)/Good | To examine a quality improvement project that utilized Motivational Interviewing (MI) as part of a health immunization strategy<br><br>Quasi-experimental design, 19 clinical staff (9 NP's, 7 physicians, 3 RN's) at 1 student health center | MI training and reinforcement guided by MI training techniques and TPB variables, monthly provider meetings regarding MI and vaccine data update | Number of vaccines given as compared with the previous year, MI knowledge (of providers) using the MIKAT-V tool | The number of HPV vaccines decreased by 2.84% during the study period. Though vaccine rates for influenza increased during the intervention, rates for HPV vaccine remained steady. To evaluate MI knowledge of providers, a paired-sample t-test showed a significant increase in the score from the pre to post test (79%). Data from this study suggests that repeated exposure to MI training leads to improvements in | Strengths: Clinicians had in-depth training at multiple points during the study timeframe, the intervention was grounded in theory<br><br>Limitations: Number of student participants not reported. College students often do not know which vaccines they have received. Other ongoing initiatives on campus could have affected |

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| | | | | MI knowledge that are statistically significant, and recommends ongoing MI training for all clinicians regarding vaccine hesitancy. | vaccine rates. Only 6/19 clinicians completed the MIKAT-V at all 4 intervals. Small number of participants limited the ability to achieve statistical significance for all outcomes. EMR for college students didn't track historical vaccine records. |

## APPENDIX B

Permission to Use Tool

Mr. Szilagyi,

My name is Rylee Cartales and I am a Doctorate of Nursing Practice student at Valparaiso University in Indiana. I am conducting an evidence-based practice project on HPV vaccine hesitancy among young adult women in the catch-up population (18-26 years). In searching the literature, I came across your study that utilized the adapted vaccine hesitancy scale to measure HPV vaccine hesitancy of parents. I would like to know if I could use a modified version of your scale, adapted to young adult women (18-26 years), to measure HPV vaccine hesitancy. Please feel free to let me know if you have any further questions regarding my project. Thank you for your time and consideration.

Sincerely,
Rylee Cartales

Rylee,

Yes that is fine-good luck!

Pete

Peter G. Szilagyi, M.D., M.P.H.
Distinguished Professor of Pediatrics
Executive Vice-Chair and Vice-Chair for Research
Department of Pediatrics
University of California, Los Angeles

## APPENDIX C

**Name** _____

# HPV Vaccine Hesitancy Scale

**Directions: Please indicate your level of agreement or disagreement with each of these statements regarding the HPV vaccine. Place an "X" mark in the box of your answer.**

| | Strongly Agree | Somewhat Agree | Somewhat Disagree | Strongly Disagree |
|---|---|---|---|---|
| 1. The information I receive about the HPV vaccine from my health care provider is reliable and trustworthy. | | | | |
| 2. The HPV vaccine is effective. | | | | |
| 3. Getting the HPV vaccine is a good way to protect myself from developing HPV-related cancers. | | | | |
| 4. The HPV vaccine is beneficial to me. | | | | |
| 5. I do/did what my health care provider recommends about the HPV vaccine. | | | | |
| 6. The HPV vaccine is important for my health. | | | | |
| 7. Getting the HPV vaccine is important for the health of others in my community. | | | | |
| 8. The HPV vaccine has not been around long enough to be sure it's safe. | | | | |
| 9. I am concerned about serious side effects of the HPV vaccine. | | | | |

## APPENDIX D

**Name** _____

# Demographic Form

**Directions: Please answer the following fill in the blank and multiple choice questions.**

1. How old are you? _____
2. What is your highest level of education?
    a. High school diploma
    b. Associate's degree
    c. Bachelor's degree
    d. Master's degree
    e. Doctorate degree
3. Please describe your ethnicity.
    a. White
    b. Asian
    c. Latino
    d. African-American/Black
    e. Other
4. Do you have health insurance?
    a. Yes
    b. No
5. Have you ever had sexual intercourse (this includes anal, vaginal, or oral)?
    a. Yes
    b. No
    c. Prefer not to answer
6. What is the number of sexual partners you have had in the past year? ____
7. If you are sexually active, do you use condoms to protect yourself from STI's such as HPV?
    a. Yes
    b. No
    c. Prefer not to answer
8. If you are sexually active, do you use monogamy (only one partner) to protect yourself from STI's such as HPV?
    a. Yes
    b. No
    c. Prefer not to answer
9. Are you in a long term relationship?
    a. Yes
    b. No
10. If you are sexually active, do you use any method to protect yourself from STI's such as HPV?
    a. Yes
    b. No
    c. Prefer not to answer
11. What is your marital status?
    a. Single
    b. Dating
    c. Married
    d. Widowed
    e. Separated
    f. Other
12. Have you received all of your other routine, recommended childhood vaccines?

a. Yes
b. No

13. Have you ever received a dose of any HPV vaccine? If so, please describe when, how many doses, and of which vaccine _____

*Thank you for participating in this project. All statistical data analyzed for the purpose of this study will be aggregated data to prevent disclosure of information about any individual.*

# APPENDIX E

CITI Program Certificate

Completion Date 27-Mar-2023
Expiration Date N/A
Record ID 55128400

This is to certify that:

**Rylee Cartales**

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

**Group 1: Social Behavioral Educational Researchers**
(Curriculum Group)
**Group 1: Social Behavioral Educational Researchers**
(Course Learner Group)
**1 - Basic Course**
(Stage)

Under requirements set by:

**Valparaiso University**

Collaborative Institutional Training Initiative
101 NE 3rd Avenue, Suite 320
Fort Lauderdale, FL 33301 US
www.citiprogram.org

Verify at www.citiprogram.org/verify/?w8d96ad90-604a-4150-868e-37c559ebfdce-55128400

# APPENDIX F

CDC Motivational Interviewing Information



## Talking with Patients about COVID-19 Vaccination

An Introduction to Motivational Interviewing for Healthcare Professionals


As a trusted source of health information and healing, your approach to a conversation with patients and families who are hesitant about receiving COVID-19 vaccines can influence their willingness to consider vaccination.

Motivational interviewing is an evidence-based and culturally sensitive way to speak with unvaccinated patients about getting vaccinated. The goal of motivational interviewing is to help people manage mixed feelings and move toward healthy behavior change that is consistent with their values and needs.

### How to Apply Motivational Interviewing During a Patient Visit

Here are four steps to apply motivational interviewing rapidly (1–5 minutes) during a patient visit.

#### Step 1: Embrace an attitude of empathy and collaboration

- Be compassionate, show empathy, and be genuinely curious about the reasons why the patient feels the way they do.
- Be sensitive to culture, family dynamics, and circumstances that may influence how patients view vaccines.
- Remember: Arguing and debating do not work. Taking a strong initial stand may also backfire, especially with people who have concerns about vaccines.

#### Step 2: Ask permission to discuss vaccines

Start by asking permission to discuss vaccines. Say something like, *"If it is okay with you, I would like to spend a few minutes talking about COVID-19 vaccines and your family."*

- **If the patient says no**, respect that.
  - **Option 1:** Move on and say, *"I respect that, and because I care about your overall health, maybe we could talk about the vaccines at a future time."*
  - **Option 2:** Based on the patient's demonstrated emotions and your assessment of the patient's worldview and values, you could spend several minutes curiously exploring why the patient doesn't want to talk about it. The goal is to understand, not to change their mind.

    Remember: These conversations may take time, and they may continue over multiple visits.
- **If the patient says yes** to talking about the vaccines, move to Step 3.
- **If the patient asks a question** about COVID-19 vaccine safety, vaccine risks, or their health or mental health, see potential responses in Step 4.

#### Step 3: Motivational interviewing

**Ask the patient a scaled question.** For example, *"On a scale of 1 to 10, how likely are you to get a COVID-19 vaccine?"* (1 = never; 10 = already have an appointment to get vaccinated). Then explore both sides of whatever number is given.

- **Example:** Let's assume someone says 4. This is where curiosity comes in. You can say, *"Okay, why 4? And why not a lower number?"* Let them answer, and ask a follow-up question like, *"What would help you move to a 5 or 6?"*

**The goal is to help the patient become more open to moving toward higher numbers**—in other words, getting vaccinated.

- You want them to **talk about this out loud** because talking actually changes how they process their choices and can develop forward momentum.
- People hesitant about vaccines usually have more practice explaining why they haven't gotten vaccinated, so it's good to reverse that. Ask them to express their vaccination benefits out loud.
- Be compassionate and curious about the patient's mixed feelings, both the part of them that wants to trust that getting a vaccine is important and safe and the other part that feels hesitant. It is important to show support for the patient to incorporate their personal values and the health needs of their family and community as they make their decision.

## Step 4: Respond to questions about vaccines, health, or mental health

If a patient asks a question about vaccine safety, vaccine risks, or their health or mental health, respond within the boundaries of your competence, ethics, and scope of practice.

- **If you feel competent and aware of how to answer the patient's question**, respond with empathy and provide scientific information as needed. Refer the patient to resources on the CDC website, which are listed below.
- **If the patient's question is outside of your competence or awareness**, recommend that they speak with their medical or mental health provider or a knowledgeable expert, as needed.

## Additional Resources:

- Key Things to Know about COVID-19 Vaccines
- Frequently Asked Questions about COVID-19 Vaccines
- Answering Patients' Questions About COVID-19 Vaccine and Vaccination
- Talking with Parents About COVID-19 Vaccination
- How to Tailor COVID-19 Information for Your Specific Audience
- How to Address COVID-19 Misinformation

*Content developed by the American Psychological Association (Jared Skillings, PhD, ABPP; Erin Swedish, PhD; Robin McLeod, PhD; Mitch Prinstein, PhD, ABPP; and Stephen Gillaspy, PhD) in partnership with U.S. Centers for Disease Control and Prevention*

Last Reviewed: November 3, 2021

## APPENDIX G

Understanding Motivational Interviewing Guide

# Understanding Motivational Interviewing


## Summary

Motivational Interviewing (MI) is often recommended as an evidence-based approach to behavior change. However, definitions of MI vary widely, including out of date and inaccurate understandings. This document provides a brief summary of what MI is, what is isn't and where to go next if you are interested in learning more about this approach.


## What is Motivational Interviewing?

*"MI is a collaborative, goal-oriented style of communication with particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion."* (Miller & Rollnick, 2013, p. 29)

The most current version of MI is described in detail in Miller and Rollnick (2013) *Motivational Interviewing: Helping people to change* (3rd edition). Key qualities include:

- MI is a **guiding** style of communication, that sits between **following** (good listening) and **directing** (giving information and advice).
- MI is designed to **empower** people to change by drawing out their own meaning, importance and capacity for change.
- MI is based on a **respectful** and **curious** way of being with people that facilitates the natural process of change and honors client autonomy.

It is important to note that MI requires the clinician to engage with the client as an equal partner and refrain from unsolicited advice, confronting, instructing, directing, or warning. It is not a way to "get people to change" or a set of techniques to impose on the conversation. MI takes time, practice and requires self-awareness and discipline from the clinician. (Miller & Rollnick, 2009)

While the principles and skills of MI are useful in a wide range of conversations, MI is particularly useful to help people examine their situation and options when any of the following are present:

- **Ambivalence is high** and people are stuck in mixed feelings about change
- **Confidence is low** and people doubt their abilities to change
- **Desire is low** and people are uncertain about whether they want to make a change
- **Importance is low** and the benefits of change and disadvantages of the current situation are unclear.

## Core elements of Motivational Interviewing

- MI is practiced with an underlying **spirit** or way of being with people:
  - **Partnership**. MI is a collaborative process. The MI practitioner is an expert in helping people change; people are the experts of their own lives.
  - **Evocation**. People have within themselves resources and skills needed for change. MI draws out the person's priorities, values, and wisdom to explore reasons for change and support success.
  - **Acceptance**. The MI practitioner takes a nonjudgmental stance, seeks to understand the person's perspectives and experiences, expresses empathy, highlights strengths, and respects a person's right to make informed choices about changing or not changing.
  - **Compassion**. The MI practitioner actively promotes and prioritizes clients' welfare and wellbeing in a selfless manner.

- MI has **core skills** of OARS, attending to the language of change and the artful exchange of information:
  - **Open questions** draw out and explore the person's experiences, perspectives, and ideas. Evocative questions guide the client to reflect on how change may be meaningful or possible. Information is often offered within a structure of open questions (Elicit-Provide-Elicit) that first explores what the person already knows, then seeks permission to offer what the practitioner knows and then explores the person's response.
  - **Affirmation** of strengths, efforts, and past successes help to build the person's hope and confidence in their ability to change.
  - **Reflections** are based on careful listening and trying to understand what the person is saying, by repeating, rephrasing or offering a deeper guess about what the person is trying to communicate. This is a foundational skill of MI and how we express empathy.
  - **Summarizing** ensures shared understanding and reinforces key points made by the client.
  - **Attending to the language of change** identifies what is being said against change (sustain talk) and in favor of change (change talk) and, where appropriate, encouraging a movement away from sustain talk toward change talk.
  - **Exchange of information** respects that both the clinician and client have expertise. Sharing information is considered a two way street and needs to be responsive to what the client is saying.

- MI has four fundamental **processes**. These processes describe the "flow" of the conversation although we may move back and forth among processes as needed:
  - **Engaging**: This is the foundation of MI. The goal is to establish a productive working relationship through careful listening to understand and accurately reflect the person's experience and perspective while affirming strengths and supporting autonomy.
  - **Focusing**: In this process an agenda is negotiated that draws on both the client and practitioner expertise to agree on a shared purpose, which gives the clinician permission to move into a directional conversation about change.
  - **Evoking**: In this process the clinician gently explores and helps the person to build their own "why" of change through eliciting the client's ideas and motivations. Ambivalence is

normalized, explored without judgement and, as a result, may be resolved. This process requires skillful attention to the person's talk about change.

- **Planning**: Planning explores the "how" of change where the MI practitioner supports the person to consolidate commitment to change and develop a plan based on the person's own insights and expertise. This process is optional and may not be required, but if it is the timing and readiness of the client for planning is important.

MI is framed as a method of communication rather than an intervention, sometimes used on its own or combined with other treatment approaches. There are a number of benefits of learning MI amongst other approaches to helping conversations:

- MI has been applied across a broad range of settings (e.g. health, corrections, human services, education), populations (e.g. age, ethnicity, religion, sexuality and gender identities), languages, treatment format (e.g. individual, group, telemedicine) and presenting concerns (e.g. health, fitness, nutrition, risky sex, treatment adherence, medication adherence, substance use, mental health, illegal behaviors, gambling, parenting).
- MI compares well to other evidence-based approaches in formal research studies.
- MI is compatible with the values of many disciplines and evidence-based approaches.
- Although the full framework is a complex skill set that require time and practice, the principles of MI have intuitive or "common sense" appeal and core elements of MI can be readily applied in practice as the clinician learns the approach.
- MI has observable practice behaviors that allow clinicians to receive clear and objective feedback from a trainer, consultant or supervisor.

## Further questions

- What are some ways MI could be helpful in your work?
- What are some reasons you might want to learn more about MI?
- What might be a next step or two? If you are interested in learning more about MI, you might consider reading the next document in the series: Learning Motivational Interviewing or the core text by Miller and Rollnick (2013).

## References


- Miller, W.R. & T.B. Moyers (2017) Motivational Interviewing and the clinical science of Carl Rogers. *Journal of Consulting and Clinical Psychology, 85*(8), 757-766
- Miller, W.R. & Rollnick, S. (2013) *Motivational Interviewing: Helping people to change* (3rd Edition). Guilford Press.
- Miller & Rollnick (2017) Ten things MI is not Miller, W.R. & Rollnick, S. (2009) Ten things that MI is not. *Behavioural and Cognitive Psychotherapy*, 37, 129-140.

## APPENDIX H

How To: Motivational Interviewing

### How to do Motivational Interviewing

> "Motivational interviewing has been *practical* in focus. The strategies of motivational interviewing are more persuasive than coercive, more supportive than argumentative. The motivational interviewer must proceed with a strong sense of purpose, clear strategies and skills for pursuing that purpose, and a sense of timing to intervene in particular ways at incisive moments" (Miller and Rollnick, 1991, pp. 51-52).

The four principle strategies of MI are:

1. Get a conversation going - express empathy through reflective listening.
2. Develop discrepancy between a patients' goals or values and their current behavior.
3. Avoid argument and direct confrontation and adjust to resistance rather than opposing it directly.
4. Support self-efficacy and optimism.

Clinicians who adopt motivational interviewing as a preferred style have found that the following five strategies are particularly useful in the early stages of treatment:

1. *Ask open-ended questions.* Open-ended questions cannot be answered with a single word or phrase. For example, rather than asking, "Do you like to drink?" ask, "What are some of the things that you like about drinking?"
2. *Listen reflectively.* Demonstrate that you have heard and understood the patient by reflecting what the patient said.
3. *Summarize.* It is useful to summarize periodically what has transpired up to that point in a counselling session.
4. *Affirm.* Support and comment on the patient's strengths, motivation, intentions, and progress.
5. *Elicit self-motivational statements.* Have the patient voice personal concerns and intentions, rather than try to persuade the patient that change is necessary.

In using MI in practice, you initial goal is to engage the patient in conversation. Without this, of course, nothing will happen.

A practitioner using MI will be able to:

- Express empathy through reflective listening.
- Communicate respect for and acceptance of patients and their feelings.
- Establish a non-judgmental, collaborative relationship.
- Be a supportive and knowledgeable consultant.
- Compliment rather than denigrate.
- Listen rather than tell.
- Gently persuade, with the understanding that change is up to the patient.
- Provide support throughout the process of recovery.
- Develop discrepancy between patients' goals or values and current behavior, helping patients recognize the discrepancies between where they are and where they hope to be.
- Avoid argument and direct confrontation, which can degenerate into a power struggle.
- Adjust to, rather than oppose, patient resistance.
- Support self-efficacy and optimism: that is, focus on patients' strengths to support the hope and optimism needed to make change.

MI: *a brief guide*

## APPENDIX I

ALA Motivational Interviewing Quick Reference Guide

American Lung Association.

# Tobacco Cessation Quick Reference Guide

## Motivational Interviewing

Motivational interviewing (MI) is the counseling method that works on facilitating and engaging intrinsic motivation with an individual in order to change their behavior. It helps individuals explore and resolve their uncertainty around quitting.

In motivational interviewing, no one person tells the other what they should or shouldn't do. Nor do they try to convince or persuade them into taking action. Instead, this method is used to guide an individual in self-identifying and resolving what is preventing them from success.

How can you use motivational interviewing to address an individual's resistance to end their tobacco use?

- Respect the individuals ultimate responsibility for making a decision.
- Avoid arguing or confrontation, as this could push an individual in the opposite direction, away from a healthy change.
- Support an individual's confidence to change and learn how to change.
- Express empathy. Help the individuals see the discrepancy between their negative behavior and desired goals.

## Interaction Skills

In order to successfully use motivational interviewing with an individual, you must first establish four basic interaction skills.

1. **Ask open-ended questions.** An open-ended question requires a full answer using the individual's own knowledge or feelings. If the answer can be "yes" or "no" or a single word answer, it is a closed ended question. Some examples of open-ended questions are "How do you feel about that?", "Could you share some of the health effects you've experienced from using tobacco?" or "Could you tell me what you look forward to most about quitting and what benefits you will experience?".

2. **Provide affirmations.** Affirmations are statements and gestures that recognize the participants' strengths and acknowledge behaviors leading towards positive change. An example of an affirming response is, "You have a lot of great ideas on different alternatives to use when a trigger occurs." Or "I appreciate that you are willing to try the deep breathing exercise even though it isn't something you'd normally do."

3. **Reflective Listening.** Reflective listening is where you are seeking to understand a speaker's idea and offering it back to them, to confirm the idea has been understood. It is a way to engage others in relationships, build trust and foster motivation to change. There are three basic levels:
   a. **Repeating or rephrasing:** Listener repeats or substitutes synonyms or phrases, staying close to what the speaker said.
   b. **Paraphrasing:** Listener makes a restatement in which the speaker's meaning is inferred.
   c. **Reflection of feeling:** Listener emphasizes emotional aspects of communication through feeling statements. This is the deepest form of listening.

4. **Providing Summary Statements.** Summary statements help to ensure there is clear communication between the speaker and listener. They can provide a steppingstone towards change. When summarizing, begin with an opening letting the participant know you are summarizing what they've just told you. Use statements such as "Let me see if I understand so far" or "Here is what I've heard. Tell me if I've missed anything." Recap what they have told you in a clear and concise way. End with an initiation for them to correct you on anything you misunderstood or omitted. For example, "Anything you want to add or correct?"

American Lung Association.

# Tobacco Cessation Quick Reference Guide

## Motivational Interviewing

### Counseling Skills

The practice of motivational interviewing requires the individual (i.e. Tobacco Treatment Specialist, counselor, primary care physician, health educator, etc.) to develop five primary skills:

1. **Express empathy.** Be non-judgmental; listen reflectively; accept ambivalence; see the world through the individual's eyes. Accurately understanding the individual's experience can facilitate change.
2. **Develop discrepancy.** Help individual perceive difference between present behavior and desired lifestyle change. Individuals are more motivated to change when they see what they're doing will not lead them to a future goal.
3. **Avoid argumentation.** Gently diffuse individual defensiveness. Confronting individuals' denial can lead to drop out and relapse. When individual demonstrates resistance to change, counselor changes strategies.
4. **Roll with resistance.** Reframe individual's thinking/statements; invite individual to examine new perspectives; value individual as being their own change agent.
5. **Support self-efficacy.** Provide hope; increase individual's self-confidence in ability to change behavior; highlight other areas where individual has been successful.

Motivational Interviewing can be utilized with the Stages of Change[1] model in counseling, and working with tobacco-dependent individuals. The goal is to help individuals move toward being ready to change behavior, NOT to get someone to quit using tobacco. The benefit in using motivational interviewing techniques is that the motivation to change is determined by the individual, not externally imposed by the counselor. The individual owns the responsibility to resolve his ambivalence. This key strategy directly aligns with American Lung Association's "facilitate" don't "instruct" philosophy as the individual/counselor relationship is seen more as a collaborative and friendly partnership than as an expert/recipient or teacher/student relationship.

**To learn more about Motivational Interviewing, visit Lung.Training and complete the free educational course, How to Help People Quit.**

**For more information about quitting tobacco use, visit the American Lung Association website at Lung.org or call the free Lung HelpLine at 1-800-LUNGUSA (1-800-586-4872).**

[1] Prochaska & DiClemente, 1983; Boston University School of Public Health, 2019. Stages of Change

# APPENDIX J

PowerPoint for Stakeholder Education

## HPV Vaccine Hesitancy

Rylee Cartales

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## Background Information

- Most common STD
- Silent infection leading to many different cancers
- 4 out of 5 women will have HPV at some point in their lifetime
- Causes 36,000 cases of cancer annually in U.S.
- Low HPV vaccine coverage

(Centers for Disease Control and Prevention, 2022; Centers for Disease Control and Prevention, 2023-a; Centers for Disease Control and Prevention, 2023-b)

2

## Need For Project

- Healthy People 2030 goal: 80% vaccination
- Estimated 35% of "catch-up" group vaccinated
- Indiana vaccine rate is lower than U.S
- Howard County is 5.2%
- Providers want to see improvement

(Centers for Disease Control and Prevention, 2021-b; Harper et al., 2023)

3

## PICOT Question & Significance

- (**P**) In women in the catch-up population ages 18-26 who are unvaccinated against HPV
- (**I**) What is the effect of a multimodal intervention in the form of a motivational interview, including a strong provider recommendation and educational materials
- (**C**) Compared to clinic standard of care
- (**O**) On HPV vaccine hesitancy
- (**T**) Over an 8-week period

## EBP Model

- Johns Hopkins Nursing EBP Model
- Created by nurses as a tool to apply EBP
- Linear design with an open system to continually refine
- Stepwise process
- Answers question: Why aren't young adults getting vaccinated and how can we decrease hesitancy?

(Dang et al., 2019)

## Literature Search

- CINAHL, JBI, TRIP, Cochrane, Medline, PubMed
- 2018-2023
- 859 → 37 → 14
- Inclusion: Intervention to decrease hesitancy and/or increase uptake, included and focused on women, included young adult population
- Exclusion: Focused on men, providers, or pediatric population, mandated a policy change, no intervention
- JBI Critical Appraisal Tool: Good - Strong

(Barker et al., 2023; O'Mathuna & Fineout-Overholt, 2019).

## Literature Search Grid

| Database Resource Searched | Keywords Phrase Used | Limiters Used | Number of Results from Search | Number of Pieces of Evidence Retained for Use |
|---|---|---|---|---|
| CINAHL | "hpv vaccine*" OR "human papillomavirus" AND hesitancy OR uptake OR refusal AND intervent* OR strategy | 2018-2023, scholarly peer reviewed, English language | 227 | 9 |
| JBI | "hpv AND hesitancy OR uptake OR refusal | 2018-2023 | 5 | 3 |
| Cochrane | hpv AND hesitancy OR uptake OR refusal | January 2018 – June 2023 | 6 | 0 |
| TRIP | "hpv vaccin*" AND hesitancy OR uptake OR refusal | Since 2018, guidelines | 57 | 0 |
| Medline | MM "papillomavirus vaccines" AND hesitancy OR uptake OR refusal AND intervent* OR strategy | 2018-2023, English language, scholarly peer reviewed | 366 | 3 |
| PubMed | hpv AND hesitancy OR uptake OR refusal | 2018-2023, meta-analysis, RCT, systematic review, English language | 157 | 3 |

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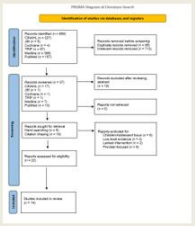
## PRISMA



8

## Appraisal of Evidence

Table 3.1
Summary of Evidence

| Author(s)/yr | Database(s) | Level of Evidence/Type | Quality/Tool | Strength of Recommendation |
|---|---|---|---|---|
| Barnard et al. (2019) | PubMed | II/QR | | Strong/IIB |
| Constable et al. (2022) | CINAHL | I/SR | | Grade/IA |
| Cory et al. (2019) | CINAHL | II/RCT | | Strong/IIB |
| Cotter-Newkirk et al. (2021) | CINAHL | I/SR & Meta-analysis | | Strong/IA |
| Deshmukh et al. (2018) | Medline | II/NRC | | Grade/IB |
| Harper et al. (2023) | CINAHL | II/RCT | | Grade/IB |
| Holcomb et al. (2021) | PubMed | II/QR | | Strong/IIB |
| Lott et al. (2020) | PubMed | II/QR | | Strong/IIB |
| Ou & Youngstedt (2020) | CINAHL | II/QR | | Strong/IIB |
| Rani et al. (2022) | CINAHL | I/SR | | Grade/IA |
| Rodriguez et al. (2018) | CINAHL | II/QR | | Grade/IIB |
| Sacca et al. (2023) | CINAHL | II/QR | | Grade/IIB |
| Valdez (2022) | JBI | I/Summary | | Strong/IA |
| Wermers et al. (2021) | CINAHL | II/NRC | | Grade/IIB |

Note. NRC = non-randomized controlled trial

(Barker et al., 2023; O'Mathuna & Fineout-Overholt, 2019).

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## Best Practice Recommendation

- Multi-modal strategy
  - Strong provider recommendation, presumptive communication, motivational interviewing
  - Educational materials
  - Reminder and recall interventions

(Barnard et al., 2019; Constable et al., 2022; Cory et al., 2019; Deshmukh et al., 2018; Harper et al., 2023; Ilonumba et al., 2021; Lott et al., 2020; Ou & Youngstedt, 2022; Rani et al., 2022; Rodriguez et al., 2018; Sacca et al., 2023; Valdez, 2022; Wermers et al., 2021).

## Project Plan

- Recruit participants at check-in, give them forms to fill out and educational handout
- Perform the motivational interview during the appointment, strongly recommend the vaccine
- Offer the vaccine
- Chart review in December to see if anyone came back to get the vaccine

## References


Barker, T., Stone, J., Sears, K., Klugar, M., Tufanaru, C., Leonardi-Bee, J., Aromataris, E., & Munn, Z. (2023). The revised critical appraisal tool for the assessment of risk of bias for randomized controlled trials (2) (Science Synthesis). Joanna Briggs Institute, 21(3), 494-506.

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Cory, L., Cha, H., Ellenbury, S., Bogner, H., Hwang, W.-T., Smith, J., Haggerty, A., Morgan, M., Harper, R., Chu, C., & Ko, E. (2019). Effects of education interventions on human papillomavirus vaccine acceptability. Obstetrics & Gynecology, 134(2), 276-284.

Cotter-Newkirk, C., Peterson, M., & Asano, M. (2022). Application of theoretical frameworks on human papillomavirus vaccine interventions in the United States: Systematic review and meta-analysis. Cancer Causes & Control, 33(1), 15-24.

Dang, D., Melnyk, B., Fineout-Overholt, E., Yost, J., Cullen, L., Couch, M., Larrabee, J., Reynolds-Maloney, J., Schaub, A., Stetler, C., & Stevens, K. (2019). Models to guide implementation and sustainability of evidence-based practice. In M. Foss & E. Ward (Eds.), Evidence-based practice in nursing and healthcare (4th ed., pp. 574-627). Wolters Kluwer.

## Appendix K

## Implementation Timeline

**Project Approval:** August 29- Approval to start project from Ascension IRB committee

**Project Start:** August 31- First day at clinical site recruiting participants

**Week 1:** August 31- September 6: Chart review, recruit & enroll participants

**Week 2:** September 7- September 13: Chart review, recruit & enroll participants

**Week 3:** September 14- September 20: Chart review, recruit & enroll participants

**Week 4:** September 21- September 27: Chart review, recruit & enroll participants

**Week 5:** September 28- October 4: Chart review, recruit & enroll participants

**Week 6:** October 5- October 11: Chart review, recruit & enroll participants

**Week 7:** October 12- October 18: Chart review, recruit & enroll participants

**Week 8:** October 19- October 25: Chart review, recruit & enroll participants

**Week 9:** October 26- November 1: Chart review, recruit & enroll participants

**Week 10:** November 2- November 8: Chart review, recruit & enroll participants

**Week 11:** November 9- November 15: Chart review, recruit & enroll participants

**Week 12:** November 16- November 22: Chart review, recruit & enroll participants

**Week 13:** November 23- December 1: Chart review, recruit & enroll participants

**Project End:** December 1- Last day at clinical site recruiting participants

# Appendix L

## Ascension IRB Exemption

Ascension

**INSTITUTIONAL REVIEW BOARD**
**NOT HUMAN SUBJECTS RESEARCH**

**To:** Rylee Cartales

**From:** Ascension Health Institutional Review Board

**Date:** August 29, 2023

On 8/29/2023, the IRB reviewed the following submission and determined that the proposed activity is not research involving human subjects as defined by DHHS/FDA regulations.

| | |
|---|---|
| Type of Review: | Initial Study |
| Title: | A multi-modal intervention to decrease HPV vaccine hesitancy and increase uptake in young adult women |
| Investigator: | Rylee Cartales |
| IRB Study ID: | RIN20230111 |
| Funding: | Name: 01Unfunded |
| Documents Reviewed: | See list at close of letter below signature line |

IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving humans in which the organization is engaged, please submit a new request to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study workspace in the Ascension eIRB system.

Documents Reviewed for this Submission:
• Ascension QA-QI worksheet (11).docx, Category: Other;

• Cartales Demographic Form.docx, Category: Recruitment Materials;

• Cartales HPV vaccine hesitancy scale.docx, Category: Recruitment Materials;

• HPV Vaccine EBP Project Protocol, Category: IRB Protocol;

• HPV vaccine information sheet.pdf, Category: Recruitment Materials;

• Verbal Consent.docx, Category: Recruitment Materials;