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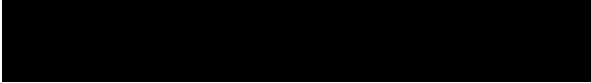
Increasing Human Papillomavirus Vaccination Rates in Active Duty Servicemembers: A Multi-
Modal Interactive Education Program

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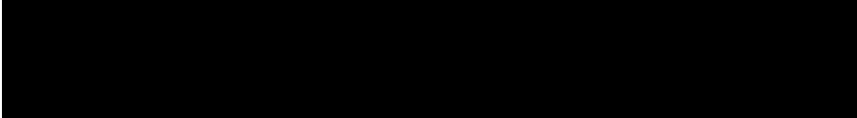
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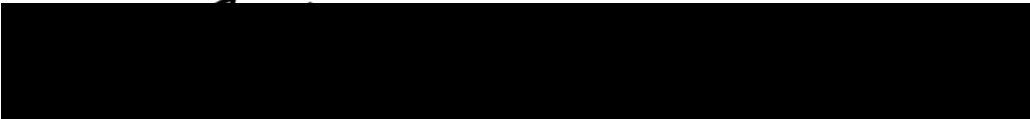
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ABSTRACT 298 words

Background: The human papillomavirus (HPV) costs the US 8 billion dollars a year and is the most common sexually transmitted infection with 14 million new cases reported annually. The virus causes cervical, vaginal, vulvar, and oropharyngeal cancers; anogenital and oropharyngeal warts. Many national organizations, including the American Cancer Society recommend the nine-valent HPV vaccine for males and females ages 9-26. Human papillomavirus vaccination prevents 90% of HPV-related diseases. Initial HPV vaccination rates in the US are low at 35-50% and a local study found the rate for females at Fort Bragg was only 15%.

Purpose: The purpose of this project was to improve HPV vaccine initiation by 20% in active duty Soldiers using a replicable, multi-modal interactive education program.

Project Design: Using the Implementation Strategies for Evidence-Based Practice model, this project incorporated a three-prong strategy involving clinician education with pre and post-tests, community engagement through social media, and command support of Soldier education.

Analysis of Results: This project team achieved a greater than 60-fold increase for HPV vaccinations in Soldiers ages 18-26. Compared to 29 total vaccines administered, the year prior to project implementation, a total of 1,951 vaccines were administered during this project. Education was provided to 2,631 Soldiers with 1,424 (54.1%) choosing HPV vaccination. Provider knowledge improved by 30.1% after an educational presentation to 59 clinicians (P-value < 0.0001). Community engagement reached over 217,449 individuals through 20 educational social media posts.

Organizational Impact: This project was designed to decrease barriers and provide Soldiers education about their risk for HPV, vaccine benefits, and the option to receive the vaccine on-site. Clinician education increased provider knowledge and social media engaged the community to raise awareness. This multi-modal intervention increased HPV vaccinations in a replicable format to improve unit readiness, access to care, and the future health of servicemembers.

ABBREVIATED VERSION

Phase II Site: Fort Bragg, NC

Project: Performance improvement project to improve Human Papillomavirus (HPV) vaccinations in active duty Soldiers, by using a multi-modal interactive education program that included clinician and Soldier education combined with social media engagement.

Impact: A replicable program that demonstrated increased HPV vaccinations in servicemembers to improve unit readiness, access to care, and the future health of the force.

Increasing Human Papillomavirus Vaccination Rates in Active Duty Servicemembers: A Multi-Modal Interactive Education Program

The human papillomavirus (HPV) affects 79 million Americans and is the most common sexually transmitted infection (STI) in the United States (US) (Centers for Disease Control and Prevention [CDC], 2014). With over 14 million new diagnoses annually, the US spends an estimated eight billion dollars on HPV treatment per year (Chesson et al., 2012; Wedel, Navarrete, Burkard, & Clark, 2016). According to the CDC (2014), 80% of the US population will have contracted at least one strain of HPV during the childbearing years.

Although cervical cancer is the second leading cause of cancer deaths in women worldwide, HPV does not solely affect women (Chan et al., 2012; CDC, 2014). In addition to the vast majority of cervical cancer cases, HPV causes 40% of vulvar, vaginal and penile cancers; 72% of oropharyngeal cancers; 90% of anal cancers; and over 360,000 annual cases of genital warts (Wedel et al., 2016). In 2015, the rate of HPV-related oropharyngeal cancers exceeded that of cervical cancer (Han, Tarney, & Song, 2017).

The nine-valent HPV vaccine is FDA approved and recommended by the Centers for Disease Control (CDC), Advisory Committee on Immunization Practices (ACIP), American Academy of Pediatrics (AAP), the World Health Organization (WHO), and numerous other health organizations since 2006 (CDC, 2014). This vaccine is effective prevention for over 90% of HPV-related diseases (Wedel, Navarrete, Burkard, & Clark, 2016).

Significance of the Problem

Nearly 200 strains of HPV have been identified (de Villiers, 2013). Most infections are transient and can be cleared by a healthy immune system; however, there are at least 15 harmful strains that can lead to genital and oropharyngeal warts or cancer (de Villiers, 2013; Schiffman,

2007). In 2010, the US spent an estimated eight billion dollars on HPV-related diseases, which includes the cost of cervical cancer screenings, procedures, and follow ups; cervical, vulvar, vaginal, penile, anal, and oropharyngeal cancers; genital warts, and recurrent respiratory papillomatosis (Chesson et al., 2012). This makes HPV the second most expensive sexually transmitted infection (STI) in the US; second only to human immunodeficiency virus (HIV) treatment (Area Health, 2015). It is estimated that the financial burden of HPV will increase 34-115% by 2020, due to the aging population and improved treatment options (Area Health, 2015). The estimated expenditures do not include costs associated with psychosocial and quality of life issues or lost work time due to infections and cancers caused by HPV (Osazuwa-Peters, 2013).

The FDA approved the first HPV quadrivalent vaccine for females in 2006. This vaccine prevents infection from strains of HPV that cause genital warts and 70% of all cervical cancers (CDC, 2006; FDA, 2014). In 2009, the FDA approved HPV vaccination for use in both males and females for prevention of genital warts (CDC, 2011). Between 2008 and 2012, nearly 39,000 HPV-associated cancers were diagnosed each year with 59% affecting females and 41% affecting males (Viens, 2016). Since the introduction of the vaccine, infections preventable by the quadrivalent HPV vaccine have decreased in both females and teens (CDC, 2015). Over 60% of these cancers are preventable with completion of the quadrivalent vaccine, and completion of the nine-valent vaccine improves coverage to greater than 90% (Viens, 2016).

Currently, the nine-valent vaccine, also known as Gardasil 9 in the US, is used to prevent up to 90% of cervical, vulvar, vaginal, and anal cancers, and has been determined a safe and effective vaccine (FDA, 2014). Per the manufacturer's guidelines, the Gardasil 9 vaccine is indicated for males and females ages 9 through 26 (Merck, 2016). Researchers at the CDC demonstrated through an immunogenicity clinical trial in 2015 that the nine-valent vaccine can

be administered safely even if the patient has previously received the quadrivalent vaccine (CDC, 2015). Researchers also found that after three doses of the nine-valent vaccine, 98% of subjects developed antibodies to all nine HPV strains (CDC, 2015). As of October 2016, the CDC and ACIP recommend two doses of the vaccine for adolescents ages 9-14, and three doses for those ages 15-26 (CDC, 2016). Findings from the clinical trial indicated a two-dose schedule for ages 9-14 is as effective as three doses because of a higher immune response to the vaccine (CDC, 2016).

In alignment with a recent World Health Organization (WHO) recommendation to increase HPV vaccination rates, more than 120 countries have included the HPV vaccine in their routine vaccination schedule (WHO, 2017; Kumar, 2015). The vaccine is recommended in the US but is not mandated as a routine immunization (CDC, 2015). Although multiple states since 2006 have introduced HPV vaccine legislation in effort to mandate vaccination, only 23% have enacted them. At this time 25 states, plus the District of Columbia, have instituted legislation to support increased HPV vaccination uptake (National Conference of State Legislation, 2017).

Evaluation of Evidence

A literature review was conducted to determine if multi-modal approaches increase vaccination uptake. Individual literature reviews were conducted for the three interventions performed in the project. These include the effects clinician education has on HPV vaccine rates, the impact of social media engagement with the community, and whether leadership support plays a role in medical decision making for a non-mandatory vaccine.

All literature searches were limited to 2006 to present day due to vaccine debut in 2006 (See Figure 1). Articles were classified by level of evidence using LoBiondo-Wood, G., & Haber's (2014) evidence pyramid with "I" as the strongest level of evidence, and "VII" as the

weakest. Articles were also classified by quality using the Johns Hopkins quality of evidence appraisal tools with “A” being high through “C” being low with major flaws (Newhouse, Dearholt, Poe, Pugh, & White, 2008).

Multi-modal Search Strategy

A literature search was conducted to determine if a multi-modal social marketing campaign increases HPV vaccination rates. The search strategy was conducted using seven databases with Boolean connectors and terms associated with the following clinical question: Does the use of a multi-modal social marketing campaign increase HPV vaccination rates for those eligible for vaccination?

Articles were included if researchers measured HPV vaccination rates, mentioned a form of social marketing, and if they described an intervention used to increase vaccination rates (e.g., pamphlet, poster, video). Articles were excluded if they were duplicates, researchers discussed attitudes, beliefs, or perceptions towards vaccination, or if one single intervention was studied (see appendix A1 for search strategy).

Literature synthesis and themes. The literature appraisal consisted of three, Level I articles; one, Level III article; two, Level V articles; and one, Level VI article. Synthesis of the seven articles identified six recurrent themes that increase HPV vaccination: (a) provider recommendation and education, (b) multi-modal approach, (c) patient reminders, (d) patient education, (e) social marketing, and (f) increased access to vaccine (see appendix A2 for literature synthesis and themes).

This review revealed high quality evidence to globally recommend combining interventions to increase HPV vaccination rates (Niccolai & Hansen, 2015; Smulian et al., 2016; Walling et al., 2016). The highest quality and level of evidence consistently supported provider

recommendation and patient education as most impactful in increasing HPV vaccination rates. Limitations of this review are the heterogeneity of interventions because different types of interventions could not be equally compared. At this time, there is insufficient data to recommend a specific combination of interventions however, interventions should be focused for the population served (Niccolai & Hansen, 2015; Smulian et al., 2016; Walling et al., 2016).

Clinician Education Search Strategy

A literature review was performed to determine the effect of clinician education on HPV vaccination rates. The search strategy was conducted using two databases with Boolean connectors and terms associated with the following clinical question: Does providing education to clinicians on HPV and the HPV vaccine improve HPV vaccination rates in females and males age 9-26, compared to current knowledge?

Abstracts and articles were included if they contained a clinician education intervention and analysis of resulting clinician knowledge or HPV vaccination rates. Additional inclusion criteria included the English language and setting within the US. Fourteen articles fulfilled these requirements (see appendix B2 for the search strategy).

Literature synthesis and themes. The literature appraisal consisted of four, Level I articles; two, Level II articles; and eight, Level V articles. The identified recurring themes included: (a) multi-modal interventions and their effects on HPV initiation; (b) HPV completion; (c) clinician recommendation; and (d) clinician knowledge. In two articles, researchers addressed provider education independently. The other twelve articles included additional interventions to improve HPV vaccination rates such as patient education, patient reminders, clinician reminders, and clinic level interventions (see appendix A1 for search strategy).

Researchers found clinician education increased HPV vaccination initiation- Additionally, vaccination uptake was improved when provider education was paired with additional interventions that addressed patient education and/or reminders for completion of the series (Berenson et al., 2015; Brewer et al., 2017; Fiks et al., 2013; Fisher-Borne et al., 2018; Jacobs-Wingo, Jim, & Groom, 2017; Krantz, Ollberdig, Beck, & Burkhardt, 2016; Mazzoni, 2016; McLean et al., 2017; Oliver, Frawley, & Garland, 2016; Paskett et al., 2016; Perkins, Zisblatt, Legler, & Hanchate, 2015; Sanderson et al., 2017; Vollrath, Thul, & Holcombe, 2018; Walling et al., 2016).

Social Media Search Strategy

A literature search on social media sentiments was conducted to examine if attitudes influence HPV vaccination uptake. The search strategy was conducted using two databases with Boolean connectors and terms associated with the following clinical question: In both males and females, does the use of a social media platform influence attitudes toward HPV vaccination?

Articles and abstracts from January 2006 to February 2016 were reviewed for current literature regarding social media influence on vaccination uptake. Inclusion criteria was patient population ages 9 to 26 and elements relevant to the clinical question. Articles were excluded if they did not address any elements of the clinical question. Results were also limited to the English language (see appendix C1 for search strategy).

Literature synthesis and themes. The literature appraised consisted of 11, Level III articles; one, Level II article; and one, Level I article. The identified recurrent themes included: (a) social media has influence (both positive and negative); (b) provider recommendation through social media influences decision; and (c) negative sentiments perpetuate negative (see appendix C2 for literature synthesis and themes).

Researchers found high level evidence supporting the idea that use of a social media platform can influence attitudes toward HPV vaccination uptake (Lai et al., 2015; Nan & Madden, 2012). The limitation of this review is the lack of experimental evidence, emphasizing the need for further research on utilization of social media as an educational modality.

Leadership Support Search Strategy

A search was conducted to examine the effect leadership support has on an individual's decision making regarding vaccine uptake. The search strategy was conducted using two databases with Boolean connectors and terms associated with the following clinical question: In a population of unvaccinated adults, how does leadership support of non-mandatory vaccines, compared to neutral support, influence vaccination rates of non-mandatory vaccines?

Articles and abstracts from June 2007 to June 2017 were included for review of current literature regarding leadership influence on vaccination rates. Articles were excluded if they did not address at least two elements of the clinical question and if they were published more than ten years ago. Results were also limited to the English language (see appendix D1 for search strategy).

Literature synthesis and themes. The literature appraised consisted of two, Level III articles; one, Level VI article; and three, Level VII articles. Synthesis of these six articles identified six recurrent themes: (a) leadership support, (b) patient education, (c) combining interventions, (d) removing barriers to the vaccine, (e) information technology, and (f) social media. All themes had a positive effect on adults choosing to receive a vaccine. leadership support influences vaccination uptake in adults, and none of the articles found that leadership support does not have an influence (see appendix D2 for literature synthesis and themes).

Researchers found that leadership support influences vaccination rates in adults. Combining leadership with the five other themes increased adult vaccination uptake (Ajenjo et al., 2010; FitzSimmon et al., 2014; Lynch et al., 2010; Paparone et al., 2015; Perman et al., 2017; Rosen & Goodson, 2014). The lack of experimental evidence is seen as a limitation overall, and indicates the need for further research.

Clinical Question

In active duty Soldiers ages 18-26, does a multi-modal interactive education program that includes Soldier and clinician education; community engagement through social media; and leadership support increase HPV vaccination rates, as compared to current vaccination rates at Fort Bragg, NC?

Focus Areas

Multi-modal

Addressing vaccination uptake using a multi-modal approach has been shown to improve vaccination rates (Blasi, King, & Henrikson, 2015). Research indicates that leadership support of non-mandatory vaccinations is effective in increasing vaccination uptake (Perman et al., 2017). A strong clinician recommendation is the number one reason for acceptance of the HPV vaccine (Dunne et al., 2014). Social media provides an opportunity for education and awareness in this highly technological age group (Perrin, 2015). This project incorporated a combination of the above interventions into a three prong approach for the purpose of increasing HPV vaccination uptake at Fort Bragg, NC.

Three Prong Strategy

The three prongs of this project utilized the American Cancer Society's (ACS), National HPV Vaccination Roundtable Toolkit as the main resource. Figure 2 depicts the strategic

crosswalk detailing this process. The first prong was clinician education; the second social media; and the third unit commander engagement for support and Soldier education. The catalysts necessary for implementation were dashboard tracking and engaged stakeholders to include unit leadership, medical personnel, and social media experts.

There were two short-term goals underpinning the three prong strategy: (a) increase HPV vaccination uptake of eligible active duty Soldiers enrolled to the soldier care clinic by 20% (b) improve Soldier readiness through adoption of a preventive health measure, namely HPV vaccination.

The long-term goal was to decrease HPV-related illness, through increased vaccination uptake in the population, which aligns with the crosswalk end state. Decreased appointments for abnormal Pap test results, colposcopies, and genital wart removal will improve access to care. Decreasing HPV-related infection and disease will improve Soldier readiness by decreasing burden and time lost for preventable HPV-related infection and disease. The effects of improved HPV vaccination rates gradually translate to decreased disease within a population. Short-term outcomes, such as decreased rates of genital warts are evident in years. Long-term outcomes, such as decreased rates of cancer may take decades to measure impact (ACS, 2017). This multi-modal approach, as depicted in the crosswalk, was designed to be easily replicated for implementation at other sites.

Clinician Education

A strong clinician recommendation is the number one reason patients choose to receive the HPV vaccine (Dunne et al., 2014; Gerend, Shepherd, Lustria, & Shepherd, 2016). Clinicians are more likely to recommend the vaccine if they are well versed on its efficacy, risks, and feel comfortable discussing it (Duval et al, 2007, 2009; McCave, 2010). All interventions in this

project used education retrieved from the American Cancer Society National HPV Vaccination Roundtable Toolkit as an essential component. The evidence-based presentation, “You are the Key to HPV Cancer Prevention”, was selected from the National HPV Vaccination Roundtable Toolkit (2017). McLean et al. (2017) and Jacob-Wingo et al. (2017) demonstrated success with this presentation as part of a multi-modal approach that increased HPV vaccination rates by 19% and 24% respectively. A pre-test and post-test were designed with four questions to measure clinician knowledge and one question to assess attitudes on intent to recommend HPV vaccination. Questions were derived from the current literature to address this population and approved for use by the project committee

Social Media

Current literature supports that social media influences attitudes toward HPV vaccination (Lai et al., 2015; Nan & Madden, 2012). Over 245 million Americans use social media, and 90% of the HPV vaccine eligible population use it daily (Perrin, 2015; PricewaterhouseCoopers, 2012). More than 80% of eligible individuals are likely to share health information through social media (PricewaterhouseCoopers, 2012). The primary audience for vaccination is online looking at health topics and social media offers a familiar modality to provide education on HPV. Evidence supports combining interventions to improve education and vaccination rates (Blasi, King, & Henrikson, 2015).

Social media experts assisted in launching a seven-month social media campaign supporting HPV vaccination. Posts were designed using resources from the National HPV Vaccination Roundtable Toolkit. The objective was to use the military treatment facility’s established social media platform to post HPV vaccination education. The development of a communication plan led to the creation of a self-sustaining campaign run by the social media

manager. Social media campaigns are tracked and analyzed using data known as analytics (Bhattacharya, Wamba, Akter, Kang, & Upal, 2016). Each platform has its own analytics program built in. The social media managers removed all Personally Identifiable Information (PII) from the results to maintain privacy. The relationship between the campaign and vaccination rates were not correlated because this is a performance improvement project intended to educate the population on HPV through multiple interventions.

Unit Commander Engagement

Current literature indicates that leadership support is an effective tool to increase vaccination rates of non-mandatory vaccines (Perman et al., 2017). A combination of multiple efforts that include education, removing barriers, and utilizing information technology has been shown to have a positive effect on adults choosing to receive a vaccine. Using the National HPV Vaccination Roundtable Toolkit, unit commanders were educated on the potential health risks facing their Soldiers. An essential catalyst for engaged stakeholders was to request the support of local commanders and subsequently obtain permission for Soldier education across several units of a large division on Fort Bragg.

The short-term goal of this project was to educate and offer the vaccine over seven months and increase initial HPV vaccination rates by 20%. Additional interventions included providing HPV education around the unit's schedule at any time or location that was most optimal for the unit; removing barriers to vaccine administration by having it available at the education location; and protecting the privacy of the Soldiers who chose to receive the vaccine by using a non-identifying numbering system for tracking. The high operational tempo of Fort Bragg units and the short duration of this project required an effective reminder system for

Soldiers to complete the vaccine series. Reminder cards and the use of a free text messaging service were used to provide Soldiers anonymous reminders.

Dashboard tracking was another project catalyst to measure numbers of vaccination uptake per unit. The Command and their medical staff received monthly updates. Updates were performed to: (a) illustrate the Soldiers' interest in health prevention education and a cancer prevention vaccine, (b) elevate our concern for the future health of our Soldiers among the unit's other priorities, (c) demonstrate that the vaccine is readily available and can be efficiently administered simultaneously with other training activities, and (d) motivate leaders to engage in friendly competition and keep cancer prevention among their list of Readiness priorities.

Military Relevance

Losing Soldiers to preventable diseases will drastically impact unit readiness for deployment and compromise the military mission (Moffitt, 2011). Other lifesaving vaccines are mandatory for all service members; however, HPV is not a mandatory vaccine in the military or most states. The military population has a rate of STIs that is up to seven times that of the general public (Goyal, Mattocks, & Sadler, 2012). This is possibly contributable to the military being a subset of the population with higher risk groups including younger aged, single adults, from various racial and ethnic groups throughout the services (Goyal, Mattocks, & Saddler, 2012). Similar to the rest of the US, HPV remains the military's most common STI (Armed Forces Health Surveillance Center, 2013). In a thirteen-year study, 304,021 HPV infections were identified across all military branches. This number of HPV cases exceeds that of chlamydia, gonorrhea, genital herpes simplex virus, and syphilis combined (Armed Forces Health Surveillance Center, 2013). According to the Army Regulation on Standards of Medical Fitness, most Soldiers with an HPV-related disease will become non-deployable due to the need

for further testing, treatment or procedures, and may result in a medical discharge from military service (Department of the Army, 2016).

The majority of American health systems use Healthcare Effectiveness Data and Information Set (HEDIS) metrics to measure performance on several aspects of care and some are eligible for reimbursement in the Defense Health Agency (National Committee for Quality Assurance, 2017). Gonorrhea, chlamydia and HPV are components of HEDIS metrics and at this time gonorrhea and chlamydia are reimbursable (National Committee for Quality Assurance, 2017). However, the military spends more money treating HPV-related diseases than gonorrhea and chlamydia combined (Maktabi, Ludwig, Eick-Cost, Yerubandi, & Gaydos, 2012). Colposcopies, wart removal, and other procedures account for clinic appointments and disrupt the service members from training for a condition that is more than 90% preventable by the HPV vaccine (Agan, 2013).

Vaccinating active duty service members with a cancer prevention vaccine that protects against nine potentially harmful HPV strains has several advantages (CDC, 2015). Benefits of an HPV vaccinated force include: (a) cancer prevention; (b) increased military readiness; (c) increased medical access; and (d) decreased medical cost associated with HPV-related diseases and long-term disability (Osazuwa-Peters, 2013).

The US HPV vaccination rate for the first vaccine in the series is 41.6 % for females and 10.1% for males in individuals ages 19-26 (Williams et al., 2017). With each additional vaccination in the series of three, the rate of completion decreases (Dunne et al., 2014). In 2009, less than 15% of eligible female service members stationed at Fort Bragg, NC had initiated the HPV vaccine series (LaRocque & Caban, 2011). The nine-valent vaccine costs the government approximately \$107.00 per dose, for a total of \$321.00 per service member to complete the three

vaccine series (R. Brucher, personal communication, March 23, 2016). It is estimated that over \$100,000 will be gained in cost per quality-adjusted life year (QALY) if female teens receive the nine-valent vaccine (CDC, 2015). In females older than 18 and males of any age, the gained cost per QALY is estimated to be even higher (CDC, 2015).

For approximately \$321.00 per vaccine eligible service member, the Defense Health Agency (DHA) stands to gain a wealth of benefits. In addition to the enormous cost savings of being vaccinated versus being treated for several types of cancer and genital warts, there are psychological benefits related to knowing that the DHA is vested in the current and future health status of service members. In the 12 months prior to the start of this project, 1,688 appointments for HPV-related conditions were recorded at the largest Soldier primary care clinic located at Fort Bragg. Appointments that would be used for HPV-related diagnostic testing, procedures, and follow-up could be saved and instead used to increase access to care for all beneficiaries (Agan, 2013).

With an HPV-vaccinated force, less time would be spent on appointments, tests, and procedures. Readiness would be maximized because more servicemembers can participate in training to prepare for worldwide deployment. Herd immunity could be established among the Fort Bragg population and provide protection for those who are not vaccinated (Area Health, 2015). The vaccine is readily accessible to units without cost burden for servicemembers. The more we educate and vaccinate our servicemembers, the more likely they will be to ensure their children are vaccinated, as well, securing better health for the future generation.

Nursing Relevance

Advanced Practice Registered Nurses (APRNs) provide care for patients with HPV as well as patients within the 9 to 26-year-old age range who are eligible for the HPV vaccination. It is

important to address adult patients and parents of minors with honest, concise, and open communication. Multiple studies have reported that a strong provider recommendation is the number one predictor of vaccination (Dunne et al., 2014; Gerend, Shepherd, Lustria, & Shepherd, 2016).

The APRN is committed to health, wellness, and promotion through preventive health practices. Caring for individuals affects the health of the community. The HPV vaccine is recommended to decrease the national burden of HPV-related cancer and disease. A goal of Healthy People 2020 is an 80% vaccination rate of 13 through 15-year-old males and females (ODPHP, 2016).

Organizing Framework

The Implementation Strategies for Evidence-Based Practice (EBP) model was used to implement this project. This project required a model that addressed evidence-based implementation strategies in order to engage stakeholders and promote change in practice. This model is comprised of four phases, each providing evidence-based strategies for implementation that are applicable to the different focus areas throughout this project (Cullen & Adams, 2012).

The three prongs of this project were clinician education, social media, and unit leadership and Soldier education.

Phase One

The first phase of this model involved creating awareness and interest (Cullen & Adams, 2012). This was accomplished through briefing project goals to key stakeholders and the Phase II Site Director, who served as the EBP mentor. Key stakeholders included the Division Surgeon, social media managers, clinician and unit leadership, and nursing research cell. Director support was integral to the success of subsequent strategies. Stakeholder support and

advertising strategies, through visual aids and social media, facilitated awareness and interest in this project.

Phase Two

The second phase was to build knowledge and commitment through implementation of this project (Cullen & Adams, 2012). A multi-modal approach using evidence from current literature allowed for the most effective interventions in educating clinicians, leaders, Soldiers, and the community to improve HPV vaccination uptake. A variety of educational modalities used included live presentation, Microsoft PowerPoint, and social media. Each aspect of Phase two required the understanding of local logistics for coordination of supplies and personnel support.

Phase Three

The third phase included promoting action and adoption to maintain productivity and maximize project implementation (Cullen & Adams, 2012). Clinician education was provided to increase knowledge on current evidence for HPV vaccination to encourage strong clinician recommendation that reinforces positive messages. Social media education was utilized to encourage the community to seek credible resources and to increase knowledge on the cancer prevention benefits of the HPV vaccine. Soldier education included an evidence-based elevator speech that provided clear, consistent education that promoted knowledge retention and facilitated a well-informed decision. Data collection, prompt follow up, and progress updates for medical personnel and their Command was instrumental in maintaining this project as a priority. Patient reminders provided the Soldiers autonomy for their preventive health. Throughout this project, challenges with implementation were resolved with multidisciplinary troubleshooting.

Phase Four

The fourth and final phase of the model was pursuing integration and sustainment (Cullen & Adams, 2012). This was difficult due to time, resources, high operational tempo, and rapid staff turnover. It was challenging to maintain the vaccination as a high priority for preventive health because it is not mandatory. Clinical pharmacists were consulted to develop a sustainable platform for continued clinician education. The pharmacists incorporated HPV education into their bi-monthly presentation that will be used at hospital orientation for all new clinicians. The public health, STI, PowerPoint was edited to include HPV vaccination education and will be presented as mandatory training for new, incoming personnel to Fort Bragg. The social media manager will continue community engagement through posts supporting HPV vaccination. The HPV vaccine will continue to be available at all outpatient clinics on Fort Bragg, accessible by Soldiers and beneficiaries on a walk-in basis.

Project Design

General Approach

This performance improvement project utilized a multi-modal approach with clinician education, social media, and command and Soldier education to improve HPV vaccination rates. The goal of this project was to improve HPV vaccination rates in active duty service members by 20% at Robinson Health Clinic in Fort Bragg, NC.

Clinician education. All privileged and non-privileged clinicians were encouraged to attend educational presentations. The knowledge and attitudes of the clinic staff were evaluated through pre-tests and post-tests in conjunction with the presentation “You are the Key to HPV Cancer Prevention” retrieved from the American Cancer Society National HPV vaccination Roundtable Toolkit. Four questions addressed HPV prevalence and vaccination recommendations. The fifth question asked about clinician recommendation of the HPV

vaccination utilizing a categorical scale with responses “no”, “sometimes”, and “yes”. The pre-test assessed current practice recommendation and the post-test addressed future practice. Visual educational tools were provided to clinicians in the form of posters, postcards, and fliers to disseminate in their practice. The link to the American Cancer Society National HPV vaccination Roundtable Toolkit was provided to all attendees. Results were provided to the clinic staff after project completion.

Social media campaign. Social media expert engagement was crucial to the success of this prong of this project because it facilitated access to well established social media pages to post evidence based messages supporting HPV vaccination. The hospital social media manager was identified as a champion change agent because she organized the hospital Facebook and Twitter page content. She expressed interest because posting on HPV was nested within her current health messages on social media.

The communication plan was a collaboration with the social media managers. Social media post design used resources from the American Cancer Society National HPV vaccination Roundtable Toolkit and was compiled into a communication plan managed by the social media manager. The communication plan outlined purpose, background, posts, desired effects, intended audience, key messages, and commonly asked questions. Initial posts included graphics, links, and media content. The post primarily used for this campaign was a one line message with a picture and a link to the American Cancer Society National HPV vaccination Roundtable Toolkit.

The social media manager posted one to two times per month and used the communication plan to craft appropriate responses. During implementation of this project, nine

posts were uploaded to Facebook and 11 tweets uploaded to Twitter. Analytics were used to retrieve data at the end of the seven months.

Analytics were used to evaluate the number of individuals reached, engagements, and sentiments and provided valuable insight on knowledge gaps in this population. Facebook and Twitter have important terms to understand for their analytics. Facebook analytics define reach as the number of times a post shows up on a users newsfeed (Mayo Clinic Social Media Network, 2017). Analytics measured engagement through views, reactions, comments and shares. Twitter analytics measured impressions, which is defined as the number of times a post showed up on a users newsfeed similar to reach for Facebook (Mayo Clinic Social Media Network, 2017). Twitter engagement was measured through likes, comments, and views.

Engagements may be positive, negative, or neutral. Engagements on Facebook and Twitter were analyzed from both platforms through a content analysis to determine sentiment, or overall tone. Sentiments were defined as positive or negative if engagements were >50% positive or negative (Bahk, 2016). Neutral implies equal positive and negative engagements or no engagements for a post. This information revealed the sentiment on HPV vaccination in the community.

Unit commander engagement. Commander engagement and support was crucial to the success of this project. A letter of support was obtained through the 82nd Airborne Division and 44th Medical Brigade Surgeons. This support allowed access to eligible Soldiers ages 18 to 26 to provide HPV education and the opportunity for vaccination. After obtaining command support and expectations, Soldier briefings were conducted throughout subordinate units. The division's third brigade combat team was the primary focus due to the extremely high operational tempo of the division.

Providing education and administering the vaccine on site removed barriers for Soldiers who elected to receive the vaccine. Flexibility was key and this project team was prepared to teach at meetings, during training, before or after PT, in the motor pool, and anywhere that an audience could be obtained. All education was provided with the vaccine on site, similar to annual flu vaccine campaigns, and administered to those interested.

Vaccine numbers were emailed to the unit medical staff monthly and immediately following events, who then informed their command, to maintain subsequent support. The number of leaders and Soldiers educated, and the number of Soldiers who chose to be vaccinated were tracked using a non-identifying numbering system. They were given reminder cards and a non-identifying text messaging system for automatic reminders for the second and third vaccines. The busy training calendar for the units and short duration of this project necessitated a reminder system. A final briefing was conducted to inform the medical staff of the project results and to thank them for their participation and support of cancer prevention.

Setting

This performance improvement project was conducted at multiple locations on Fort Bragg, NC, to include: Robinson Health Clinic, several units in the 82nd Airborne Division, and 44th Medical Brigade. Fort Bragg is an Army Base in North Carolina that primarily supports Special Operations and the 82nd Airborne Division. Robinson Health Clinic serves approximately 34,000 beneficiaries, including 8,387 Soldiers ages 18 to 26 assigned to the 82nd Airborne Division. It is organized as a Soldier Centered Medical Home with experienced nurses, providers, medical technicians, medics, and ancillary staff. This project focused on the clinicians at Robinson Health Clinic and primarily combat units in their garrison setting. An additional setting included the 82nd Airborne Division's Soldier Readiness Center (SRC), where incoming

Soldiers to the division were provided education on HPV and the HPV vaccine while they were screened for medical readiness.

HIPAA Concerns

Personally identifiable information (PII) was encountered in this project through chart reviews and documentation of HPV vaccinations administered. Several courses of action were implemented to mitigate the risk associated with handling this information. Project coordinators maintained current HIPAA certification. The collated data had PII removed so that participants could not be identified. Information recorded included only gender, age, and unit assigned. This information was stored in a secured folder on a CAC enabled computer (Wofford, 2016). The pre and post-tests were anonymous, requesting only the position of the staff member. The information gained from the analytics used in the social media campaign were statistics and did not include any PII. The HPV vaccine is available at the immunization clinic in Fort Bragg and is an optional vaccine not mandated for active duty military. Therefore, disclosure of responses would not place the participants at risk or become damaging to their financial standing, employability, or reputation (Department of Health and Human Services [DHHS], 2016).

This project is not research; it is a performance improvement project to increase the amount of HPV vaccinations. The involvement of human subjects was through surveys, review of data, documents, and records that span before and after implementation of the toolkit. This project group received Internal Review Board exemption under 45 CFR 46.1010(b)(2) through expedited procedures with waived informed consent under 45 CFR 46.116(d) (DHHS, 2016).

Project Results

Four clinic staff presentations were provided with a total of 64 attendees. Three arrived late and did not complete a pre-test or post-test and two were excluded for not completing a post-

test. The remaining 59 clinicians included six physician assistants (PAs), 16 pharmacists, one Registered Nurse (RN), three Licensed Practical Nurses (LPNs), and 32 medics.

The social media campaign consisted of 20 total posts with nine posts on Facebook and 11 tweets on Twitter. The majority of the posts were an image with the message “HPV associated cancer prevention is as easy as 1-2-3!” and a link to the American Cancer Society page on HPV vaccination. One Facebook post was a live question and answer (Q&A) video. The total reach for Facebook was 214,860. Of this reach, 191,692 were generated from the Facebook Q&A video. Similar to reach for Facebook, the total impressions for Twitter were 2,589. Total engagements for both Facebook and Twitter were 22,811 expressed as reactions, comments, and shares.

Five command briefings were conducted, providing education to 167 leaders. A total of 2,631 Soldiers were educated. Fifty-four percent of those educated chose to receive the HPV vaccine, resulting in 1,952 vaccines being administered to 1,424 Soldiers. In the year prior to the implementation of this project 29 vaccines were administered from February 2016-March 2017. After project implementation from February 2017-March 2018 the average monthly vaccinations for the population 18-26 years were increased from 3 to 267, a 60 fold increase. The majority of HPV vaccinations were the first dose in the series with 1,424 vaccinations, 447 individuals received both first and second vaccines in the series, and 40 Soldiers received all three doses.

Analysis of the Results

The significant 30.1% improvement in clinician knowledge from a short educational presentation is similar to what Paskett et al (2016) saw with their five question post-test. The improvement of scores on the post-test was statistically significant for the collective clinic staff ($p < .001$), the medics ($p < .001$), and the pharmacists ($p = .0036$). The other categories were not

statistically significant due to the small sample size. The results signify a gap in knowledge for clinicians. The clinician group with the greatest improvement of knowledge was the medics. This was important because the medics often screen records and inform the Soldiers of the immunizations they need.

The 57.6% improvement of clinicians' attitude towards recommending the vaccine in the future was of importance, as patients who receive a recommendation from a clinician are more likely to receive the vaccination. The vast majority of literature shows an increase in vaccination initiation after clinician education, enhanced further by additional patient and provider interventions (Krantz et al., 2018; Sanderson et al., 2017; Paskett et al., 2018).

The 54% of Soldiers educated who chose to receive vaccination was greater than the national rate of 41.6% for females and 10.1% for males in this age range (Williams et al., 2017). The percentage is of importance because this project focused on primarily combat arms, a primarily male dominated specialty. This also demonstrated Soldier's interest in HPV vaccination when provided evidence-based education. The tremendous increase of HPV vaccinations from a monthly average of 3 to 267 through the multi-modal approach reflects what is seen in the literature with multiple interventions improving initiation and completion rates (Walling et al., 2016). Seventeen percent of the Soldiers received their 1st and 2nd vaccine and 40 Soldiers completed the series of three during this project. The lower incidence of second and third dose vaccinations is consistent with what is seen nationally (Dunne et al., 2014). During this project receiving the second and third doses in the series was further complicated in this population by high operational tempo with units mobilizing for training and deployments. This complication, combined with a less than ideal time frame of seven months for implementation

likely affected the ability of Soldiers to return for the second and third vaccines prior to the end of this project.

The social media campaign had a total reach of 217,449 on Facebook and Twitter with 23,168 from the most commonly used post. The post designed with the social media manager was an image with the message “HPV associated cancer prevention is as easy as 1-2-3!” and a link to the American Cancer Society page on HPV vaccination. This post had a reach of 23,168 with prevailing positive and neutral sentiments on both Facebook and Twitter.

The majority of reach from Facebook was 191,692 from the live Q&A video. The majority of the 21,677 engagements occurred after the session was over and the video was posted for replay to the local military treatment facility Facebook page. The sentiment of these engagements from the live event were negative with certain individuals commenting multiple times and interacting with others who share a similar negative sentiment. Content of the negative engagements attacked the credibility of information by posting screenshots of the package insert with misinterpretations, non-scholarly sources such as “Natural News”, and the documentary “VAXXED by Andrew Wakefield”. This is consistent with the literature that negative potentiates negative (Lai et al., 2015; Nan & Madden, 2012). Engagements that were positive were attacked by negative engagements.

Organizational Impact/ Implications to Practice and Policy

Mandating the HPV vaccination for military service is a long-term goal that would ultimately impact practice and policy. Ensuring servicemembers are vaccinated will decrease loss of work and non-deployable Soldiers due to HPV-related diseases, appointments, and treatments. This will further ensure a fit and ready force.

Implementation of a multi-modal approach to educate and increase HPV vaccination instilled a culture of knowledge and awareness, emphasized readiness, and will decrease healthcare costs. This impact was sustainable because pharmacists will champion presentations to continue educating clinicians and other personnel in the military treatment facility. The ACS toolkit will be used to place emphasis on the key point that clinician recommendation is the number one reason patients will choose to vaccinate (Dunne et al., 2014; Gerend, Shepherd, Lustria, & Shepherd, 2016).

The HPV vaccine contributes to readiness because higher vaccination rates correlate with less transmission. Decreased appointments for HPV related diseases that are largely preventable contribute to overall Soldier health and readiness and will decrease healthcare costs because HPV is the second most expensive STI in the military (Agan, 2013; Area Health, 2015).

Recommendations for Improvement

Barriers and limitations were encountered during this project. This section will explain them and provide recommendations for improvement. Fort Bragg, NC is the largest Army base by population and has an extremely high operational tempo because units are constantly in rotation for deployment and quick reaction missions. Training is nonstop and units are not present for weeks to months at a time. This must be taken into consideration when approaching leaders for future projects. Due to unit priorities Soldiers may be difficult or impossible to access if this project team is not flexible. Educating unit leadership on HPV related diseases and the potential consequences to their Soldiers' health and readiness, as well as flexibility, will be key for future project teams to gain leadership support and access to Soldiers.

The American Cancer Society National HPV Vaccination Roundtable Toolkit presentation used for clinician education is evidence based and validated. Validated questions

for the pre and post-test were not available instead the project team designed questions based on the information in the presentation, which may be seen as a limitation.

The social media campaign was affected by online etiquette. Literature shows that negative perceptions perpetuate further negativity online, including comments and reactions (Lai et al., 2015; Nan & Madden, 2012). Throughout this project it was discovered that more comments were made on social media posts when participants had a negative reaction to the material. Individuals with positive comments were ridiculed by opposing opinions. Less comments were made when participants had a neutral or positive reaction. A recommendation for future projects would be to correlate these incidental findings and utilize social media networking with vaccination advocates for support.

This project found that closing the knowledge gap on HPV and removing barriers to accessing the HPV vaccine had a positive impact on improving the vaccination rate. Throughout this project it was very common for Soldiers to ask why the presentation was the first time they had heard of HPV and why they were not aware the vaccine was available to them and their families. Providing them with the knowledge and having the vaccine available at their location immediately following removed several access barriers. Many Soldiers ages 18-26 are in entry level ranks and their time during the work day is dictated by their superiors. It is not an easy task for most young Soldiers to be permitted to miss work for a non-mandated vaccine. However, having the vaccine present at their work location in conjunction with their leadership's support of this project made receiving the HPV vaccine seamless for the Soldiers. This project demonstrated that using programs that are already in place is an effective strategy to maximize education and vaccination. Educating Soldiers on integrating their vaccination records from prior to military service with their current records is a recommendation for future projects. When

a Soldier had received the HPV vaccine prior to entrance in the military, their records were frequently unavailable and contributed to the number of Soldiers who did not receive the vaccine. Not having prior documentation of a Soldiers vaccinations prior to entrance into the military makes calculation of vaccination rates inaccurate.

This project was nine months long and included seven months of employing the interventions. In a military setting with busy Soldier training calendars it may be difficult or impossible to access the Soldiers precisely on time for their second and third vaccines in the series. Due to this project time constraint it was clear that the Soldiers would be completing their series beyond the end of this project. It is recommended future projects take this into consideration and extend the duration if possible.

Future Direction for Research and Practice

The purpose of this project was to use a multi-modal interactive educational approach to increase HPV vaccination uptake among active duty Soldiers ages 18-26. The combination of clinician education, social media engagement with the community, and leadership support to educate and vaccinate Soldiers was successful. There are a few recommendations identified for future research and practice.

The HPV vaccine prevents several types of cancer and warts in men and women. It is a preventive health tool that can save lives and prevent many HPV-related diseases in Soldiers. Maintaining readiness is a high priority across the Army and even more so in units that deploy often. The authors recommend future research to examine a cost benefit analysis for mandating the HPV vaccine upon entrance to active duty service.

The use of multi-modal interventions was successful in increasing vaccination rates in this setting. Future projects may include duplicating resources and refining the action plan for

implementation in other military facilities. Repeated retrospective chart reviews at Robinson clinic may be beneficial to determine if the sustainment plan with clinician education and social media maintains or increases the HPV vaccination rate, and also to quantify whether a reduction in appointments for HPV-related diseases occurred.

Routine HPV vaccination promotes readiness through a healthier force with less HPV diseases and decreased healthcare costs due less treatment for largely preventable conditions. It may benefit the DHA to consider the review of HPV as a reimbursable HEDIS metric because of the financial burden of HPV costing more than gonorrhea and chlamydia combined (Maktabi et al., 2012). The adoption of HPV as a HEDIS metric, may also further incentivize clinicians and leaders to place the vaccine higher among priorities and increase recommendations.

This project identified the need for social media platforms to network with other organizations that support health prevention policies and immunizations. Networking and other methods of maintaining dissemination of education and awareness can be achieved through programs like the CDC HPV “train the trainer” program. This program provides CMEs and the “You are the Key to HPV Cancer Prevention” presentation used in this project.

Conclusion

As evidenced by the literature, clinician recommendation demonstrates a strong correlation for patient acceptance of vaccine compliance. A multimodal intervention can further improve initiation and completion rates. This performance improvement project demonstrated an effective multimodal intervention in the military population that combined clinician, leadership, and Soldier education with a social media campaign that improved HPV vaccination rates. This project may be replicated at other military facilities with the utilization of the American Cancer Society National HPV Vaccination Roundtable Toolkit. This project further demonstrated

Soldiers' interest in HPV prevention. The HPV vaccination should be considered as a requirement for military service to protect the future health and readiness of the force.

References

- Agan, B. K., Macalino, G. E., Nsouli-Maktabi, H., Wang, X., Gaydos, J. C., Ganesan, A., Kortepeter, M.G., & Sanchez, J. L. (2013). Human papillomavirus seroprevalence among men entering military service and seroincidence after ten years of service. *MSMR*, 20(2), 21.
- Ajenjo, M. C., Woeltje, K. F., Babcock, H. M., Gemeinhart, N., Jones, M., & Fraser, V. J. (2010). Influenza vaccination among healthcare workers: ten-year experience of a large healthcare organization. *Infection Control & Hospital Epidemiology*, 31(3), 233-240.
- American Cancer Society. (2017, May). You are the key to HPV cancer prevention [Powerpoint]. National HPV Vaccination Roundtable: Provider education tools. Retrieved from <https://www.mysocietysource.org/sites/HPV/ResourcesandEducation/SitePages/Home.aspx>
- Area Health Education Centers. (2015). *HPV vaccination resource book*. George Washington University: Washington, DC.
- Armed Forces Health Surveillance Center. (2013). Sexually transmitted infections, active component, US Armed Forces, 2000-2012. *MSMR*, 20(2), 5.
- Bahk, C. Y., Cumming, M., Paushter, L., Madoff, L. C., Thomson, A., & Brownstein, J. S. (2016). Publicly Available Online Tool Facilitates Real-Time Monitoring Of Vaccine Conversations And Sentiments[HMA1] . *Health Affairs*, 35(2), 341-347.
- Baylor, N.W. (2006, June 6). Approval Letter - Human Papillomavirus Quadrivalent (Types 6,

- 11, 16, 18) Vaccine, Recombinant [Letter to Merk & Co Inc]. U.S. Food and Drug Administration, Rockville, MD. Retrieved from <http://www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm111283.htm>
- Berry-Cabán, C. S., & Buenaventura, J. B. (2009). HPV vaccination coverage among adolescents aged 9 to 17 years in a United States military treatment facility. *International Journal of Adolescent Medicine and Health*, 21(4), 567-570.
- Bhattacharya, M., Wamba, S. F., Akter, S., Kang, H., & Upal, M. (2016). The primer of social media analytics. *Journal of Organizational and End User Computing (JOEUC)*, 28(2), 1-12. doi:10.4018/JOEUC.2016040101
- Blasi, P.R., King, D., & Henrikson, N. B. (2015). HPV vaccine public awareness campaigns: An environmental scan. *Health Promotion Practice*, 16(6), 897-905. doi:
- Brewer, N. T., Hall, M. E., Malo, T. L., Gilkey, M. B., Quinn, B., & Lathren C. (2017). Announcements versus conversations to improve HPV vaccination coverage: A randomized trial. *Pediatrics*, 139(1), 1-9. doi: 10.1542/peds.2016-1764
- Cates, J. R., Diehl, S. J., Crandell, J.L., & Coyne-Beasley, T., (2014). Intervention effects from a social marketing campaign to promote HPV vaccination in preteen boys. *Vaccine*, 32, 4171-4178. doi: 10.1016/j.vaccine.2014.05.04410.1177/1524839915596133
- Centers for Disease Control and Prevention. (2016). *CDC recommends only two HPV shots for younger adolescents*. Retrieved from <https://www.cdc.gov/media/releases/2016/p1020-hpv-shots.html>
- Centers for Disease Control and Prevention. (2014). *Genital HPV Infection - Fact Sheet*. Retrieved from <http://www.cdc.gov/std/HPV/STDFact-HPV.htm>.
- Centers for Disease Control and Prevention. (2014). *Human Papillomavirus vaccine Gardasil:*

What you need to know. Retrieved from <http://www.cdc.gov/vaccines/pubs/vis/downloads/vis-hpv-gardasil.pdf>

Centers for Disease Control and Prevention. (2008). HPV vaccine information for clinicians.

CDC Web site: <http://www.cdc.gov/STD/hpv/STDFact-HPV-vaccine-hcp.htm>.

Centers for Disease Control and Prevention. (2011). Recommended adult immunization schedule--United States, 2011. *MMWR. Morbidity and Mortality Weekly Report*, 60(4),

Centers for Disease Control and Prevention. (2011). Recommendations on the use of quadrivalent human papillomavirus vaccine in males--Advisory Committee on Immunization Practices (ACIP), 2011. *MMWR. Morbidity and Mortality Weekly Report*, 60(50), 1705.

Centers for Disease Control and Prevention. (2006). STD-prevention counseling practices and human papillomavirus opinions among clinicians with adolescent patients--United States, 2004. *MMWR. Morbidity and Mortality Weekly Report*, 55(41), 1118.

Centers for Disease Control and Prevention. (2015). Supplemental information and guidance for vaccination providers regarding use of 9-valent HPV vaccine. *Atlanta, GA: Centers for Disease Control and Prevention.*

Chan ZC, Chan TS, Ng KK, Wong ML. (2012). A systematic review of literature about women's knowledge and attitudes toward human papillomavirus (HPV) vaccination. *Public Health Nursing*. 29(6):481-489.

Chesson, H., Ekwueme, D., Saraiya, M., Watson, M., Lowy, D., & Markowitz, L. (2012). Estimates of the annual direct medical costs of the prevention and treatment of disease associated with human papillomavirus in the United States. *Vaccine*, 30(42), 6016-6019. doi:10.1016/j.vaccine.2012.07.056

- Cullen, L. & Adams, S. L. (2012). Planning for implementation of evidence-based practice. *Journal of Nursing Administration*, 42(4), 222-230. doi:10.1097/NNA.0b013e31824ccd0a
- Daly, K. L., Halon, P. A., Aronowitz, T., & Ross, G. (2016). A university health initiative to increase human papillomavirus vaccination rates. *The Journal for Nurse Practitioners*, 12(6), e281-e286.
- de Villiers, E. (2013). Cross-roads in the classification of papillomaviruses. *Virology*, 445(1-2), 2-10. doi:10.1016/j.virol.2013.04.023
- Dempsey, A. F., & Zimet, G. D. (2015). Interventions to improve adolescent vaccination what may work and what still needs to be tested. *American Journal of Preventative Medicine*, 49, S445-S454. doi: 10.1016/j.amepre.2015.04.013
- Department of Health and Human Services. (2016). Human subject regulations decision charts. *Office of Human Resources Protections*. Retrieved from <http://www.hhs.gov/ohrp/regulations-and-policy/decision-trees/index.html>
- Department of the Army (2017). Army Regulation 40-501 Standards of Medical Fitness. Retrieved from https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN3801_AR40-501_Web_FINAL.pdf
- Dunn, A., Leask, J., Zhou, X., Mandl, K., & Coiera, E. (2015). Associations between exposure to and expression of negative opinions about human papillomavirus vaccines on social media: An observational study. *Journal of Medical Internet Research*, 17(6), e144. doi:10.2196/jmir.4343
- Dunne, E. F., Markowitz, L. E., Saraiya, M., Stokley, S., Middleman, A., Unger, E. R., &

- Iskander, J. (2014). CDC grand rounds: Reducing the burden of HPV-associated cancer and disease. *MMWR. Morbidity and Mortality Weekly Report*, 63(4), 69-72.
- Duval, B. Gilca, V., Boulianne, N. Pielak, K., Halperin, B., Simpson, M. A., ..., Lavoie, F. (2009). Cervical cancer prevention by vaccination nurses' knowledge, attitudes, and interventions. *Journal of Advanced Nursing*, 65, 499-508.
- Duval, B. Gilca, V., McNeil, S., Dobson, S., Money, D. Gemmill, I. M., ..., Ouakki, M. (2007). Vaccination against human papillomavirus: A baseline survey of Canadian clinicians' knowledge, attitudes, and beliefs. *Vaccine*, 25, 7841-7847.
- Fiks, A. G., Grundmeier, R. W., Mayne, S., Song, L., Feemster, K., Karavite, D., Hughes, D. D., Massey, J., Keren, R., Bell, L. M., Wasserman, R., & Localio, A. R. (2013). Effectiveness of decision support for families, clinicians, or both on HPV receipt. *Pediatrics*, 131(6), 114-118. doi: 10.1542/peds.2012-3122
- Fisher-Borne, M., Preiss, A. J., Black, M., Roberts, K., & Saslow, D. (2017). Early outcomes of a multilevel human papillomavirus vaccination pilot intervention in federally qualified health centers. *Academic Pediatrics*, 18(2), 79-84. doi: 10.1016/j.ampere.2017.01.024
- FitzSimons, D., Hendrick, G., Lernout, T., Badur, S., Vorsters, A., & Van Damme, P. (2014). Incentives and barriers regarding immunization against influenza and hepatitis of health care workers. *Vaccine*, 32(38), 4849-4854.
- Friedman, M. M., Bowden, V. R., & Jones, E. (2003). *Family nursing: Research, theory & practice*. Upper Saddle River, NJ: Pearson.
- Gerend, M., Shepherd, M., Lustria, M., & Shepherd, J. (2016). Predictors of provider

- recommendation for HPV vaccine among young adult men and women: Findings from a cross-sectional survey. *Sexually Transmitted Infections*, 92(2), 104-104.
doi:10.1136/sextrans-2015-052088
- Goldman, D. (2012). Keeping it legal. In Mayo Clinic Center for Social Media. (2012), *Bringing the social media revolution to health care* (pp. 75-28). Rochester, MN: Mayo Foundation for Medical Education and Research.
- Goyal, V., Mattocks, K. M., & Sadler, A. G. (2012). High-Risk Behavior and Sexually Transmitted Infections Among U.S. Active Duty Servicewomen and Veterans. *Journal of Women's Health*, 21(11), 1155–1169. <http://doi.org/10.1089/jwh.2012.3605>
- Han, J.J., Tarney, C.M., & Song, J. (2017). Variation in genital human papillomavirus infection prevalence and vaccination coverage among men and women in the USA. *Future Oncology*, 13(13), 1129-1132.
- Jacobs-Wingo, J. L., Jim, C. C., & Groom, A. V. (2017). Increasing HPV vaccination coverage through provider-based interventions. *American Journal of Preventive Medicine*, 53(2), 162-168. doi: 10.1016/j.ampre.2017.01.024
- Kilic, A., Seven, M., Guvenc, G., Akyuz, A., & Ciftci, S. (2012). Acceptance of human papillomavirus vaccine by adolescent girls and their parents in Turkey. *Asian Pacific Journal of Cancer Prevention*, 13(9), 4267-4272.
- Krantz, L., Ollberding, N. J., Beck, A. F., & Burkhardt, M. C. (2016). Increasing HPV Vaccination coverage through provider-based interventions. *Clinical Pediatrics*, 57(3), 319-326. doi: 10.1177/0009922817722014
- Kumar, S., Biswas, M., & Jose, T. (2015). HPV vaccine: Current status and future directions. *Medical Journal Armed Forces India*, 71(2), 171-177.

- Lai, C. Y., Wu, W. W., Tsai, S. Y., Cheng, S. F., Lin, K. C., & Liang, S. Y. (2014). The effectiveness of a Facebook-assisted teaching method on knowledge and attitudes about cervical cancer prevention and HPV vaccination intention among female adolescent students in Taiwan. *Health Education & Behavior*, 1090198114558591.
- LaRocque, J. D., & Caban, C. S. (2011). Human PapillomaVirus vaccination coverage among Soldiers in a military treatment facility, 2007-2010. *Journal of Vaccines & Vaccination*, 2(1), 1-3. DOI: 10.4172/2157-7560.1000116
- LoBiondo-Wood, G., & Haber, J. (2014). Integrating research, evidence-based practice, and quality improvement processes. In G. LoBiondo-Wood & J. Haber, *Nursing research: methods and critical appraisal for evidence-based practice* (pp. 13-21). St. Louis, Missouri: Elsevier Mosby.
- Lynch, J. R., Frankovich, E., Tetrick, C. A., & Howard, A. D. (2010). Improving influenza vaccination in dialysis facilities. *American Journal of Medical Quality*, 25(6), 416-428.
- Maktabi, H., Ludwig, S. L., Eick-Cost, A., Yerubandi, U. D., & Gaydos, J. G. (2012). *Quadrivalent human papillomavirus vaccine initiation, coverage, and compliance among US active component service women, 2006-2011*. Armed Forces Health Surveillance Center: Silver Spring MD.
- Markowitz, L. E., Dunne, E. F., Saraiya, M., Chesson, H. W., Curtis, C. R., Gee, J., & Unger, E. R. (2014). Human papillomavirus vaccination: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR. Morbidity and Mortality Weekly*
- Mayo Clinic Center for Social Media. (2012). *Bringing the social media revolution to health care*. Rochester, MN: Mayo Foundation for Medical Education and Research.

- Mayo Clinic Social Media Network. (2017). *Social media basics for healthcare*. Retrieved from <https://socialmedia.mayoclinic.org/social-media-basics-certification/>
- Mazzoni, S. E., Brewer, S. E., Pyrzanowski, J. L., Durfee, M. J., Dickinson, L. M., Barnard, J. G., Dempsey, A. F., & O'Leary, S. T. (2016). Effect of a multi-modal intervention on immunization rates in obstetrics and gynecology clinics. *American Journal of Obstetrics & Gynecology*, 214(617), e1-7. doi: 10.1016/j.ajog.2015.11.018
- McCave, E. L. (2010). Influential factors in HPV vaccination uptake among providers in four states. *Journal of Community Health*, 35, 645-652.
- McLean, H. Q., VanWormer, J. J., Chow B. D. W., Birchmeier, B., Vickers, E. DeVries, E., Meyer, J., Moore, J., McNeil, M. M., Stokley, S., Gee, J., & Belongia, E. A. (2017). Improving Human Papillomavirus Vaccine Use in an Integrated Health System: Impact of a Provider and Staff Intervention. *Journal of Adolescent Health*, 61, 252-258. doi: 10.1016/j.jadohealth.2017.02.019
- Melnyk, B. M. & Fineout-Overholt, E. (2011). *Evidence-based practice in nursing and healthcare: A guide to best practice*. Philadelphia, Pennsylvania: Lippincott Williams & Wilkins.
- Merck (2016). *Gardasil 9: Full prescribing information*. Merck, Sharp, & Dohme Corp: Whitehouse Station, NJ
- Merriam-Webster's dictionary (2017). *Social media*. Retrieved from <https://www.merriam-webster.com/dictionary/social%20media>
- Moffitt, K. (2011, August 25). Army updates women's readiness protocols. *Fort Lee Traveller*. Retrieved from [http://www.ftletraveller.com/community_life/kenners_ corner/army-](http://www.ftletraveller.com/community_life/kenners_corner/army-)

updates-women-s-readiness-protocols/article_ce000338-ce8b-11e0-b9d6-001cc4c03286.html

Montgomery, I. (2016). *Phase II site brief update; Fort Bragg*. Bethesda, MD

National Committee for Quality Assurance (2016). *HEDIS 2016 measures* [Summary table].

Retrieved from <http://www.ncqa.org/Portals/0/HEDISQM/HEDIS2016/HEDIS%202016%20List%20of%20Measures.pdf>

National Committee for Quality Assurance (2017). *HEDIS 2017 measures* [Summary table].

Retrieved from <http://www.ncqa.org/Portals/0/HEDISQM/HEDIS2017/HEDIS%202017%20Volume%2020List%20of%20Measures.pdf?ver=2016-06-27-135433-350>

National Conference of State Legislation. (2017). *HPV vaccine: State legislation and statutes*.

Retrieved from <http://www.ncsl.org/research/health/hpv-vaccine-state-legislation-and-statutes.aspx#2017-18>

Newhouse, R. R., Dearholt, S.L., Poe, S.S., Pugh, L.C., & White, K.M. (2008). *Johns Hopkins evidence-based practice model and guidelines*. Indianapolis, Indiana: Sigma Theta Tau International.

Niccolai, L. M., & Hansen, C. E. (2015). Practice and community-based interventions to increase

Human Papillomavirus Vaccine coverage a systematic review. *Journal of the American Medical Association Pediatrics* 169(7), 686-692. doi: 10.1001/jamapediatrics.2015.0310.

Office of Disease Prevention and Health Promotion (2016). *Immunizations and infectious*

diseases. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives>

- Oliver, K., Frawley, A., & Garland, E. (2016). HPV vaccination: Population approaches for improving rates. *Human Vaccines & Immunotherapeutics*, 12(6), 1589-1593. doi: 10.1080/21645515.2016.1139253
- Osazuwa-Peters, N. (2013). Human papillomavirus (HPV), HPV-associated oropharyngeal cancer, and HPV vaccine in the United States—Do we need a broader vaccine policy?. *Vaccine*, 31(47), 5500-5505.
- Paparone, P. (2015). Supporting influenza vaccination intent among nurses: Effects of leadership and attitudes toward adoption of evidence-based practice. *Journal of Nursing Administration*, 45(3), 133-138.
- Paskett, E. D., Krok-Schoen, J. L., Pennell, M. L., Tatum, C. M., Retier, P. L., Peng, J., Bernardo, B. M., Weier, R. C., Richardson, M. S., & Katz, M. L. (2016). Results of a multi-level intervention to increase human papillomavirus (HPV) vaccine uptake among adolescent girls. *Cancer Epidemiology, Biomarkers & Prevention*, 25(4), 593-602. doi: 10.1158/1055-9965.EPI-15-1243
- Perkins RB, Zisblatt L, Legler A, Trucks E, Hanchate A, Gorin SS. (2015). Effectiveness of a provider-focused intervention to improve HPV vaccination rates in boys and girls. *Vaccine*, 33, 1223-1229. doi: 10.1016/j.vaccine.2014.11.021
- Perman, S., Turner, S., Ramsay, A. I., Baim-Lance, A., Utley, M., & Fulop, N. J. (2017). School-based vaccination programmes: a systematic review of the evidence on organization and delivery in high income countries. *BMC public health*, 17(1), 252.
- Perrin, A. (2015). *Social media usage:2005-2015*. Retrieved from Pew Research Center website: <http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/>
- PricewaterhouseCoopers, L. L. P. (2012). Social media “likes” healthcare: From marketing to

- social business. Retrieved from [http:// pwchealth.com/cgi-local/hregister.cgi /reg/health-care-social-media-report.pdf](http://pwchealth.com/cgi-local/hregister.cgi/reg/health-care-social-media-report.pdf)
- Rosen, B., & Goodson, P. (2014). A recommendation to use the diffusion of innovations theory to understand school nurses' role in HPV vaccine uptake. *International quarterly of community health education, 34*(1), 37-49.
- Sanderson, M., Canedo, J. R., Khabele, D., Fadden, M. K., Harris, C., Beard, K., Burrell, M., Pinkerton, H., Jackson, C., Mayo-Gamble, T., Hargreaves, M.K., & Hull, P. C. (2017). Pragmatic trial of an intervention to increase human papillomavirus vaccination in safety-net clinics. *BMC Public Health, 17*(158), 1-10. doi: 10.1186/s12889-017-4094-1
- Schiffman, M. (2007). Integration of human papillomavirus vaccination, cytology, and human papillomavirus testing. *Cancer Cytopathology, 111*(3), 145-153.
- Smulian, E. A., Mitchell, K. R., & Stokley, S. (2016). Interventions to increase HPV vaccination coverage: A systematic review. *Human Vaccines & Immunotherapeutics, 12*(6), 1566-1588. doi:10.1080/21645515.2015.1125055
- U.S. Food and Drug Administration. (2014). FDA approves Gardasil 9 for prevention of certain cancers caused by five additional types of HPV [Press release]. Retrieved from [http://www.fda.gov/ News Events/ Newsroom/PressAnnouncements/ucm426485.htm](http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm426485.htm)
- Viens, L. J. (2016). Human papillomavirus–associated cancers-United States, 2008–2012. *MMWR. Morbidity and Mortality Weekly Report, 65*.
- Vollrath, K., Thul, S., & Holcombe, J. (2018). Meaningful methods for increasing human papillomavirus vaccination rates: An integrative literature review. *Journal of Pediatric Healthcare, 32*(2), 119-132. doi: 10.1016/j.pedhc.2017.07.005

Walling, E. B., Benzoni, N., Dornfeld, J., Bhandari, R., Sisk, B. A., Garbutt, J., & Colditz, G.

(2016). Interventions to improve HPV vaccine uptake: a systematic review.

Pediatrics, 138, 1-11. doi: 10.1542/peds.2015-3863

Wedel, S., Navarrete, R., Burkard, J. F., & Clark, M. J. (2016). Improving Human

Papillomavirus Vaccinations in Military Women. *Military Medicine*, 181(10), 1224-1227.

Williams, W., Peng-Jun, L., O'Halloran, A., Kim, D., Grohskopf, S. Pilishvili, T., . . .

Fiebelkorn, A. (2017). Surveillance of vaccination coverage among adult populations-
United States, 2015. *Morbidity and Mortality Weekly Report* 66(11), 1-28.

Wofford, K. (2016). Information technology podcast [Recorded presentation]. *Information*

technology. Retrieved from <https://drive.google.com/file/d/0B-1eScB2Rq>

TVdk9TMWJGWkJuSVU/view

World Health Organization. (2017). Human papillomavirus vaccines: WHO position paper, May

2017. *Weekly Epidemiological Record No. 19(92)*. 241-268.

■ **Figure 1.** Multi-PRISMA Literature Review Summary

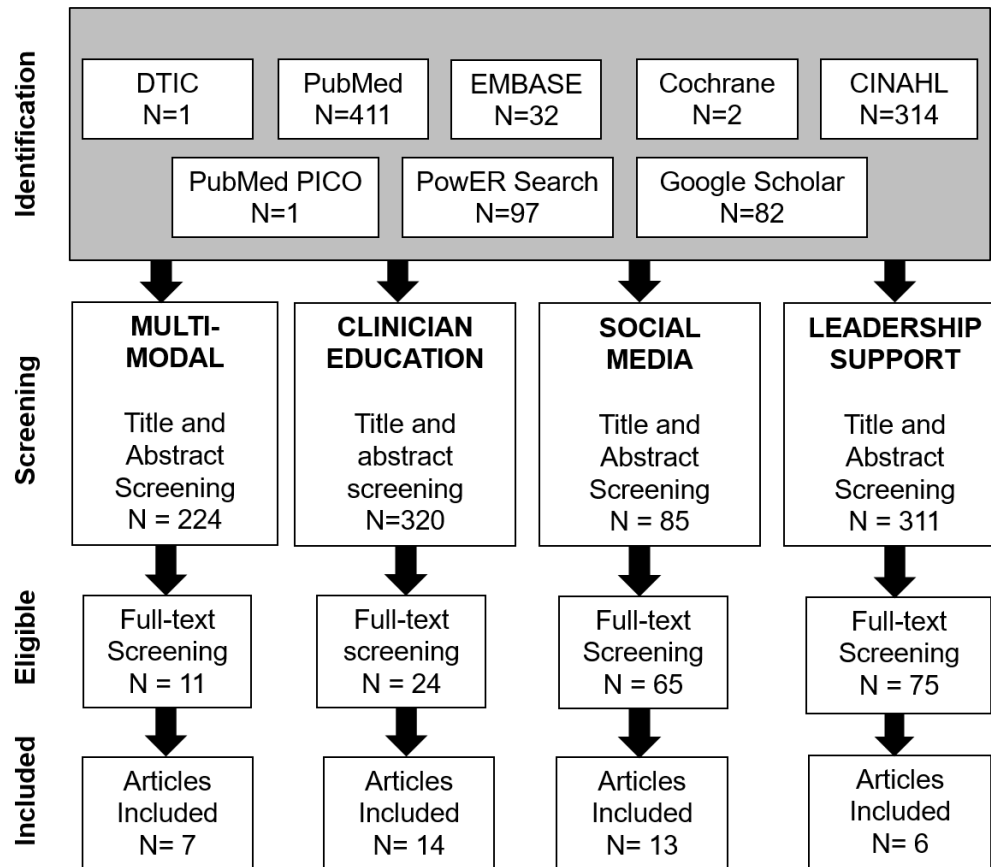


Figure 1. Summary of four literature reviews using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Individual PRISMA charts for each literature review are found in appendices A through D. Adapted from “Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, D. Altman, and The PRISMA Group, 2009, *PLoS Medicine*, 6(7), p. 3.

Figure 2. Three Prong Strategic Crosswalk

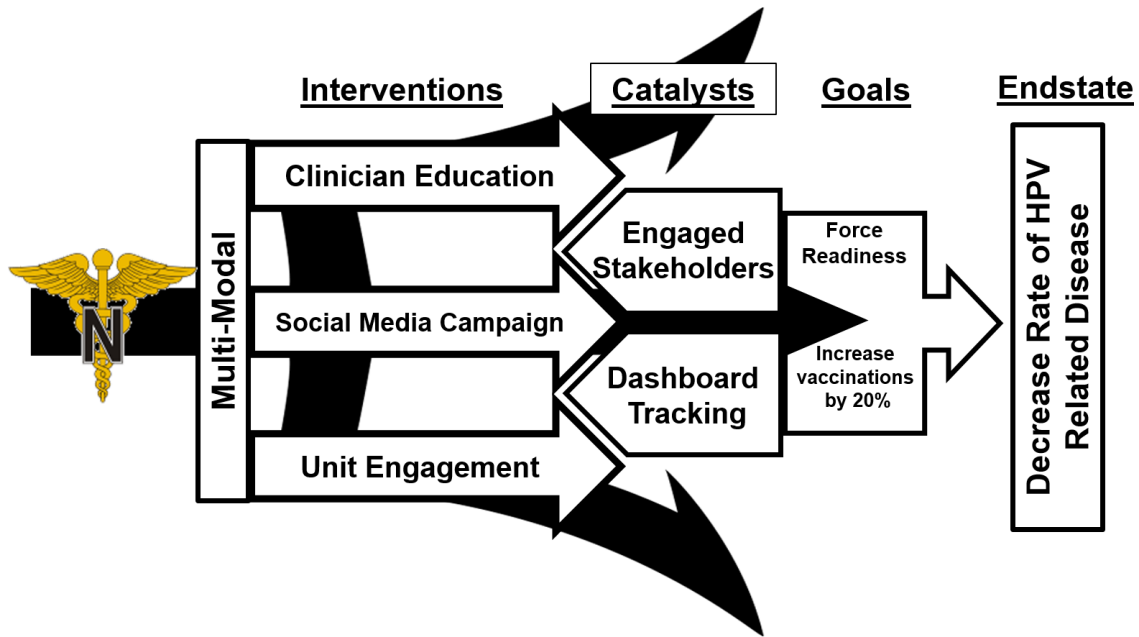


Figure 2. Three prong strategic crosswalk to increasing Human Papillomavirus Vaccination (HPV) rates at Fort Bragg, North Carolina. This figure illustrates a multi-modal three prong strategy utilized to increase readiness and improve HPV vaccination by 20% with an endstate of decreased rates for HPV related diseases.

Appendix A

Figure A1. Multi-modal PRISMA Chart

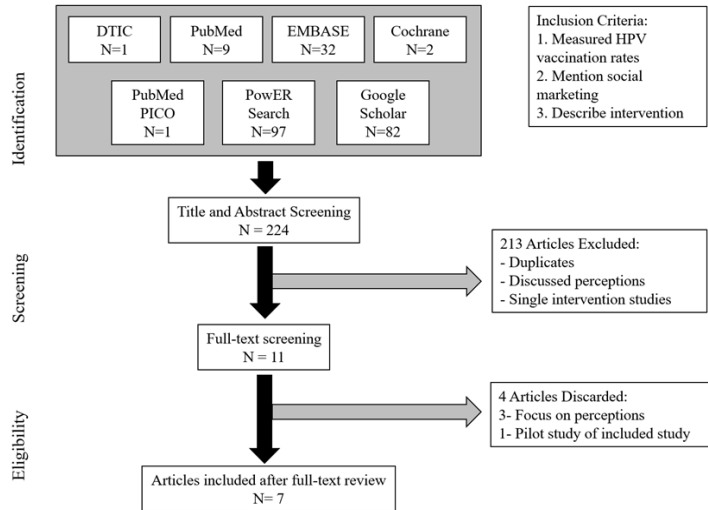


Figure A1 Multi-modal Education Methods PRISMA Chart. Adapted from “Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, D. Altman, and The PRISMA Group, 2009, *PLoS Medicine*, 6(7), p. 3.

Figure A2. Multi-modal Themes Chart

	Blasi et al., 2015	Cates et al., 2015	Daly et al., 2016	Dempsey & Zimet, 2015	Niccolai & Hansen, 2015	Simulian et al., 2016	Walling et al., 2016
Multi-modal Approach	✓	✓	✓		✓	✓	✓
Provider recommendation and education	✓	✓	✓	✓	✓	✓	✓
Patient Reminders			✓	✓	✓		✓
Patient Education	✓			✓	✓		✓
Social Marketing			✓	✓	✓		
Increased Access to Vaccine					✓	✓	✓
	V/C	II/B	V/II/B	V/C	IA	IA	II/B

Figure A2. Multi-modal Education Methods: Themes Evident in Literature Review
Appendix B

Figure B1. Clinician Education PRISMA Chart

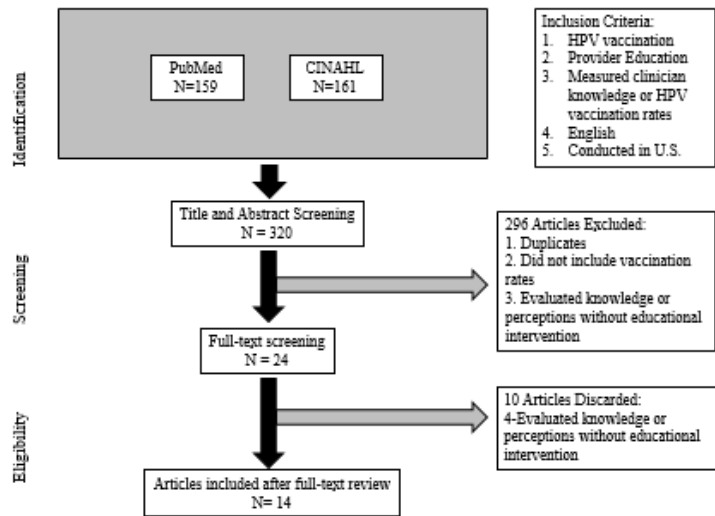


Figure B1 Clinician Education PRISMA Chart. Adapted from “Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, D. Altman, and The PRISMA Group, 2009, *PLoS Medicine*, 6(7), p. 3.

Figure B2. Clinician Education Themes Chart

	Berenson et al., 2015	Brewer et al., 2017	Fiks et al., 2013	Fisher-Borne et al., 2018	Jacobs-Wingo et al., 2017	Kranz et al., 2018	Mazzoni et al., 2016	McLean et al., 2017	Oliver et al., 2016	Paskett et al., 2016	Perkins et al., 2015	Sanderson et al., 2017	Volinnich et al., 2018	Walling et al., 2016
Clinician Education	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi-Modal Approach			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Increase in HPV Initiation		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Increase in HPV Completion				✓	✓	✓		✓	✓	✓	✓		✓	✓
Increase in HPV Recommendation						✓				✓		✓	✓	
Increase in HPV Clinician Knowledge	✓									✓			✓	
	II/A	IA	IB	VA	VB	VA	VB	VB	VB	IB	VB	II/B	VA	IB

Figure B2. Clinician Education: Themes Evident in Literature Review

Appendix C

Figure C1. Social Media PRISMA Chart

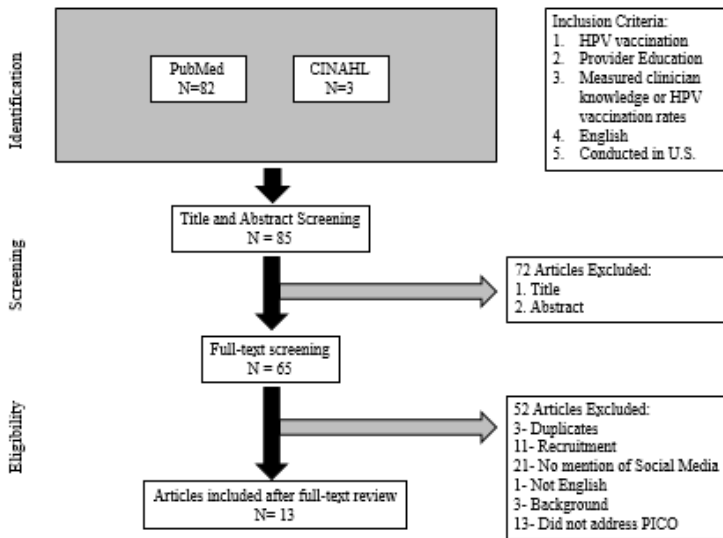


Figure C1 Social Media PRISMA Chart. Adapted from “Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, D. Altman, and The PRISMA Group, 2009, *PLoS Medicine*, 6(7), p. 3.

Figure C2. Social Media Themes Chart

	Babik et al., 2016	Britt et al., 2014	Dunn et al., 2015	Hale et al., 2014	Keelan et al., 2010	Lui et al., 2015	Madden et al., 2012	Nan & Madden, 2012	Ortiz et al., 2015	Peña & Babian, 2013	Piac-Pelotero et al., 2013	Zhang et al., 2015	Zhou et al., 2015
Current events have impact	✓				✓					✓	✓		
Theory based		✓				✓	✓						✓
Negative perpetuates negative	✓		✓		✓			✓					✓
Social media has influence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Provider rec. through social media	✓	✓		✓	✓		✓	✓	✓		✓		
Vaccine at no cost						✓		✓		✓			
Target parents for education					✓	✓		✓					
	III/B	III/A	III/A	III/A	III/A	II/A	III/A	I/A	III/C	III/B	III/A	III/B	III/A

Figure C2. Social Media: Themes Evident in Literature Review

Appendix D

Figure D1. Leadership Support PRISMA Chart

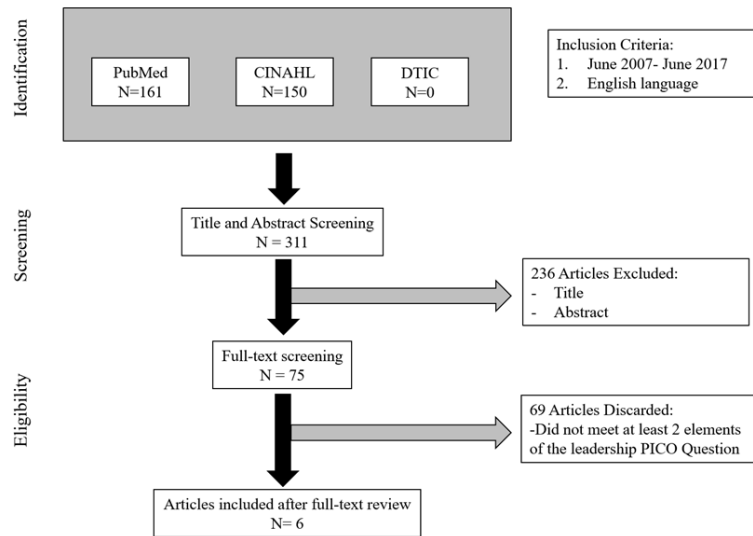


Figure D1 Leadership Support PRISMA Chart. Adapted from “Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, D. Altman, and The PRISMA Group, 2009, *PLoS Medicine*, 6(7), p. 3.

Figure D2. Leadership Support Themes Chart

	Alejo et al., 2010	FitzSimmons et al., 2014	Lynch, et al., 2010	Paganone et al., 2015	Perman et al., 2017	Rosan & Goodison, 2014
Leadership Support	✓	✓	✓	✓	✓	✓
Multiple Approaches		✓	✓			
Education		✓	✓			✓
Removing Barriers		✓	✓			
Using Social Media		✓			✓	
Information Technology		✓			✓	
	V/E/C	VII/B	VII/B	III/A	III/B	VII/B

Figure D2. Leadership Support: Themes Evident in Literature Review

Appendix E

Table E1. Clinical Staff Knowledge

Group	N	Pre	Post	P-value
Overall	59	66.1%	96.2%	<.0001
Medics	32	59.0%	95.0%	<.0001
Pharmacists	16	72.0%	97.0%	.0036
Physician Asst.	6	91.7%	100%	NA*
Nurses	4	62.5%	93.8%	NA*
Pharm Tech	1	80.0%	98.0%	NA*

Table E1. Knowledge increase was statistically significant

Table E2. Clinical Staff Attitudes

Group	N	Less Often	More Often
Overall	58	1.7%	57.6%
Medics	32	3.1%	46.9%
Pharmacists	15	0.0%	33.3%
Physician Asst.	6	0.0%	33.3%
Nurse	4	0.0%	50.0%
Pharm Tech	1	0.0%	0.0%

Table E2. Greater than 57% of clinicians reported they would recommend HPV vaccination to their patients.

Figure E3. Social Media Results for Twitter

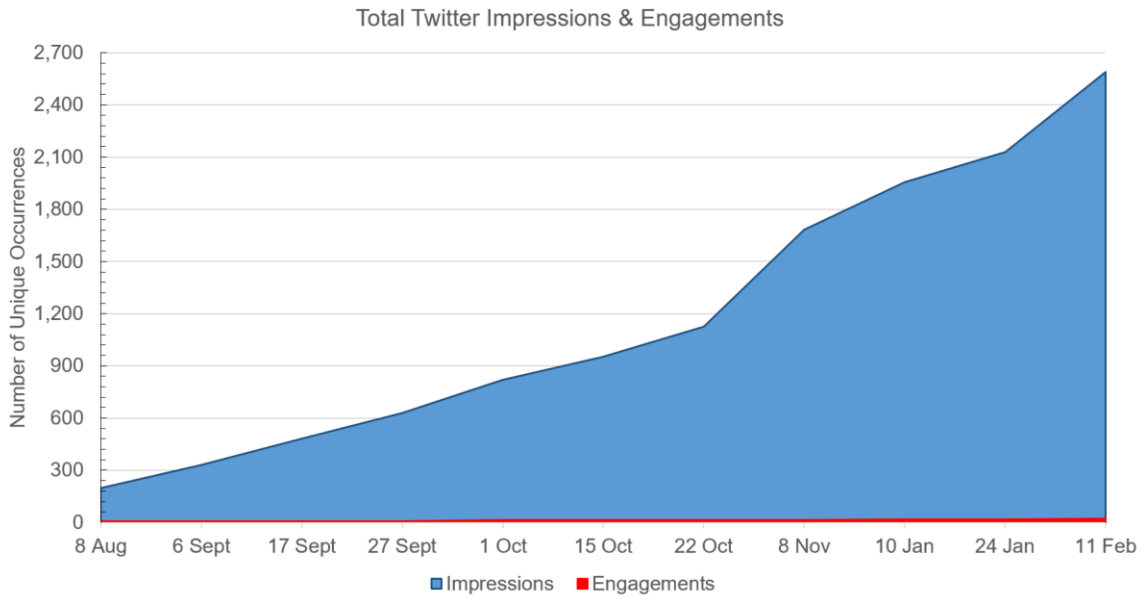


Figure E4. Social Media Results for Facebook

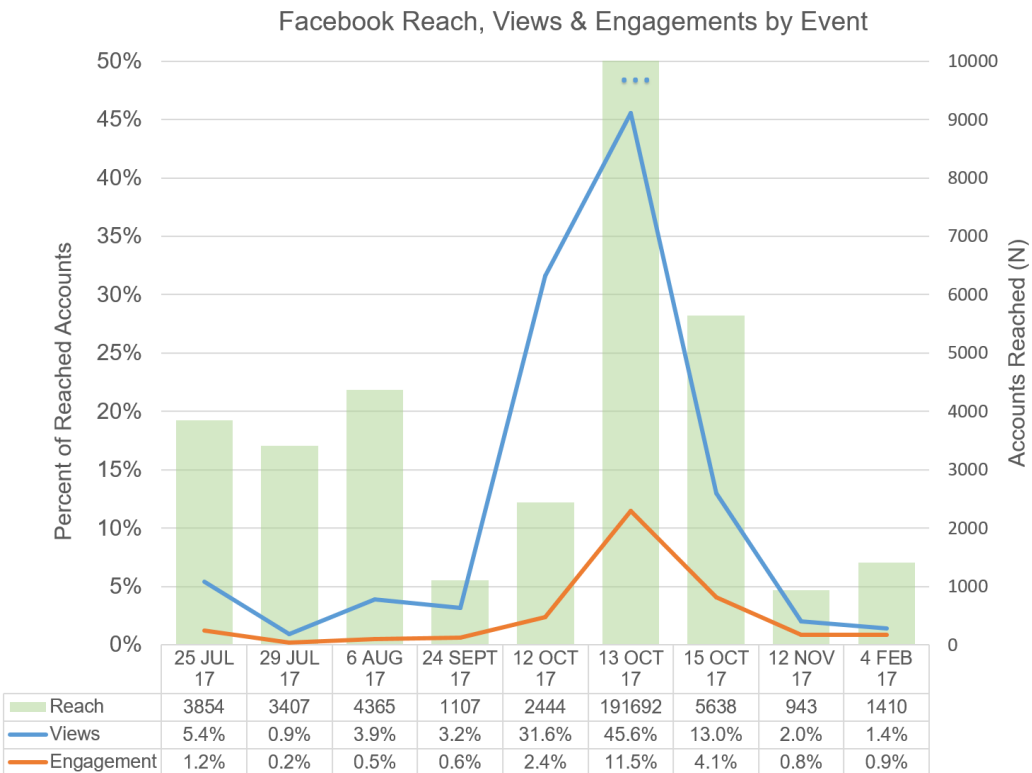


Figure E5. Unit Engagement Results

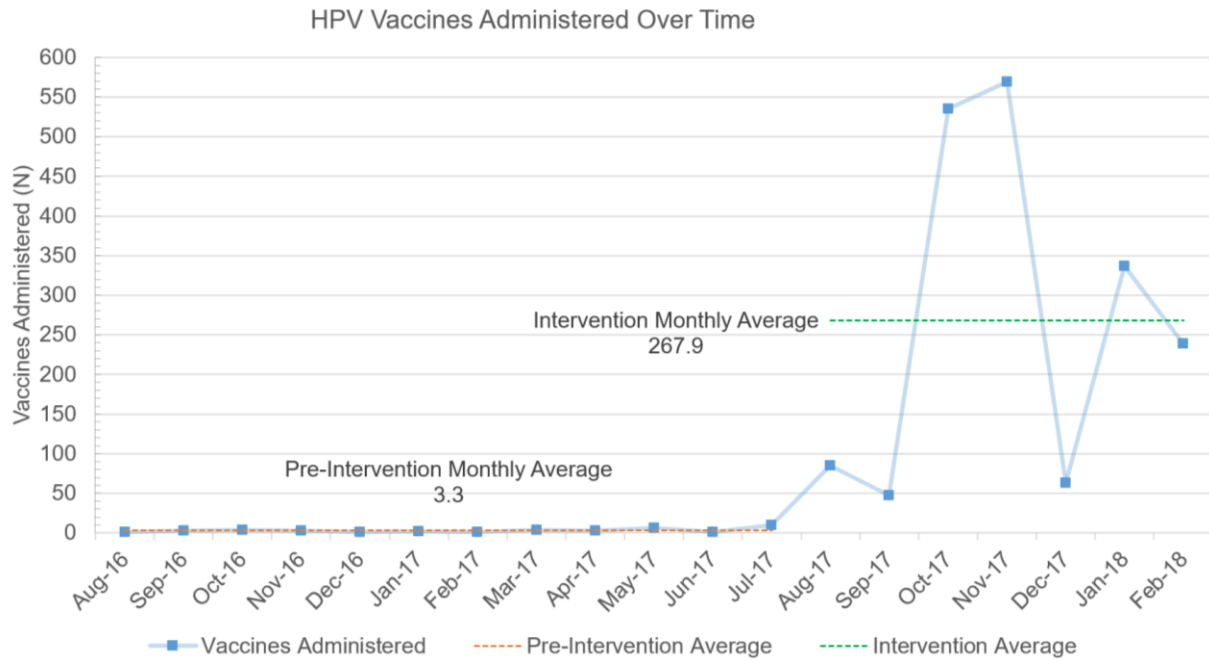
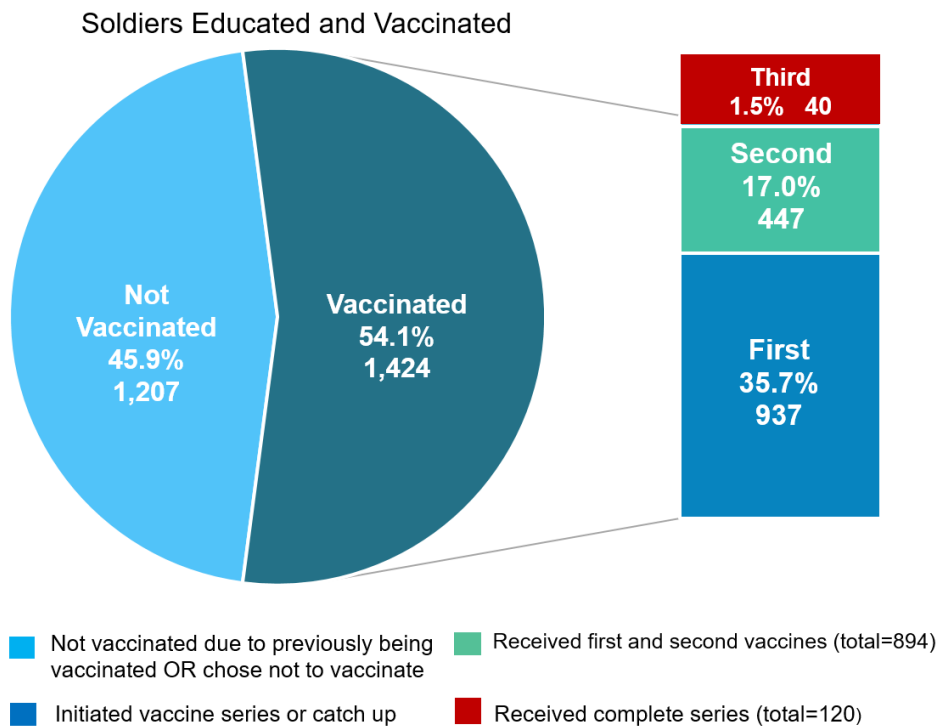


Figure E6. Unit Engagement Results



Appendix F

Figure F1. CITI Certificate 1 for Nash, Lauren

**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK REQUIREMENTS REPORT***

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Lauren Nash (ID: 4993369)
- **Email:** lauren.nash@usuhs.edu
- **Institution Affiliation:** Uniformed Services University of The Health Sciences (ID: 395)
- **Institution Unit:** GSN
- **Phone:** 254-258-3028

- **Curriculum Group:** OUSD P&R Human Research (Current)
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 16996807
- **Completion Date:** 08/24/2015
- **Expiration Date:** 08/23/2018
- **Minimum Passing:** 80
- **Reported Score*:** 94

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED
Records-Based Research (ID: 5)	08/24/15
Vulnerable Subjects - Research Involving Children (ID: 9)	08/24/15
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	08/24/15
FDA-Regulated Research (ID: 12)	08/24/15
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	08/24/15
Informed Consent (ID: 3)	08/24/15
History and Ethics of Human Subjects Research (ID: 496)	08/24/15
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	08/24/15
Genetic Research In Human Populations (ID: 6)	08/24/15
Populations In Research Requiring Additional Considerations and/or Protections (ID: 16680)	08/24/15
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others In Biomedical Research (ID: 14777)	08/24/15
Conflicts of Interest In Research Involving Human Subjects (ID: 488)	08/24/15
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	08/24/15
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	08/24/15
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	08/24/15
Vulnerable Subjects - Research Involving Prisoners (ID: 8)	08/24/15

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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Figure F2. CITI Certificate 2 for Nash, Lauren

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK TRANSCRIPT REPORT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Lauren Nash (ID: 4993369)
- **Email:** lauren.nash@usuhs.edu
- **Institution Affiliation:** Uniformed Services University of The Health Sciences (ID: 395)
- **Institution Unit:** GSN
- **Phone:** 254-258-3028

- **Curriculum Group:** OUSD P&R Human Research (Current)
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 16996807
- **Report Date:** 08/24/2015
- **Current Score**:** 94

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT
History and Ethics of Human Subjects Research (ID: 498)	08/24/15
Informed Consent (ID: 3)	08/24/15
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	08/24/15
Records-Based Research (ID: 5)	08/24/15
Genetic Research In Human Populations (ID: 6)	08/24/15
Vulnerable Subjects - Research Involving Prisoners (ID: 8)	08/24/15
Vulnerable Subjects - Research Involving Children (ID: 9)	08/24/15
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	08/24/15
FDA-Regulated Research (ID: 12)	08/24/15
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	08/24/15
Conflicts of Interest In Research Involving Human Subjects (ID: 488)	08/24/15
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	08/24/15
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	08/24/15
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others In Biomedical Research (ID: 14777)	08/24/15
Populations In Research Requiring Additional Considerations and/or Protections (ID: 16680)	08/24/15
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	08/24/15

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Figure F3. CITI Certificate 1 for Terehoff, Christina

**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK TRANSCRIPT REPORT****

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Christina Terehoff (ID: 4989705)
- **Email:** christina.terehoff@usuhs.edu
- **Institution Affiliation:** Uniformed Services University of The Health Sciences (ID: 395)
- **Institution Unit:** Graduate School of Nursing
- **Phone:** 571-244-3836

- **Curriculum Group:** OUSD P&R Human Research (Current)
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 16982778
- **Report Date:** 08/24/2015
- **Current Score**:** 100

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT
History and Ethics of Human Subjects Research (ID: 498)	08/23/15
Informed Consent (ID: 3)	08/23/15
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	08/23/15
Records-Based Research (ID: 5)	08/23/15
Genetic Research in Human Populations (ID: 6)	08/24/15
Assessing Risk - SBE (ID: 503)	08/24/15
Vulnerable Subjects - Research Involving Children (ID: 9)	08/23/15
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	08/23/15
FDA-Regulated Research (ID: 12)	08/23/15
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	08/24/15
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	08/24/15
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	08/24/15
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	08/23/15
Stem Cell Research Oversight (Part I) (ID: 13882)	08/24/15
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	08/24/15
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	08/24/15
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	08/24/15

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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Figure F4. CITI Certificate 2 for Terehoff, Christina

**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK REQUIREMENTS REPORT***

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Christina Terehoff (ID: 4989705)
- **Email:** christina.terehoff@usuhs.edu
- **Institution Affiliation:** Uniformed Services University of The Health Sciences (ID: 395)
- **Institution Unit:** Graduate School of Nursing
- **Phone:** 571-244-3836

- **Curriculum Group:** OUSD P&R Human Research (Current)
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 16982778
- **Completion Date:** 08/24/2015
- **Expiration Date:** 08/23/2018
- **Minimum Passing:** 80
- **Reported Score*:** 100

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED
Records-Based Research (ID: 5)	08/23/15
Vulnerable Subjects - Research Involving Children (ID: 9)	08/23/15
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	08/23/15
FDA-Regulated Research (ID: 12)	08/23/15
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	08/23/15
Informed Consent (ID: 3)	08/23/15
History and Ethics of Human Subjects Research (ID: 498)	08/23/15
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	08/23/15
Genetic Research in Human Populations (ID: 6)	08/24/15
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	08/24/15
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	08/24/15
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	08/24/15
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	08/24/15
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	08/24/15
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	08/24/15
Assessing Risk - SBE (ID: 503)	08/24/15

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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Figure F5. CITI Certificate 1 for Wyatt, Monica

**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK REQUIREMENTS REPORT***

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** monica wyatt (ID: 4991449)
- **Email:** monica.wyatt@usuhs.edu
- **Institution Affiliation:** Uniformed Services University of The Health Sciences (ID: 395)
- **Institution Unit:** gsn
- **Phone:** 3373787779

- **Curriculum Group:** OUSD P&R Human Research (Current)
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 16989435
- **Completion Date:** 08/27/2015
- **Expiration Date:** 08/26/2018
- **Minimum Passing:** 80
- **Reported Score*:** 97

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED
Records-Based Research (ID: 5)	08/24/15
Vulnerable Subjects - Research Involving Children (ID: 9)	08/24/15
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	08/24/15
FDA-Regulated Research (ID: 12)	08/24/15
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	08/24/15
Informed Consent (ID: 3)	08/25/15
History and Ethics of Human Subjects Research (ID: 498)	08/25/15
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	08/26/15
Genetic Research in Human Populations (ID: 6)	08/26/15
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	08/26/15
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	08/26/15
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	08/27/15
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	08/27/15
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	08/27/15
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	08/27/15
Assessing Risk - SBE (ID: 503)	08/27/15

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program
 Email: citisupport@miami.edu
 Phone: 305-243-7970
 Web: <https://www.citiprogram.org>

Figure F6. CITI Certificate 2 for Wyatt, Monica

**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK TRANSCRIPT REPORT****

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** monica wyatt (ID: 4991449)
- **Email:** monica.wyatt@usuhs.edu
- **Institution Affiliation:** Uniformed Services University of The Health Sciences (ID: 395)
- **Institution Unit:** gsn
- **Phone:** 3373787779

- **Curriculum Group:** OUSD P&R Human Research (Current)
- **Course Learner Group:** Biomedical Investigators and Research Study Team
- **Stage:** Stage 1 - Biomedical Investigators

- **Report ID:** 16989435
- **Report Date:** 08/27/2015
- **Current Score**:** 97

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES	MOST RECENT
History and Ethics of Human Subjects Research (ID: 498)	08/25/15
Students in Research (ID: 1321)	08/27/15
Informed Consent (ID: 3)	08/25/15
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	08/26/15
Records-Based Research (ID: 5)	08/24/15
Genetic Research in Human Populations (ID: 6)	08/26/15
Assessing Risk - SBE (ID: 503)	08/27/15
Vulnerable Subjects - Research Involving Children (ID: 9)	08/24/15
Vulnerable Subjects - Research Involving Pregnant Women, Human Fetuses, and Neonates (ID: 10)	08/24/15
FDA-Regulated Research (ID: 12)	08/24/15
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	08/27/15
International Studies (ID: 971)	08/27/15
Office of the Under Secretary of Defense (Personnel and Readiness) (ID: 912)	08/27/15
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	08/27/15
Avoiding Group Harms - U.S. Research Perspectives (ID: 14080)	08/27/15
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	08/24/15
Stem Cell Research Oversight (Part I) (ID: 13882)	08/27/15
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	08/26/15
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	08/26/15
Module for Non-DoD Personnel Conducting Research Involving Human Subjects Supported by the DoD (ID: 16769)	08/27/15

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

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Appendix G

Figure G1. USU VPR Form 3202N



OFFICE OF RESEARCH
 4301 JONES BRIDGE ROAD
 BETHESDA, MARYLAND 20814
 PHONE: (301) 295-3303; FAX: (301) 295-6771

NOTICE OF PROJECT APPROVAL

Change Number: Original

VPR Site Number: T0-GSN-61-9004-01
Principal Investigator: Nash, Lauren (GSN-61)
Department: Graduate School of Nursing
Project Type: Student
Project Title: HPV & the Use of an interactive education program for clinicians & patients to increase HPV vaccination rates at Fort Bragg, NC
Project Period: 4/4/2017 to 6/30/2017

Assurance and Progress Report Information:

<u>Name</u>	<u>Sup</u>	<u>Approval Type</u>	<u>Status</u>	<u>Approved On</u>	<u>Forms Received</u>
Progress Report	0			To be Submitted	N/A

Remarks:
 This Notice of Project Approval has been reviewed and approved. Please remember that you must submit a final Progress Report (Form 3210) upon completion of this project.

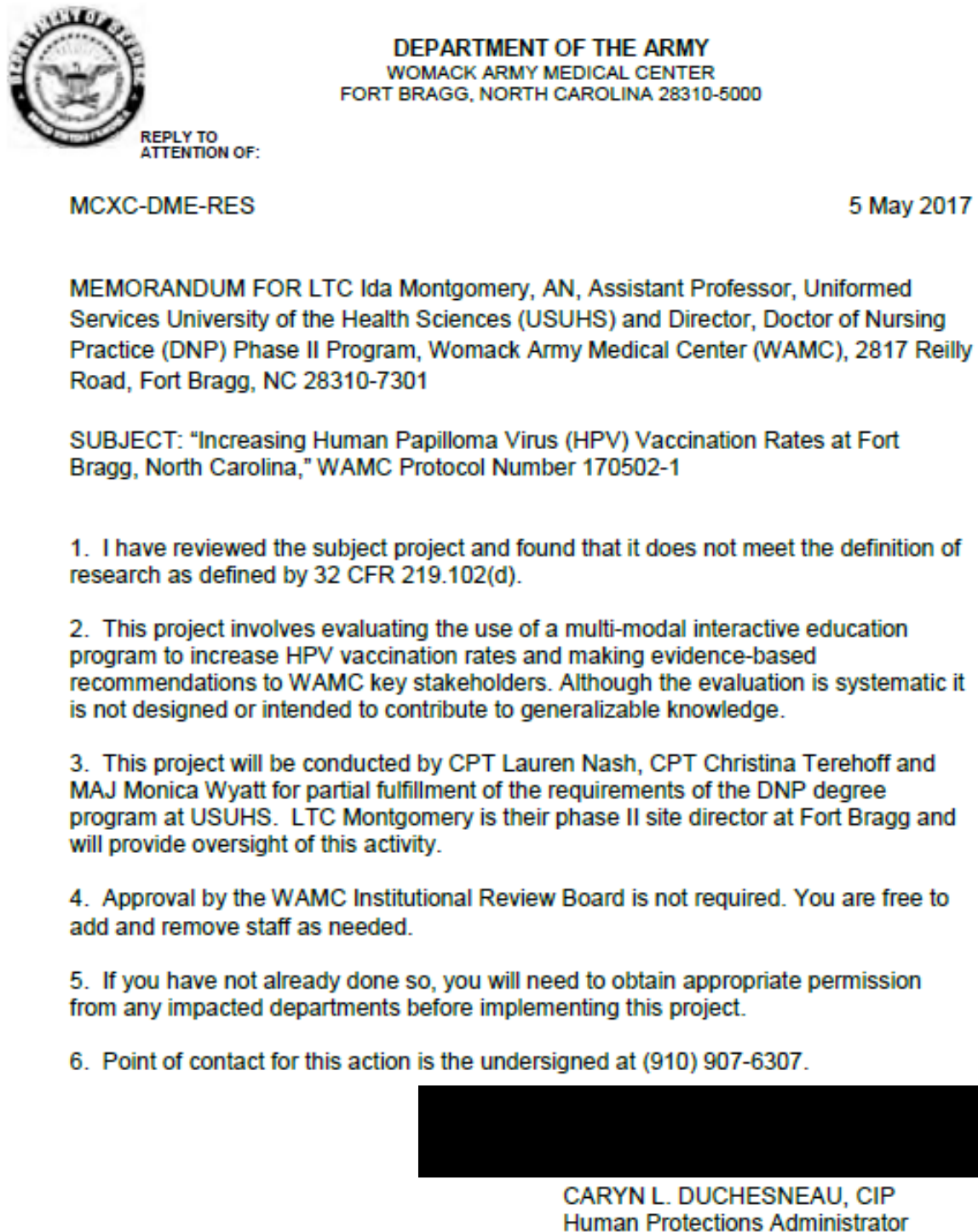
Questions regarding this approval should be directed to the following person in the Office of Research:
 Ronda Dudley, (301) 295-9818.



Yvonne T. Maddox, Ph.D. Date
 Vice President for Research
 Uniformed Services University of the Health Sciences

cc: Nash, Lauren (GSN-61)
 Vernell Shaw
 File
 Andrea Fuller
 Linda Wanzer

Appendix H

Figure H1. MTF IRB Letter of Determination*Figure H1.* This figure contains the IRB letter of exemption for the DNP Project.

Appendix I

Figure II. PAO Clearance



DEPARTMENT OF THE ARMY
Womack Army Medical Center
Fort Bragg, North Carolina 28310

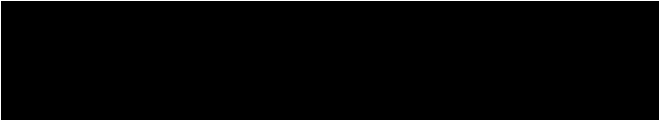
MCXC-DME-RES

30 March 2018

MEMORANDUM FOR MAJ Monica Wyatt, MAJ Lauren Nash, CPT Christina Terehoff

SUBJECT: WAMCPC0419 Increasing HPV Vaccination Rates Among Active Duty Servicemembers: An Interactive Multimodal Education Program

1. Your publication has been reviewed by all appropriate personnel and approved by the Department of Clinical Investigation for public presentation/submission.
2. This approval allows you to present the approved publication at other venues so long as only minor changes have occurred.
3. Thank you for your submission, and we look forward to seeing your scholarly activity in the near future. Please include the title of your publication and reference number in all correspondence.
4. The POC for this memorandum is Melissa Griffin at (910) 907-9055 or melissa.e.griffin.civ@mail.mil.



Department of Clinical Investigation
Womack Army Medical Center

Appendix J

Figure J1. Clinician Pre-test

HPV PRE-TEST

OCCUPATION (please circle the correct option)

Physician

Nurse Practitioner

Physician Assistant

RN

LPN

Medic

NA

Medical Support Assistant

Other: _____

1. In the United States, _____ of the population will be infected with HPV at some point in their lifetime.

- a. 10%
- b. 25%
- c. 50%
- d. >80%

2. How many doses of the 9-valent HPV vaccine is recommended for males and females age 18-26 years?

- a. 0 doses (this age group is too old)
- b. 1 dose
- c. 2 doses

- d. 3doses
3. The 9-valent HPV vaccine is recommended for which age group?
- a. Females ages 9-15 years old
 - b. Females and males ages 6-12 years old
 - b. Females and males ages 9-15 years old
 - d. Females and males ages 9-26 years old
4. A female patient with an abnormal PAP test is eligible for the 9-valent vaccine.
- a. True
 - b. False
5. Do you currently recommend the HPV vaccine to your patients age 18 to 26?
- a. Yes
 - b. Sometimes
 - c. No

Figure J2. Clinician Post-test

OCCUPATION (please circle the correct option)

Physician

Nurse Practitioner

Physician Assistant

RN

LPN

Medic

NA

Medical Support Assistant

Other: _____

1. In the United States, _____ of the population will be infected with HPV at some point in their lifetime.

- a. 10%
- b. 25%
- c. 50%
- d. >80%

2. How many doses of the 9-valent HPV vaccine is recommended for males and females age 18-26 years?

- a. 0 doses (this age group is too old)
- b. 1 dose
- c. 2 doses
- d. 3 doses

3. The 9-valent HPV vaccine is recommended for which age group?

- a. Females ages 9-15 years old
 - b. Females and males ages 6-12 years old
 - b. Females and males ages 9-15 years old
 - d. Females and males ages 9-26 years old
4. A female patient with an abnormal PAP test is eligible for the 9-valent vaccine.
- a. True
 - b. False
5. Will you recommend the HPV vaccine to your patients age 18 to 26 in the future?
- a. Yes
 - b. Sometimes
 - c. No

Figure J3. Sample Social Media Post



Figure J4. Soldier Sign-in Sheet

HPV Vaccination Sign In Roster

DO NOT WRITE YOUR NAME DOD Identification Number (Located on the back of ID card)	**DO NOT WRITE YOUR NAME** DOD Identification Number (Located on the back of ID card)
1	18
2	19
3	20
4	21
5	22
6	23
7	24
8	25
9	26
10	27
11	28
12	29
13	30
14	31
15	32
16	33
17	34

