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After the Vaccine: Cervical Cancer Screening in Army Women

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After the Vaccine: Cervical Cancer Screening in Army Women

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Cervical cancer is the second most common cancer in U.S. military women, a much greater risk than observed in the general population. Health seeking behaviors such as consistent cervical cancer screening and vaccination against specific human papillomaviruses (HPV) can greatly reduce a woman's risk for cervical cancer. Thus delays in health seeking behaviors and those factors which influence delay remain significant and relevant to military healthcare researchers to support and maintain a healthy military force. Underpinned by the Theory of Reasoned Action, findings included that female Soldiers had generally positive attitudes towards cervical cancer screening. However, one in five female Soldiers had not completed a cervical cancer screening exam in the previous year. One in ten female Soldiers less than 27 years in age had completed the HPV vaccination. Utilizing a predictive correlation study design, the primary objective of this research endeavor predicted the strongest determinant for adherence to cervical cancer screening and HPV vaccination was encouragement by a healthcare provider. Finally, although most female Soldiers were aware of their last cervical cancer screening exam, female soldiers tended to over report their previous HPV vaccination behavior. By gaining an understanding of determinates for health seeking behaviors in female soldiers, future targeted evidence-based interventional strategies can

confidently be developed to bolster healthcare seeking in this population and potentially reduce their overall incidence of cervical cancer.

This dissertation by Meryia D. Throop fulfils the dissertation requirement for the doctoral degree in Nursing approved by Patricia McMullen, PhD, JD, CRNP, as Director, and by Janice Agazio, PhD, CRNP, and Diane Padden, PhD, CRNP, as Readers.

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DEDICATION

I dedicate this dissertation to my family, friends, and fellow Soldiers.

To my Dad, who has always challenged me to learn.

To my Mom who instilled my lifelong interest in science.

To my daughter Maisey, who taught me the beauty of becoming a Mom.

To my friend Kathy Szymczak, who always keeps me grounded.

To my husband Alan, who believed in me and encouraged me every day.

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TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

LIST OF APPENDICIES

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CHAPTER I

Introduction and Background

Cancer is the second most common cause of mortality in the United States. One third of all women in the United States will develop cancer in their lifetime (American Cancer Society [ACS], 2009). Globally, cancer is the leading cause of death and the total number of deaths related to cancer is increasing (World Health Organization [WHO], 2009).

Following breast cancer, cervical cancer is the second most common cancer in the world (WHO, 2009). The greatest incidence and mortality related to cervical cancer is found in developing counties with less access to cervical cancer screening (Nene et al., 2007). In the U.S. cervical cancer is not consider one of the top ten cancers for all women, although it is the sixth, eighth, and tenth most common cancers in Hispanic, African American, and Native American women, respectively (Center of Disease Control [CDC], 2009). In 2009, only 11,270 cases were reported in the U.S., reflecting a greater level of access to screening and treatment for cervical cell abnormalities (ACS, 2009). With screening and treatment of abnormal or precancerous cervical cells, cervical cancer is a disease which can be prevented (Germar, 2004).

However, in military women cervical cancer is the second most common cancer (Yamane, 2006). Military service members receive their healthcare in an open access system without cost. Cervical cancer screening is considered mandatory per Army regulations (Army Regulation [AR] 40-501, 2008). Yet, nearly one in five military

women are non-adherent to annual cervical cancer screening (Thomson & Nielsen, 2006).

Service members are unique in terms of job requirements, personal risk, commitments, and social support systems. Within the military, women are a minority population within a male dominated, hierarchal culture. In the Army, women account for approximately 15.4% of the total force (Maxfield, 2009). Even though access is available within the military healthcare system and regulations prescribe annual screening, the incidence of cervical cancer in military women suggests an urgent need to understand and address gender specific health promoting activities. Within this unique and complex population, researchers must consider other factors, such as attitudes and subjective norms, which can influence a military women's adherence to health promoting behavior such as cervical cancer screening. As a disease which can be prevented, cervical cancer should be just a rare in the military population as it is in the U.S. civilian population.

Cancer is the overgrowth of abnormal cells which invade other adjacent cells and tissues. Specific cancers are named for the cells in which the abnormal cells originate within the body, such as breast, prostate, or cervical tissues. These abnormal collections of cells fail to perform their primary function and when invading other tissues, interrupt other cell and tissue functions as well. When cancer cells travel to other places in the body and invade distant tissues, this is referred to as metastasis.

Cancer and cells that are identified as having a high likelihood to develop into cancer are often treated by direct removal by surgery, interruption of cell replication by

chemotherapy, or destruction by radiation or cryotherapy. When found early, before the abnormal cells have invaded and interrupted adjacent cells and tissues, less aggressive treatments are usually required (National Cancer Institute [NCI], 2008). Consequently, screening for early abnormal cells is a mainstay of cancer prevention and treatment, and is a major component of health promotion activities (Douglas & Fenton, 2008). The WHO estimates that 30% of the burden related to cancer can be reduced with early detection (2009).

Detection of cancer originating from the cervix was first developed by George Papanicolaou in 1928 and published 13 years later (Papanicolaou & Traut, 1941). Since the introduction and promotion of cervical cancer screening by the Papanicolaou test (Pap), the incidence of cervical cancer has been reduced significantly (Teitelman, Stringer, Averbuch, & Witoski, 2009). However, in spite of screening measures, cervical cancer remains the second most common malignancy in women worldwide, primarily in countries which have limited healthcare resources (Parkin, Bray, Ferlay & Pisani, 2005; WHO, 2009).

By the early the 1950's, routine Pap test screening for American women became common practice (Skloot, 2009). In the past 30 years, the incidence and mortality in the U.S. for cervical cancer has declined by nearly 50% (NCI, 2005). However, cervical cancer screening is less common in ethnic minority populations, populations with lower socioeconomic conditions and educational achievements, and decreased access to healthcare (Hawes & Kiviat, 2008). Therefore, although less than 11,000 U.S. women are expected to be diagnosed with cervical cancer this year, the vulnerable populations of

U.S. women (described above) are expected to experience more cervical cancer burden and will tend to be diagnosed at more advanced stages (NCI, 2008).

In the past 20 years, vaccines have been developed and administered to prevent specific cancers. Two vaccines have recently been approved in the U.S. to protect against nearly 70% of cervical cancers. In 2006, Gardasil gained U.S. Federal Food and Drug Administration approval and in 2009, Cervarix was approved. However, data suggest that women in minority populations are less likely to initiate or complete HPV vaccination (Wagner, 2009).

Health promotion activities to prevent cervical cancer include both screening for abnormal cervical cells and vaccination. When a woman delays or fails to vaccinate against cervical cancer, she reduces her likelihood to prevent such cancer from developing later in life. Additionally, when a woman delays seeking cervical cancer screening, she reduces her likelihood that cervical cancer will be detected at an early stage. Contemporary research indicates that women in most minority populations are particularly vulnerable to cervical cancer and represent a significant target group in need of healthcare screening and vaccination (Rogers & Cantu, 2009).

Cervical Cancer

Cervical Anatomy

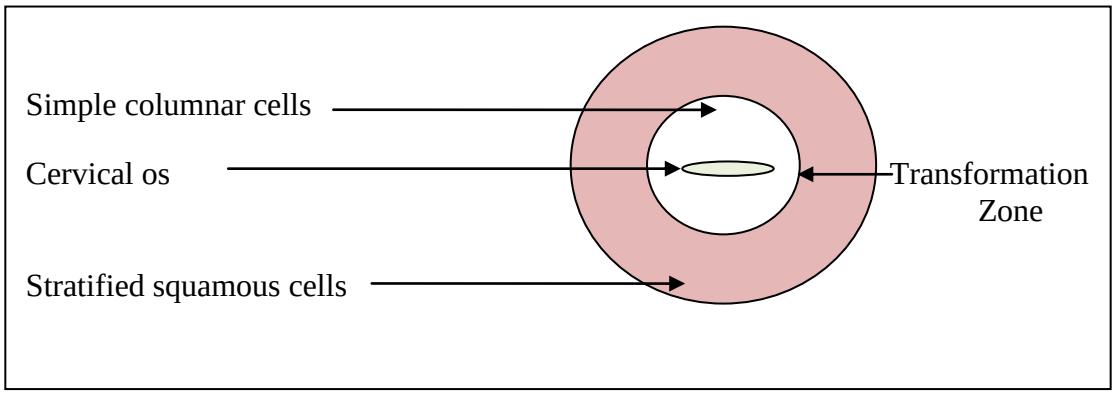
The cervix is the lower third of the uterus and connects the uterus to the vagina. The cervix is approximately 3 inches in diameter and shaped like a small bagel. The central opening of the cervix (the cervical os) allows the passage of sperm into the uterus and menstrual flow out of the uterus. During childbirth, the cervix dilates to

approximately 10 centimeters to allow passage of the fetus from the uterus into the vagina.

Towards the outermost edge, where the cervix is attached to the vagina, cells of the cervix are comprised of non-keratinizing stratified squamous epithelia cells. Towards the center of the cervix, where the cervix opens into the uterus, the cells are comprised of simple columnar epithelium. The point at which stratified squamous cells meet the simple columnar cells is referred to as the transformation zone (Figure 1).

During puberty, the transformation zone is located at the outermost parts of the cervix. Visible to the naked eye during a speculum examination, the squamous cells are pink and located towards the exterior of the cervix, while the columnar cells are darker red and located towards the interior of the cervical os. As a consequence of hormonal and concomitant pH changes that accompany menarche, as women age, the squamous cells located on the exterior portion of the cervix move towards the center of the cervical os. Therefore, the interior columnar cells are paved over by the squamous cells from the exterior portion of the cervix and the transformation zone slowly retreats towards the cervical os. After several decades, the transformation zone is often no longer visible and located deep within the cervical os (Jhingran et al., 2008).

Figure 1. Basic cervical anatomy and location of cells of the cervix.



Note: This figure was created by the researcher to elucidate key cervical anatomic and pathologic concepts in regards to the development of cervical cancer.

Cervical Cancer and Human Papillomavirus

The exact cause for most cancers is largely unknown (ACS, 2009). Some behaviors (i.e., smoking or overexposure to sunlight) can significantly increase a person's chance for cancer; these behaviors are often referred to as modifiable risk behaviors. However, in the past 20 years, some specific cancers have been found to be related to infectious diseases, for example hepatitis B and liver cancer. The strongest relationship between a specific infectious disease and cancer is the human papilloma virus (HPV) and cervical cancer (Castellsague, 2008). Nearly all cervical cancers are related to specific strains of HPV (Hutchinson & Klein, 2008; NCI, 2008).

Over 130 stains of HPV are currently known and most are considered highly contagious (Stanley, Pett, & Coleman, 2007). Approximately 40 HPV strains directly

affect the genital tract, and transmission is most often via sexual contact by direct skin to skin contact. HPV is the most common viral sexually transmitted infection in the United States and worldwide (CDC, 2008). During their lifetime, over one half of sexually active women and men are infected with HPV (CDC, 2007).

Although a majority of women are potentially exposed to HPV, less than one third of the known HPV strains which affect the genital tract are considered "high risk" and directly linked to cervical cancer. The two most common high risk HPVs are types 16 and 18, which are present in 70% of the cervical cancers in the U.S. (CDC, 2007). However, most women who are exposed to HPV, including those strains that are high risk, will clear the virus via their own immunity mechanisms and no overt signs of infection or disease will be detected. Additionally, most high risk HPV infections are asymptomatic, meaning that men and women do not know that they have the infection and thus, they transmit the infection to their partners unknowingly (Jones & Cook, 2008). Through vaccination against HPV 16 and 18 prior to a woman's exposure to the virus, most cervical cancers in the U.S. are preventable (NCI, 2008).

Screening for Cervical Cancer

Screening for cervical cancer is determined by the typical age for abnormal cells to manifest in a person, the time required for abnormal cells to invade and disrupt other tissues, the estimated benefit to a person's life, and the cost of the test. For example, while every woman could have a screening mammogram every year from birth, a majority of breast cancers do not manifest until a woman is over 40 years of age. Thus, a screening mammogram is not recommended until a woman is over age 40. Likewise, a

screening mammogram is not recommended in most 90 year old woman with advanced heart disease who could not withstand surgery or chemotherapy, since treating breast cancer would not greatly enhance quality of life.

Screening for cervical cancer is conducted via a test named after the scientist who developed a technique to observe abnormal cervical cells in guinea pigs, George Papanicolaou. Papanicolaou's test, often referred to as the "Pap smear", was established as a routine screening exam for cervical cancer in women by the 1950s (Gardner, 2006). The procedure has changed very little since that time in terms of collecting cervical cells and observing those cells under a microscope. During the screening exam, the cervical cells at junction of the squamous and columnar epithelium, or transformation zone, are scraped from the cervix via a spatula and brush, and then smeared on a glass plate or placed within a bottle of preservative solution and sent to a laboratory. Via microscopic examination a pathologist assesses for individual cervical cell abnormalities. Cells may be classified as normal, precancerous, or cancerous. Cells may also be individually tested for high risk HPV strains, when clinically indicated.

Cervical Cancer Staging

When cancer cells are identified, the cells are grouped into stages. Cancer cells that are contained within the cervix and have not grown from where they were initially detected are staged as 0, or carcinoma in situ (CIS). Those cancerous cells to various areas of the cervix and surrounding tissues are staged in increasing numbers, with stage 4 indicating that the cervical cancer cells have spread to other distant tissues and organs within the body. Metastatic cervical cancer typically will invade local tissues in the

pelvis, adjacent lymph nodes, liver, lung, and bone (Garcia, 2009). Less than 20% of cervical cancers arise from glandular cervical tissues, also known as adenocarcinomas (Balasubramanian, Palefsky, & Koutsky, 2008). The vast majority of cervical cancers, greater than 80%, originate from the cervical squamous cells (Thigpen, 2003).

Cervical cancer symptoms include bleeding after intercourse and unusual vaginal discharge. However, most cervical cancers are identified via cervical cancer screening conducted with the Pap smear (Shinn, 2004). Squamous cervical cells which are abnormal during the Pap smear are often referred to as precancerous, as these abnormal cells have the potential to continue to change over several months or years and evolve into cervical cancer. These collections of abnormal or precancerous cells rarely produce symptoms for women.

Precancerous Cell Stratification

Abnormal precancerous cervical cells are stratified based on their appearance. In order to standardize nomenclature, the Bethesda system is utilized by most clinicians and pathologists to describe abnormal precancerous cervical cells. However, clinicians and pathologists may still use more than one term to describe abnormal cervical cells (Hawes & Kiviat, 2008).

Mild to moderate dysplasia is referred to as Cervical Intraepithelial Neoplasia I (CIN I), or low-grade squamous intraepithelial lesion (LGSIL). Both of these terms indicate that the lower one-third of cells in the upper layer of the cervix are considered abnormal. Moderate dysplasia, or CIN II, indicates a greater degree of cervical cell abnormalities. In such cases, as up to two-thirds of the upper layer of the cervix contains

abnormal cells. Moderate or severe dysplasia, also known as CIN III, indicates involvement of the entire top layer of the cervix. The term high grade squamous intraepithelial lesion (HSIL) includes CIN II and CIN III cells. Often pathologists will not differentiate CIN III from CIS, as the difference between the two is difficult to determine (Stoler & Schiffman, 2001).

Some screening exams demonstrate abnormal cervical cells, but are unable to determine their significance. This screening result is stratified into two subcategories, atypical squamous cells of undetermined significance (ASCUS) and atypical squamous cells cannot rule exclude HSIL (ASC-H) (Wright et al., 2007).

Evaluation and Treatment of Abnormal Cervical Cells

When abnormal cells with unknown significance (ASCUS) are detected, clinicians may repeat the screening exam in 12 months, conduct a colposcopy, or most frequently will have the abnormal cells tested for the high risk HPVs (Eversole et al., 2010). In the presence of abnormal cervical cells such as CIN I or LGSIL, or those ASCUS Paps that are also high-risk HPV positive, treatment is usually limited to a "wait and see approach" via visualization with a low powered microscope (i.e., a colposcopy) and biopsy of abnormal appearing tissue to confirm the diagnosis of mild disease. Treatments for more advance cervical abnormalities such as HSIL may include removing the abnormal tissue via a loop electrosurgical excision procedure (LEEP), cone biopsy, destroying the tissue by freezing (cryotherapy), or by burning the tissue with a laser. Treatment for advanced disease, such as cancer, may include surgical removal of the uterus (hysterectomy), chemotherapy, and radiation (Shinn, 2004).

Natural Progression of Precancerous Cells to Cervical Cancer

Although not all researchers agree, Balasubramanian et al. (2008) report that all women exposed to the high risk HPVs will demonstrate cervical abnormality classified as CIN I/LGSIL. Further, Balasubramanian et al. (2008) and Winer et al. (2005) report that most cervical abnormalities related to HPVs resolved in less than six months and, therefore, are not detected by annual Pap smears. Balasubramanian and associates and Winer and colleagues report that approximately 10 to 20 percent of women exposed to the high risk HPV strains will have abnormal cervical cellular changes at the junction of the squamous and columnar epithelium, referred to as precancerous cellular changes or dysplasia, that are detected during their annual Pap smear. Winer and his colleagues reported that in young adult women, mild dysplasia or low grade lesions (CIN I) can progress to moderate or high grade lesions (CIN II-III) in less than two years. Most women are thought to be exposed to HPV in late adolescence, develop mild cervical changes in their early 20s, progress to moderate or high grade lesions in the late 20s, and express cervical cancer when they are 40 to 50 years old (Balasubramanian et al., 2008).

Because most U.S. women are treated for cervical abnormalities, the natural progressive history from HPV exposure to cervical cancer is difficult to determine. Goldie et al. (2004) calculated that without screening or treatment, 3.64% of American women would progress from no detection of HPV to cervical cancer. High grade lesions and cervical cancer are most often detected in women who have persistent HPV infection over the course of three or more years (Hawes & Kiviat, 2008). While most women are infected with only one high risk strain, Revzina and Diclemente (2005) estimated that

5-30% of women in the U.S. are infected with more than one high risk HPV strain. However, nearly all cervical cancers are preventable with routine screening and prompt intervention during the early stages of cervical abnormalities.

Risk Factors for Cervical Cancer

Non-modifiable risk factors which are associated with cervical cancer and cervical abnormalities include low socioeconomic status, minority population membership, immunosuppression, in utero exposure to diethlystibestrol, and a partner's increased number of sexual partners (ACS, 2009). Yet, women with abnormal cellular changes tend to exhibit the greatest number of modifiable risk behaviors (Castellsague, 2008). Modifiable risk behaviors for cervical cancer include several behaviors related to decreasing the transmission of sexually transmitted infections, such as decreasing lifetime number of sexual partners, maintaining monogamy with one partner, increasing age of first intercourse, and using barrier protection during sexual activities (e.g., condoms) (CDC, 2008). Co-infection with Chlamydia, another sexually transmitted infection, has also been identified as a risk factor for cervical cancer. Additionally tobacco use (due to concentration of tobacco toxins in cervical mucus), long term oral contraceptive use, and grand parity (greater than six births) have been associated with abnormal cervical cellular changes (Castellsague, 2008). However, the single most frequent risk factor for cervical cancer in the United States is never having had or infrequently completing cervical cancer screening exams (CDC, 2008).

With frequent screening, abnormal cervical cellular changes can be identified and removed by means of minor surgical procedures, preserving cervical tissues and often

fertility. However, like most other cancers, when cervical cancer cells have invaded other tissues or metastasized, treatment is more complex and incurs a greater risk of morbidity or mortality for the woman as well as greater monetary healthcare expenditures.

Cervical Cancer Research, Prevention, and Costs

Fostering health promotion and disease prevention are important to those who provide health care. The National Institutes of Nursing Research has designated health promotion as an area of research emphasis (NINR, 2008). In 2008 alone, the National Cancer Institute invested over $76.8 million towards cervical cancer research (NCI, 2009). The Association of Women's Health, Obstetrics, and Neonatal Nurses (AWHONN) *2010 Position Statement* regarding HPV vaccination also encourages more research to expand the use of HPV vaccination (AWHONN, 2010).

Routine screening, a mainstay of health promotion to identify abnormal cervical cells prior to the diagnosis of overt cervical cancer, has been described as the most important factor associated with preventing invasive cervical cancer (CDC, 2007). Dailard (2006) reports that over half the women diagnosed with cervical cancer did not have a screening exam in the previous three years.

HPV vaccination prior to first sexual intercourse has been estimated to be able to decrease cervical cancer abnormalities in almost 70% of women (Jones, 2009). The two approved vaccines are recommended for girls aged 9-12, and a catch up phase, may be administered until age 26 (Advisory Committee on Immunization Practices [ACIP], 2009). However, the decrease in cervical abnormalities is not expected for several

decades when sufficient numbers of women have been immunized, nor will the vaccine eliminate the need for cervical cancer screening (Goldhaber-Fiebert, Stout, Salomon, Kuntz, & Goldie, 2008). Further, researchers have noted that minority populations as less likely to initiate the HPV vaccine (Wagner, 2009).

In the U.S., cervical cancer treatment is estimated to cost $160 million every year (NCI, 2005). Annually, 12,000 new diagnoses of cervical cancer are expected and nearly 4,000 women will die from cervical cancer in the U.S. alone (CDC, 2007). Cervical cancer screening adherence has been shown to be effective for early detection and decreased mortality related to cervical cancer. Kim & Goldie (2008) report that vaccination ratio for quality adjusted life years is the greatest for routine vaccination of 12 year old girls. Kim and Goldie found even when extending vaccination to the age of 26 years of age, HPV vaccination was still economically advantageous to deter cervical cancer and warts in adults, and respiratory papillomatosis in infants.

Screening and Vaccination Delays in the Military

Military service is a mostly male dominated, hierarchical culture. The military female is unique in terms of job requirements, commitment and social support systems. Currently, female Soldiers (women who are serving in the Army), comprise 15% of the Army; most are enlisted ranks and well over half are less than 30 years old (Maxfield, 2009). The modern female Soldier differs significantly from women who served only a decade ago. Unlike previous wars, a “front line” no longer exists and the military has been restructured to address these changes. Within a new era of structural transformation for an integrated Army, more women are closer to direct combat roles, serve in austere

environments, and subsequently have decreased access to gynecologic care (Thomson & Nielsen, 2006). As cervical cancer strikes military women at a younger age (Yamane, 2006), an elevated concern by healthcare clinicians is required to address gender specific healthcare for military women in modern military environments in which women work and live.

Although HPV is directly linked to cervical cancer, historically sexually transmitted infections, such as HPV, have been a problem for military forces (Gadyos & Gaydos, 2008). Although the exact nature of the causes have not been revealed, military women have been identified as having a greater risk for abnormal cervical cellular changes and cervical cancer (Ollayos & Peterson, 2002; Yamane 2006). Further, military women have been identified as having more risk factors for cervical cancer, such as higher than expected tobacco use and concurrent STIs such as chlamydia, than their civilian counterparts (Boyer, Pollack, Becnel & Shafer, 2008; Haddock et al., 2007; von Sadovszky & Ryan-Wenger, 2007). Since such infections are not associated with immediate morbidity, Gaydos and Gaydos (2008) suggest waning interest in STIs as a military healthcare priority.

Limited access to healthcare is frequently identified by researchers as a main deterrent for cervical cancer screening and more recently, HPV vaccination non-adherence behaviors (Forbes, Jepson, & Martin-Hirsch, 2009). The military healthcare system is an open access system, yet previous researchers have reported that women in the military remain non-adherent in terms of cervical cancer screening (Herberger, 2000; Thomson & Nielsen, 2006). Additionally, although universal access is available and

nearly all military women will be offered vaccinations during their first year in the military, few eligible Army women complete HPV vaccination (C. Berry-Caban, personal communication, March 10, 2010). It is unknown if the increase in cervical cancer in military women is a function of poor adherence to screening or an increased number of modifiable and non-modifiable risk factors. However, because cervical cancer is conventionally considered a slower growing cancer, without changing risk factors, adherence to annual cervical cancer screening as directed by military regulation should negate the disproportionately high numbers of overt cervical cancers found in the female military population.

Researchers have suggested that the late adolescent and early adult ages of the majority of female Soldiers, coupled with female Soldier's sexual risk taking behaviors, requires military healthcare providers to consider employing unique approaches in addressing female service member's healthcare (Hwang, Shafer, Pollack, Chang, & Boyer, 2007). Several interventional approaches to decrease modifiable risk behaviors for sexually transmitted infections have been employed with both military and civilian populations. Although there are multiple published studies regarding cervical cancer screening within civilian populations (Ackerson, Pohl, & Low, 2008; Documet et al., 2008; Duffett-Leger, Letourneau, & Croll, 2008; Ingledue, Cottrell, & Bernard, 2004; Jennings-Dozier, 1999; Kahn et al., 2007; Neilson & Jones, 1998; Nelson, Moser, Gaffey, & Waldron, 2009; Ross, Forsyth, & Rosenbaum, 2006; Schiffner & Buki, 2006; Welch, Miller, & James, 2008) few have been conducted with female Soldiers. Of those investigators who have published research regarding cervical cancer screening behaviors

in female Soldiers in the past decade (Herberger, 2000), sampling has not been reflective of the majority of female Soldiers in terms of education, rank, and military occupational specialties. Subsequent to the recent release of the HPV vaccine, a paucity of studies has been conducted within the military population. Additionally, while cervical cancer screening is an annual requirement for female Soldiers by Army regulation (AR 40-510, 2008); HPV vaccination is currently only a recommendation, and not a requirement, for female Soldiers (Kiley, 2007).

In summary, even with total adherence, HPV vaccination will not eliminate the need for screening for several future generations of women (Goldhaber-Fiebert, et al., 2008; Steinbrook, 2006). However, the possibility of eradicating cervical cancer is on the not so distant horizon with a combination of appropriate health seeking behaviors, such as vaccination and screening. The military healthcare system provides universal healthcare with unlimited access for Soldiers. Yet, in an open access healthcare system and cervical cancer screening mandatory per Army regulation, military women still remain non-adherent with cervical cancer screening and demonstrate a significantly greater risk for cervical cancer. Therefore, researchers must consider other unique factors, such as attitudes and subjective norms, which can influence the military population adherence to health promoting behaviors. In the future, health promoting interventional strategies may be developed by understanding female Soldiers' unique attitudes and subjective norms in terms of screening adherence and vaccination acceptance, as well as risk reduction techniques. Therefore, exploring unique military factors, such as the influence of the chain of command, which may influence adherence

to both cervical cancer screening and HPV vaccination, may allow healthcare providers to better predict health promotion behaviors in female Soldiers, and ultimately, significantly decrease a female Soldier's risk for cervical cancer.

Statement of the Problem

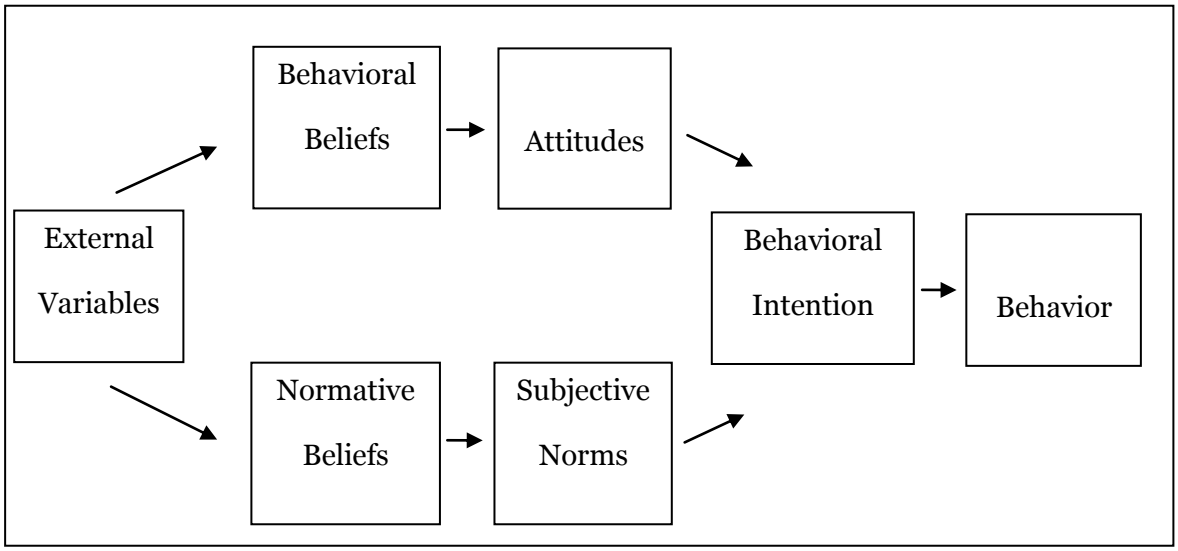
While multiple barriers for screening and vaccination have been reported for a variety of female populations, the female Solider is unique in terms of job requirements, commitments, and social support systems. Additionally, female Soldiers are a minority in the Army and in terms of social support systems are frequently isolated from family, friends, and familiar healthcare providers due to the recent restructuring of Army units. In the previous two decades, researchers have expressed a need for female Soldiers to complete cervical cancer screening prior to deployment, however female Soldiers still remain non-adherent with cervical cancer screening. Even less is known regarding female Soldier acceptability for and completion of HPV vaccination. The findings of the current research will add to the knowledge of those factors which may be predictive for female Soldiers to complete cervical cancer screening, as well as HPV vaccination.

Conceptual Framework

Developed in 1967 by Icek Ajzen and Martin Fishbein, the Theory of Reasoned Action (TRA) originated in the social psychology field as a vehicle to describe the relationship between attitudes and behavior (Werner, 2004). Major components of the TRA include constructs of behavioral beliefs which influence attitudes and normative beliefs which influence subjective (social) norms. These cognitive individual

characteristics then influence a person's behavioral intention and ultimately their behavior. The relationship of these constructs is illustrated in Figure 2.

Figure 2. Theory of Reasoned Action Constructs



Note: Adapted from "Reasoned Action and Planned Behavior" by P. Werner in S.J. Peterson and T.S. Bredow, 2004, *Middle Range Theories: Application to Nursing Research*, p. 127. Copyright 2004 by Lippincott, Williams, & Wilkins.

Operationally, attitudes, based in behavioral beliefs, require a perception of the consequence of a given behavior and the evaluation of that consequence by the individual. Subjective norms, a function of normative beliefs, are based in an individual's perception of the extent in which a salient other (i.e., spouse) supports the performance of a given behavior. Attitudes and subjective norms are then measureable per semantic scales (i.e., a 7 point Likert scale). Their product indicates the likelihood

for behavioal intent and ultimately the application by the individual for a given behavior (Ajzen & Fishbein, 1980). Overtly, the purpose of the theory is to predict and understand behavior (Werner, 2004). Assumptions of the TRA include that individuals make rational decisions and individuals also consider implications of given actions.

Fishbein has recently suggested a new formulation of the TRA to include environmental factors, skills, and abilities that serve as additional moderators for the intention-behavior relationship (2008). However, because this model is relatively new and in the infancy of testing, this dissertation effort will continue to utilize the older, more established model in which the selected dissertation instrument was constructed.

As a causal model, the TRA has been applied to several health-related topics, such as intent to have intercourse (Flores, Tschann, & Marin, 2002) and more frequently for topics that involve health promotion behavior such as cancer screening adherence (Soskolne, Marie, & Manor, 2007). However, when conducting research on health promotion and behavior, the Health Belief Model (HBM) is more often utilized in the nursing literature (Janz, Champion, & Strecher, 2002). Yet, the HBM lacks the consideration of subjective norms.

In the military setting, subjective norms, more often identified as social norms, are both cultivated and expected to influence individual behavior (Akerlof & Kranton, 2005). Addressing social norms in the Army has been suggested as a method to decrease the acceptability for tobacco use (Conway, 1998) and to prevent sexual assault by fellow service members (Lopez, 2008).

Several researchers have successfully tested the TRA in the area of health promotion and have found it to be suitable to predict and understand an individual's behavior to include seeking information about cancer (Ross, Kohler, Grimley, & Anderson-Lewis, 2007) and vaccine acceptance (Giocos, Kagee, & Swartz, 2008). However, this paucity of research has yet to determine which subjective (social) norms (i.e., peers or chain of command), and to what extent such norms influence health promoting behaviors in the female Soldier population. Limited interventional research which has included military populations and the construct of subjective norms has demonstrated that changing military members' subjective (social) norms can result in improving mental healthcare seeking (Knox, Litts, Talcott, Feig, & Caine, 2003) and behavioral intention for adoption of safer sexual practices (Booth-Kewley, Shaffer, Minagawa, & Brodine, 2002). Therefore, the potential utility of the TRA in predicting behavior for the unique features that exist in the female Soldier population may be supported by this dissertation effort.

Statement of the Purpose

The primary objective of this study was to explore and predict determinants of intent and behavior for women serving in the Army (female Soldiers) to conduct annual cervical cancer screening. A secondary objective was to explore determinates of intent and behavior for female Soldiers (under the age of 27 years old) to initiate and complete HPV vaccination. A tertiary objective was to compare the self-reported cervical cancer screening and HPV vaccination by female Soldiers with the documented screening/vaccination per their electronic medical record.

Research Questions

The following research questions were formulated to guide this study [Secondary]:

In the military healthcare system:

Q_1. Primary- What is the past behavior (adherence) of female Soldiers regarding cervical cancer screening [and HPV vaccination]?

Q_2. Primary- What is the future planned behavior (intent) of female Soldiers regarding cervical cancer screening [and HPV vaccination]?

Q_3. Primary- What are female Soldiers' attitudes towards cervical cancer screening?

Q_4. Primary- What are female Soldiers' subjective norms towards cervical cancer screening [and HPV vaccination]?

Q_5. Primary- Which of the above factors best predict female Soldiers to be non-adherent in yearly screening for cervical cancer [and initiate and complete the HPV vaccine series]?

Q_6. Tertiary- What is the difference between what female Soldiers self report for last previous cervical cancer screening exam (Pap) and HPV vaccination and the reported exam per their electronic medical record?

Research Hypotheses

$H_{1[P]}$ Adherence for cervical cancer screening in for female Soldiers is greater than U. S. national goals set forth in *Healthy People 2010* (HP2010).

$H_{1[S]}$ Adherence (initiation and completion) to HPV vaccination in eligible female Soldiers (i.e., less than 27 years old) is less than 50%.

$H_{2[P]}$ Future planned behavior (intent) by female Soldiers for cervical cancer screening is greater than the HP2010 goals.

$H_{2[S]}$ HPV vaccination planned behavior (intent) in female Soldiers is less than cervical cancer screening planned behavior (intent).

$H_{3[P]}$ Female Soldiers will report generally positive attitudes (likelihood and acceptability) towards cervical cancer screening.

$H_{4[P]}$ The healthcare provider and chain of command provide the greatest encouragement and motivation to adhere to annual cervical cancer screening exams, while media provide the least motivation to comply with cervical cancer screening.

$H_{4[S]}$ The healthcare provider and friends will provide the greatest encouragement and motivation to comply with HPV vaccination initiation and completion, while the chain of command will provide the least encouragement and motivation to initiate and complete HPV vaccination.

$H_{5[P]}$ Subjective norms (in particular the healthcare provider) predicts more adherent behavior with cervical cancer screening, attitude predicts non-adherent cervical cancer screening behavior.

$H_{5[S]}$ Subjective norms (in particular the healthcare provider) predict more adherent behavior with HPV vaccination initiation and completion, attitude predicts non-adherent HPV vaccination initiation and completion.

$H_{6[T]}$ Female Soldiers tend to over self-report their last cervical cancer screening exam and HPV vaccination.

Definition of Terms

The terms Soldier, military health care system, cervical cancer screening, HPV vaccination, attitudes, subjective norms, self-report, and behaviors (adherence and intent) are noted in terms of both theoretical and operational definitions below. Additionally, a glossary of military terms is available in Appendix N.

Terms

Soldier.

Theoretical definition: An individual with a desire to serve their nation, who volunteers to support and defend the Constitution of the United States through duty and responsibility by the profession of arms, guided by Army values and the warrior ethos (FM 7-21.13, 2004).

Operational definition: Any person who is serving in the Active Army as their full time occupation, to include officer, warrant officer, and enlisted ranks and activated Army National Guard and Army Reservist (FM 7-0, 2002).

Military Healthcare System.

Theoretical definition: A world class health care organization for service members and their family members, which encourages fitness, delivers top quality healthcare, and focuses on medical combat readiness (FM 7-21.13, 2004).

Operational definition: An organized entity comprised of healthcare providers, treatment facilities, and a variety of support mechanisms that provides medical care to members of the U. S. Army (AR 40-400, 2008).

Cervical Cancer Screening.

Theoretical definition: A secondary intervention strategy, which utilizes a diagnostic procure to detect the presence of a disease (Tucker, 2008). Cells from the transformation zone of the cervix are collected and directly observed in the laboratory for abnormalities and overt cancer. In accordance with Army regulation, cervical cancer screening is recommended to begin for female Soldiers upon entry level training, but required annually thereafter (AR 40-501, 2008).

Operational definition: Completion of cervical cancer screening will be defined for those reporting their last exam at a military treatment facility, as the most recent cervical cytology documented in the electronic medical record. For those reporting their last exam in a civilian facility, completion of cervical cancer screening completion will be based on the self-report of the respondent.

HPV Vaccination.

Theoretical definition: A primary intervention strategy, which involves introducing a mixture of four non infectious, inactivated virus particles (HPV 6, 11, 16, and 18) or two (HPV 16 and 18), via the intramuscular route, to stimulate a natural immunity from the previously mentioned HPV strains (Markowitz et al., 2007). In accordance with Army policy, HPV vaccination is recommended to begin for females at age 11-12 years of age, but may be given as early as 9 years of age. HPV vaccination consists of 3 doses, the second and third to be administered 2 months and 6 months respectively, after the initial dose. The vaccine in not recommended for females that are pregnant. Female Soldiers up to the age of 26 years old who have not initiated or

completed the series are encouraged to complete the HPV vaccination series (Kiley, 2007).

Operational definition: Completion of HPV vaccination will be defined for those reporting their last exam at a military treatment facility, as those injections recorded in the electronic medical record. For those reporting their last vaccine in a civilian facility, completion of HPV vaccination will be based on the self-report of the respondent.

Attitudes.

Theoretical definition: A positive or negative psychological tendencies towards a belief for a behavior, based on favorable or unfavorable evaluation of that behavior (Werner, 2004).

Operational definition: Attitude includes the belief that cervical cancer or HPV infection may occur, as well as evaluation of the acceptability of that outcome. Attributes for attitude include the evaluation of pain, embarrassment, inconvenience, testing for disease, thinking about a disease, and long term possibilities, such as loss of fertility or treatment regimens. Attitude will initially be measured via the total score of two subscales, likelihood and acceptability. The final score for Attitude will be calculated via the multiplication of the total score of each for each subscale.

Subjective norm.

Theoretical definition: A perceived judgment concerning another's preference and support for performing or not performing a behavior (Werner, 2004).

Operational definition: Subjective norms (also referred to as social norms in the military population) include the influences for cervical cancer screening and HPV

vaccination behavior by considering the recommendations of salient others and the motivation to comply with the salient other's recommendation. Social Norms will initially be measured via the total score of two subscales, recommendations and adherence. The final score for Social norms will be calculated via the multiplication of the total score of each for each subscale.

Behavior- Intent.

Theoretical definition: Determined by attitude and subjective norms, the likelihood to engage in a future specific behavior as a function of motivation (Werner, 2004).

Operational definition: The planned likelihood reported by a female Soldier to complete annual cervical cancer screening, and for female Soldiers less than age 27, to initiate and complete HPV vaccination. Intent will be measured via the score on the instrument regarding the respondent's perception regarding the likelihood that they will complete cervical cancer screening (or HPV vaccination) in the following year.

Behavior- Adherence.

Theoretical definition: The transmission of intention into action (Werner, 2004).

Operational definition: Based on self-report (for those who report last exam/vaccination at a civilian clinic) and electronic medical chart review (for those who report last exam/vaccination at a military treatment facility), the previous cervical cancer screening exam completed by a female Soldier, and for females less than age 27, the completion or appropriate continuation of HPV vaccination.

Relevance to Nursing

Historically nurses have been pivotal in assisting female Soldiers in engaging in health promotion, such as screening for disease and decreasing disease proliferation. The elevated rate of cervical cancer incidence in military women, coupled with significant cervical cancer screening non-adherence, empirically demonstrates a need to gain better understanding of the unique behavioral factors that may exist in this population. The significant consequences of undetected cervical cancer demands researchers gain greater understanding of those factors which may promote or deter screening and vaccination behavior.

The benefit for nursing includes adding to the breadth of scholarly research. Additionally, the proposed research will likely have the greatest impact in terms of practice. The 2009 Veterans Affairs/Department of Defense Clinical Practice Guidelines for the Management of Pregnancy recommend post partum HPV vaccination for all vaccine eligible women prior to discharge from their postpartum inpatient stay (VA/DoD, 2009). Thus, a greater understanding of vaccination behavior may be desired, as the postpartum women will be required to complete the vaccination series several months after initiation on the postpartum ward.

In addition to nurses who provide healthcare to women, Community Health Nurses provide a substantial portion of health promotion educational services to Soldiers. Advanced practice nurses provide primary care in the military healthcare setting and are vital in the direct delivery of preventive services. Further, greater understanding of those factors which influence health promotion can then be utilized to develop effective

interventional strategies by all nurses to promote screening and vaccination, as well redirect effective health promotion activities.

Finally, in terms of cost for follow up of abnormal cytology, treatment for low grade cervical lesions (LGSIL) found earlier with consistent repeat screening has been estimated in the military healthcare setting to cost approximately $2000, while treatment for overt cervical cancer can range from $15,000 to $65,000 (Maxwell et al., 2002). Abnormal cervical cytology follow up usually includes colposcopy and tissue biopsy, and may also include cryotherapy, laser treatment or excision of abnormal cervical tissue. Soldiers may be required to delay deployment to receive follow up care. During deployment, follow up for abnormal cytology typically requires women be removed from their unit for 7-10 days in order to obtain care at higher level military healthcare facility with a trained advance practice nurse or gynecologist (Thomson & Nielsen, 2006). Finally, HPV vaccination prior to exposure may eliminate a vast majority of all abnormal cervical samples in female Soldiers.

Limitations

For this dissertation effort, the sample was limited to active duty female Soldiers. However, the selected site maintains a higher degree of deployability than most other Army posts and command influence may have been greater. Therefore, caution should be taken in generalizing study findings to other military populations (service branches) and those serving at other posts.

Additionally, more obstetrical patients and/or wounded Soldiers who were assigned to the Wounded Transition Unit (WTU) may have been present at the site to

conduct administrative tasks. These Soldiers tend to see healthcare providers more frequently (e.g., once a month versus one to two visits per year for non-obstetrical or non-wounded patients). Additionally, obstetrical patients are often afforded a greater likelihood to see a provider who has greater ability to discuss gender specific issues (i.e., sexual health, sexually transmitted infections).

Further, as noted during observations by the researcher during a pilot study in December 2008, some Soldiers may have been accompanied by a significant other (husband or boyfriend) and occasionally by their first line supervisor. Therefore, participants may limit and/or distort their answers to some questions, such as sexual risk history or other survey questions. The participants' responses may also have been biased by recall. Finally, the instrument constructs may only explain a portion of variance in behavior (Werner, 2004).

Assumptions

This study was based on the following assumptions:

1. The research instrument was answered by the participants to whom the instrument was distributed.
2. The participants understood the instrument questions and answered the questionnaire honestly.
3. The participant's electronic medical record reflected the most accurate and up to date cervical cancer screening examination and HPV vaccination.
4. When participants reported their last exam at a civilian facility, the date they reported as their last exam was accurate.

4. Knowledge regarding cervical cancer (to include screening) and HPV (to include vaccination), had a non-significant effect on behavior and little difference in knowledge of these topics exists between military and civilian populations.

5. Individual behavior was guided by rational considerations.

Summary

HPV, the precursor to cervical cancer, is the most commonly transmitted sexual infection in the U.S. However, adherence to cervical cancer screening and HPV vaccination has the potential to nearly eliminate cervical cancer, especially within an open access healthcare system such as the Military Healthcare System. Evaluating predictors for health promotion behavior is essential for military nursing researchers to develop effective interventional strategies to encourage adherence.

Soldiers remain the Army's most important resource to accomplish missions and to serve our nation (FM 1, 2005). Female Soldiers are a complex minority in the military. Previous literature reports an increased likelihood for cervical cancer, diagnosis at a younger age, and significant non-adherence for cervical cancer screening in the military population; little is known regarding influences for HPV vaccination adherence. Further, the consequence of undetected abnormal cervical cytology impacts the individual female Soldier and her unit.

Nurses are a key resource in the military healthcare system to encourage gender specific health promotion for female Soldiers. Articulating predictors for health promotion behavior, such as cervical cancer screening and HPV vaccination, in the military population merits a greater depth of research by the nursing discipline.

CHAPTER II

Review of the Literature

Introduction

The current literature demonstrates a strong effort to understand screening delay behaviors in a variety of populations. A majority of these studies report limited patient knowledge regarding cervical cancer, barriers to access to care, and various efforts to increase screening behavior, such as patient education, personal invitations, and outreach by lay personnel who speak the same primary language as the patient. In general, the current research demonstrated that women in minority populations tended to engage in less screening for cervical cancer (NCI, 2009) and were diagnosed with cervical cancer at a more advanced stage (Balasubramanian et al., 2008).

While many factors influence cervical cancer screening behaviors for a variety of female populations, the military female is unique in terms of job requirements, commitment, and social support systems. Additionally, a female Soldier is a minority in the Army and is frequently isolated from family, friends, familiar health care providers, and other female Soldiers who may have the experience needed to negotiate the military healthcare system. Although access to preventive healthcare services is promoted in the military healthcare setting, female Soldiers remain non-adherent in terms of cervical cancer screening (Herberger, 2000; Thomson & Nielsen, 2006). Further, researchers have noted limited current studies that describe military women's health care (Pierce, Antonakos, & Deroba, 1999) or only describe a specific female military population, such as hospital personnel (Wynd & Ryan-Wenger, 2004) or lower enlisted women (Hopkins-

Chadwick, 2006).

Few researchers have studied the factors that influence female Soldier's delay in cervical cancer screening or HPV vaccination. Those researchers who have studied military women and their screening behaviors have had relatively small samples that were not reflective of most females serving in the military in terms of rank, education, or job skills (Herberger, 2000). Research regarding military women and HPV vaccination has been primarily descriptive in nature and unpublished at this time.

Keyword Search

In exploring the literature regarding cervical cancer screening and female Soldiers, several terms in the research were used interchangeably. The most widely used test for cervical cancer screening is the Pap smear. Additionally, cervical cancer screening is often completed during a "Well Woman Exam." Finally, a precursor for cervical cancer is exposure to the human papillomavirus (HPV), which is a sexually transmitted infection (STI), also referred to as a sexually transmitted disease (STD). Subjective norms are also referred to in the literature as social norms. Military terms are often substituted in nursing research as well. Terms that are service specific may be inadvertently used to describe a different military population (e.g., Soldier refers to members of the Army only, rather than service members serving in all branches of the military). Each of these terms increases the complexity of the search that is required. In an attempt to capture the greatest breadth of the available literature, Table 1 below describes the various primary and substituted terms, as well as the secondary terms and limiting terms (i.e., when the search produced more than 100 articles) utilized to search

the literature. Sources for the search included: CINAHL, PubMed, MEDLINE, Dissertation Abstracts International, USUHS Dissertations, Google Scholar, and the Institutes of Medicine.

Previous research efforts regarding cervical cancer include biologic factors, individual factors, and health care system parameters. Biologic factors relevant to this research endeavor included the discovery of a screening method for cervical cancer and the association between HPV and cervical cancer. Research regarding individual factors encompassed an individual's knowledge, beliefs, risks for, and behaviors related to cervical cancer and HPV. For this endeavor, the individual factors described in detail were limited to those factors that were related to healthcare seeking behavior of those most similar to military women (younger age and/or diverse ethnicity) and in the context of the Theory of Reasoned Action constructs undergirding this research endeavor, such as beliefs, behavior, and subjective norms. The final portion of the literature review focused on the studies regarding cervical cancer that were conducted with military women as the population of interest.

Table 1.

Keyword Search

Primary Term [PT]	Alternate Terms [AT]	Secondary Term [ST]	Limiting Term
Cervical cancer		Screening Knowledge Beliefs Behavior Attitude Social Norms Subjective Norms Intent	Military
Cervical cancer	HPV Human Papillomavirus Pap Pap smear Papanicolaou Well woman Physical	Military Army Soldier Service Member Veteran	Screening Knowledge Beliefs Behavior Intent Social Norms Subjective Norms
Human papillomavirus	HPV	Vaccine Vaccination Immunization Inoculation	Military Soldier Service Member Veteran Beliefs Behavior Knowledge Attitude Social Norms Subjective Norms
Military	DOD Veteran Service Member Soldier Sailor Airman Marine	Screening Cervical Cancer (and all alternative terms) Human Papillomavirus (and all alternative terms) STD STI Gender Specific	Female Women Woman

Biologic Factors Related to Cervical Cancer

Widespread screening for cervical cancer began in the United States shortly after World War II (Gardner, 2006; Skloot, 2009). George Papanicolaou, a naturalized Greek scientist, developed the technique to collect and observe cervical cells in the 1920's; hence the common name for this test is "Pap smear" (Carmichael, 1973). As originally described by Papanicolaou and Traut in 1941, the technique has changed very little. Cells from the transformation zone of the cervix are collected via a small brush and spatula, or just a brush, and directly observed in the laboratory for abnormalities (Hardy, 2007).

The transformation zone is the key location for HPV to be introduced into a women's body (Noller, 2007). This is the location of squamous metaplasia, (stratified sqaumous epithelium replacing columnar epithelium) and is readily available on the exocervix during puberty and slowly retreats towards the cervical os as women age (Balasubramanian, et al., 2008). Hence, the risk of HPV infection in women generally decreases with age and increases with younger age of sexual debut (Balasubramanian et al., 2008).

In the last 30 years, over 130 HPV strains have been identified and 30-40 strains are known to directly affect the genital tract (Stanley et al., 2007). Approximately one third of those affecting the genital tract are considered high risk and have been directly associated with cervical cancer (CDC, 2007). In the past decade, direct testing for the two most frequently occurring high risk HPV strains, specifically HPV 16 and HPV 18, has become clinically available and utilized (Noller, 2007; Winer & Koutsky, 2008).

HPV, a small double stranded DNA virus, is described as the most common viral sexually transmitted infection worldwide and in the United States (CDC, 2008). However, infection with a high risk HPV is not a guarantee that a woman will develop cancer (Balasubramanian et al., 2008).

Transmission of the high risk HPVs is facilitated by skin to skin contact and most often associated with penetrative sexual activity. The majority of HPVs, to include those identified as high risk and associated with cervical cancer, are asymptomatic, often self-limiting, and nearly 90% resolve without intervention (Markowitz et al., 2007). The progression from atypical cells to overt cervical cancer can take several years upon initial exposure to HPV, thus requiring repeated screening tests for an individual (CDC, 2008; Noller, 2007; Warmen, 2010).

A general consensus regarding the progression from HPV to overt cervical cancer is not currently well established in the literature (Balasubramanian et al., 2008; CDC, 2007; Goldie et al., 2004; Noller, 2007). Balasubramanian and colleagues suggest that 100% of women infected with a high risk HPV strain will eventually develop cervical intraepithelial neoplasia grade I (CIN I) lesions, a precursor to invasive cervical cancer. However, Winer et al. (2005) report most cervical abnormalities caused by HPV resolve in less than six months, therefore, only 10% of CIN I lesions are detected via normal screening, and of those, 8% will develop into invasive cervical cancer.

HPV Vaccine

In 2006, Gardasil, a vaccination was introduced to decrease a women's risk of developing cervical cancer and is effective against the two most common high risk HPV

strains, HPV 16 and 18. This vaccine is also effective against HPV strains 6 and 11 which are causative for 90% of external genital warts (Wiley et al., 2002). Gardasil is currently Federal Drug Administration (FDA) approved only for men and women ages 9-26. The vaccination consists of one injection given at three points in time; initially, at two months, and at six months.

Cervarix, a second vaccine to prevent cervical cancer gained U.S. Food and Drug Administration (FDA) approval in October 2009. Cervarix is approved for women ages 10 to 25 years of age. Cervarix is also administered as a three injection series; initially, at one month, and at six months. However, Cervarix is protective against HPV strains 16 and 18 only, and does not protect against HPV strains 6 and 11.

Both Cervarix and Gardasil have been reported as well tolerated by patients (Jones, 2009; Slade et al., 2009). Currently, there are no recommendations for boosters in females after the completion of the three injection series (Jones, 2009). Gardasil was approved in 2009 for use in males, but not demonstrated wide spread use at this time (Liddon, Hood, Wynn & Markowitz, 2010). The efficacy for HPV vaccines to prevent cervical cancer has been reported as greater than 90% in several studies (Adams, Jasani, & Fiander, 2007; Romanowski et al., 2009). However, the vaccine must be administered prior to exposure to HPV. Therefore, vaccination is ideally provided in early adolescence, rather than later in young adulthood (ACIP, 2009).

Cervical cancer's relationship with HPV is unique and permits healthcare providers to provide timely education and a variety of risk prevention strategies (Anderson, Pohl, & Low, 2008). HPV is sexually transmitted, thus most risk factors for

other sexually transmitted infections also apply to HPV, and ultimately cervical cancer (CDC, 2008). In addition to an earlier age for sexual debut (e.g., less than 17 years old), risk for HPV acquisition is proportionally linked to increased number of sexual partners, infection with other sexually transmitted diseases (i.e., Chlamydia), and male partners with multiple partners (CDC, 2007). Barriers, such as condoms decrease, but do not eliminate, the risk for transmission (Winer et al., 2003). Additionally, risk factors for other cancers are also associated with cervical cancer, such as cigarette smoking (CDC, 2007).

Beliefs, Knowledge and Behavior for Cervical Cancer Screening

Previous research regarding beliefs and cancer screening has indicated women have a multitude of attitudes and sentiments towards cervical cancer and cervical cancer screening (Mays et al., 2000). As noted in the literature, beliefs regarding cervical cancer are affected by an individual's perception of acceptability, stigma, provider influence, and ease of obtaining a cervical screening exam. A systematic review conducted by Ackerson and Preston on women with access to care for breast or cervical cancer screening reported that women did not have a clear understanding of cervical cancer (2009). Of the 19 studies reviewed by Ackerson and Preston, samples included a variety of ages (ranging from 14 to 86 years of age), ethnicities/races, and geographical locations (U.S., U.K., and Sweden). Beliefs such as perceptions of fear of cancer, personal risk factors for cancer, and provider mistrust drove the likelihood of screening behavior. However, Ackerson and Preston reported that several studies reported that women were not told by their healthcare provider that they needed a screening exam or failed to

clearly provide information on the benefits for screening exams to detect cancer early (2009).

Only a handful of studies include samples that are reflective of typical female Soldiers, that is, younger, ethnically diverse working adults. Of the studies with younger women, most have been limited to a single minority population. A review of the pertinent literature does uncover a variety of relevant themes in terms of beliefs and behaviors that are potentially applicable to women who serve in the military. A qualitative study by McMullin, De Alba, Chavez, and Hubbell (2005) with women from Mexico that had immigrated to the U.S. (n = 20), described several beliefs that were related to non-adherent cervical cancer screening behavior. McMullin and colleagues reported participant's beliefs in the need for screening (e.g., having a Pap smear performed), included that the Pap smear was an evaluation of the respondent's ability to bear children rather than to detect cancer.

McMullin et al. (2005) conducted semi-structured interviews and reported several beliefs about sexual behavior that affected these immigrants's decision to obtain a Pap smear. The most common beliefs about sexual behaviors related to a woman's likelihood for cervical cancer included having an abortion (90%) and poor hygiene (85%). Although most believed cervical cancer was related to an infection caused by behavior, none of the respondents reported knowledge of HPV. Because the belief for cervical cancer risk was mostly related to socially undesirable behaviors, McMullin et al. reported that 95% of the women interviewed reported they would not get a Pap smear because "they did not want other people to think they were 'bad' women" (p. 13, 2005).

However, McMullin also reported that the respondents stated if they had engaged in behaviors they believed would put them at a higher risk for cervical cancer, they would be more, rather than less, inclined to obtain an exam.

McMullin et al. (2005) noted that most of the respondents reported screening was conducted when they received obstetrical care or in conjunction with other medical care, although the exact number was not provided by the authors. This sample included only women greater than 30 years of age (mean 39 years of age). Further, half of the sample lacked health insurance, only one participant had completed high school, and most (55%) were not employed outside the home.

Beliefs regarding cervical cancer also include the relationship between knowledge and individual perceptions of susceptibility to cervical cancer and the seriousness of cervical cancer. An older study, Mays et al. (2000) reported most participants perceived cervical cancer as life threatening, but otherwise had limited knowledge regarding HPV. The participants included 20 adults (mean age 33.6 years) and 20 adolescents (mean age 15.6 years) of lower economic status. Recruited from the waiting room in a clinic in two large American Midwestern cities, most of the adolescents were Caucasians (75%), and most the adult participants were African American (95%).

Mays and colleagues conducted semi-structured interviews and reported most of both samples had a Pap smear at least once (85% of the adolescents and all of the adult participants) previously. However, the majority of the participants (65% of the adolescents and 60% of the adults) could not identify the purpose of the Pap smear. Further, both groups reported Pap smear were also used for STD testing, however none of

the respondents associated testing for HPV with the Pap smear. Akin to the study by McMullin et al. (2005), a reoccurring theme for the need for Pap smear testing in Mays et al. study was the use of the Pap smear for validation of fertility.

An older quantitative study by Jennings-Dozier (1999) described African American women (n = 108) and Latino women (n = 96) as both having a stronger intention to obtain annual exams when they had favorable attitudes and perceptions that a Pap smear was easy. This sample included women aged 18 to 83 years old, with a mean age of 36 years of age. Half of the sample was employed and 77% had health insurance. In addition to positive attitudes towards Pap smears, both groups in Jennings-Dozier's study reported a greater propensity for previous cervical cancer screening when they perceived stronger social norms for screening and support from others. However, Jennings-Dozier reported subjective norms did not significantly contribute to future intention for cervical cancer screening in either group.

In a more recent qualitative study by Ackerson, et al. (2008), a sample of lower income African American women (n = 7) reported their likelihood to follow up with cervical cancer included beliefs as to their personal risk for cervical cancer. The women had a mean age of 28 years and reported their previous cervical cancer screening experience as generally negative. Ackerson et al. (2008) reported healthcare providers and family were important influencing factors for screening adherence.

Although the military population has higher numbers of those from immigrant populations (Quester, 2005) and enlistment from those of lower socioeconomic status (Segal & Wechsler-Segal, 2004), one should use caution to derive the same conclusions

for female Soldiers and their beliefs, knowledge, and behavior towards cervical cancer screening. In reviewing the literature, the population that mirrors the average age of female Soldiers was the research conducted with college students.

By conducting focus groups, a study focusing on female Latina college students (n = 16) at a large Midwestern University reported information about Pap smears generally came from the participant's mother, although the exact percent was not reported (Schiffner & Buki, 2006). Schiffner and Buki noted that most of the sample population (88%) knew they should have a Pap smear, but only 50% had completed an exam. The participants reported less protective sexual health behaviors (i.e., picking up condoms and completing an exam at the clinic) due to concerns about their reputation if others in their minority community observed them at the clinic (Schiffner & Buki, 2006). Additionally, the authors reported the sample perceived multiple risks were associated with cervical cancer screening, such as negative perception by friends and family and the possibility of being diagnosed with a STI.

In a sample derived from another college study at a large Midwestern university, Ingledue, Cottrell, and Bernard (2004) described a correlation between low knowledge of HPV, and low perception of HPV as a serious disease, as well as perceived low susceptibility to acquiring HPV, with less screening behavior in college students (n = 428). Based on a qualitative instrument developed by Ingledue, participants reported their knowledge regarding cervical cancer and HPV, and perceptions regarding cervical cancer/HPV seriousness and personal susceptibility. The mean age for respondents was

21.5 years and 91% were unmarried. Ingledue et al. did not report race/ethnicity or socioeconomic status for the sample.

Two years after Ingledue's and colleagues study, Denny-Smith, Bairan, and Page (2006) reported greater knowledge of HPV in a sample of nursing students (n = 240) at a large Southeastern university as compared to the population in Ingledue's et al (2004) study. The nursing students were older (mean 30 years in age) and about 49.5% were married. Using the same instrument as Ingledue et al. (2004), Denny-Smith and colleagues reported the nursing student respondents who reported a higher risk for HPV acquisition (increased number of sexual partners), had greater knowledge regarding HPV and a statistically significant perception of their increased risk for cervical cancer. Only those respondent's in Denny-Smith's et al. study with an increased perception of risk, rather than knowledge, reported a greater likelihood for a Pap smear testing, $F(2,237) = 4.64$, $p = .01$. In comparison to female Soldiers, the majority of participants in the study by Ingledue et al. (2004) were single and unmarried; while in Denny-Smith et al. (2006) the participants were older and had some basic health knowledge as a nursing student.

While knowledge and beliefs may be factors contributing to a lack of testing for cervical cancer, a quantitative study conducted with civilian OB/GYN residents (n = 204) reported 19% of the respondent's as non-adherent with cervical cancer screening (Williams, Santoso, Ling, & Przepiorka, 2003). The two most frequently reported barriers for screening by the non-adherent OB/GYN residents were time away from work and discomfort in using their workplace facility. However, a quantitative study with older African American women (n = 144) identified pain as the best predictor for Pap

screening non-adherence for older African American women (aged 45-65), rather than those factors previously identified in younger women such as knowledge, fear, and access (Hoyo et al., 2005).

In a meta-analysis of 35 studies performed by Forbes, Jepson, and Martin-Hirsch (2007), education (e.g., knowledge) regarding cervical cancer screening (2007) demonstrated limited evidence for women to adopt health promotion behaviors. Most (42.8%) of the studies included in the Forbes et al. meta-analysis were conducted in the U.S. and set in community or primary care clinics. Forbes and colleagues reported invitation (n = 9,400) and educational efforts (n = 4,084) as the most effective methods for promoting cervical cancer screening. However the authors were unable to delineate a specific education method that was superior.

Denning-Smith et al. (2006) reported greater knowledge as compared to the study by Ingledue et al. (2004), both of which used the same instrumentation, but demonstrated little change in behavior between the two samples. However, caution should be used in comparing college student's knowledge, beliefs, and behaviors regarding cervical cancer to female Soldiers. Hopkins-Chadwick's (2006) efforts to describe the determinates of health readiness in junior enlisted military women describes this population as generally the same age as college students, but living and working in a conservative and male dominated culture and experiencing decreased health seeking due to stigmatization. Military personnel also demonstrate a higher level of health literacy as compared to civilians (Weld, Padden, Ricciardi, & Bibb, 2009). However, generalization to the total

military force is limited as Weld et al.'s study (n = 155) was a convenience sample of active duty personnel in a hospital setting.

Beliefs, Knowledge and Behavior for HPV and HPV Vaccination

Knowledge regarding HPV and cervical cancer is hypothesized in the general U. S. population as a function of direct-to-consumer targeted advertisements by Merck, the manufacture for one of two FDA approved HPV vaccinations (Herzog, Huh, Downs, Smith, & Monk, 2008). Yet, as illustrated by the study by Williams, et al. (2003) with the sample of civilian OB/GYN residents, knowledge was not found to be a significant determinate for the adoption of health promoting behaviors. In a quantitative study of women who had been diagnosed and treated for cervical cancer (n = 328), most women (81%) did not identify HPV as the primary risk factor for cervical cancer (Stark et al., 2008). This sample included a diverse ethnic/racial sample, 65.2% Caucasians and 34.9% African Americans, and 93% were at least high school graduates. The average age of diagnosis of cervical cancer was 35 years of age. Most of the women (63.7%) reported a belief that cervical cancer was not preventable and only 61.9% reported knowing the name of the screening exam for cervical cancer (Pap smear).

Following the approval of Gardasil, Head, Crosby and Moore (2009) conducted a mixed methods study to determine Pap smear knowledge. Using a sample of female college students (mean age of 20.5 years) seeking care at a university health clinic, respondents were instructed to describe the term Pap smear in their own words and by selecting terms from a list. Although 93% of the sample reported some form of sex education in their lifetime, the majority (90.3%) of the respondents (n = 145) did not

correlate the term Pap smear with HPV or cervical cancer. Further, most incorrectly indicated that the Pap smear was the same as a pelvic exam (68.5%) or a test for an STD (42.5%). However, as the Pap test is conducted during a pelvic exam and involves testing for HPV when abnormal cells are detected; perhaps the women were attempting to be more inclusive of the experience, rather than providing a precise definition.

Sandfort and Pleasant (2009) also describe the knowledge and attitudes of college students (n = 1,282) at a large Northeastern university regarding HPV following the HPV vaccine campaign by Gardasil. This quantitative study included predominately Caucasian (47.7%) and Asian (37.0%) students. Most of the respondents were unmarried (95.6%), female (57.1%) and the mean age was 19.4 years, with a range of 17 – 45 years of age. Most respondents indicated that they knew that it was transmitted sexually, 68% and 77% for the males and females, respectively. More women (89%) reported HPV as causing serious problems for women, than did the men, 81%. Overall, the males tended to have lower scores for HPV knowledge than the females and a higher stigma score regarding HPV. The differences in knowledge and stigma scores between the males and females were both found to be statistically significant at the .01 level. Although most of the entire sample had heard of HPV (92%) and an HPV vaccine (78%), most reported hearing about the vaccine from television advertisements (65.7%), friends (37.7%), and the Internet (32%). Although Sandfort and Pleasant did not provide an exact percentage, a majority of the women were reported as preferring sexual health information from a gynecologist, family, and advertisements.

In a similar quantitative study by Gerend and Maglorie (n = 124), which included recruitment of students at a historically black university, most (94%) of the female participants had heard of HPV (2008). Information sources for the sample included the media (60%), healthcare providers (39%), and friends (32%). The mean age of students was 19 years, with a range of 18 to 26 years. All of the participants were single; nearly half of the sample were males (48%); and most participants were African American (57%) or Caucasian (32%). Most of the participants reported they were sexually active (78%) and using condoms consistently (58%). On the other hand, most believed their personal risk for HPV was relatively low. A total of four women in the study reported receiving the HPV vaccine, but 65% reported they were interested in receiving the vaccine in the future. Gerend and Maglorie reported that vaccine interest in women was greatest in those with the greatest number risk factors for HPV. However, the research conducted by both Sandfort and Pleasant (2008) and Gerend and Maglorie (2008) included student populations who were of younger ages, and nearly all of the participants were single/unmarried.

In a larger cross-sectional study with women between the ages of 13 and 26 years of age, Caskey, Lindau, and Alexander (2009) reported only 30% of the women having initiated the HPV vaccine (n = 1,011). Caskey and colleagues (2009) conducted a quantitative Internet based study with an ethnically/racially diverse population reflective of the same proportions in the U.S. For the women between 18 to 26 years of age (n = 599), the mean age was 23 years, 19% had a Bachelor's degree, and only 9% had received at least one injection of the HPV vaccine series.

Caseky et al. reported that most respondents received information about Gardasil from advertisements (61%), healthcare providers (35%), and family members (31%). When stratified to those who had initiated the vaccine, a higher number of women reported receiving vaccine information from healthcare providers and family. In the subsample of women ages 18 to 26 years of age, 80% reported they would likely get the vaccine if recommended by their healthcare provider or a parent, followed by 55% if recommended by a friend. Further, of the women who had received the vaccine, nearly all (95%) reported understanding that they would still need continued cervical cancer screening in the future. It is important to note that this study was limited to those participants that could read English and had access to the Internet. Additionally, in general, most of the studies regarding HPV and cervical cancer screening can be limited by participant reliance on self-reporting and social desirability for answering the questions.

Subjective Norms and Screening Exams

In reviewing of the literature, the concept of subjective norms has been more often been applied to mammography, rather than cervical cancer screening. Subjective norms or social norms are an individual's perception of the extent in which a salient other supports the performance of a given behavior. Although many of the studies regarding mammography screening behaviors are with an older population (i.e., greater than 40 years old), subjective or social norms have been identified as a significant determinate for adherence for screening behavior (Allen, Stoddard, & Sorensen, 2008).

Allen, Stoddard, and Sorensen's interventional study reported a moderate effect for social norms to predict mammography adherence (2008). The study stratified working women 40 to 51 years in age and women greater than 51 years in age (n = 1,475). After all the participants received an educational intervention regarding mammography at their work site, the participant's mammography adherence was measured two years later. In the sample of younger women, adherence was influenced by friends and family encouragement (Odds Ratio [OR] 2.2). However, this study sample included a rather highly educated group of participants (56% with a Bachelors degree or higher), most of whom were Caucasian (85%).

An older study by Rutledge, Barsevick, Knobf, and Bookbinder (2001) reported nearly identical findings as Allen et al. (2008), with the greater the age, the higher the perceived risk for cancer, and the social norm encouragement by a healthcare provider as predicting nearly 50% of mammography behavior ($N = 370$, $R^2 = .486$, $p < .001$). However, the average age for the participants in Rutledge et al.'s quantitative study was 60 years in age (Standard Deviation [SD] = 15) and included an urban, predominately Caucasian (99%) and fairly educated population (46% with at least a Bachelor's degree).

In regards to cervical cancer screening, Duffett-Leger, Letourneau, and Croll (2008) reported, in a quantitative, on-line study involving Canadian college students (N = 904), that social (subjective) norms demonstrated a significant positive relationship with the particip ant's intention to complete cervical cancer screening. Duffett-Leger et al. (2008) reported that an increased social norm belief by participants significantly influenced future cervical cancer screening behavior ($p < 0.001$). However, Duffett-

Leger and colleagues also reported 29% of the sample as felt there was a need for a repeat screening in past six months, indicating an elevated possibility for overestimation of actual cervical cancer screening.

An older study by Solomon and Gottlieb (1999) with an Native American sample, (n = 199) who were all less than 40 years in age, also reported subjective norms as a significant determinate for cervical cancer screening behavior adoption. Solomon further reported that the strongest influencing subjective norm was encouragement for screening by a healthcare provider (i.e., nurse or doctor).

The influence of subjective norms has also been tested in terms of HPV vaccination acceptance. A large online quantitative study (n = 1,401) conducted with female college students (Allen et al., 2009), described social norms as a positive influence for the adoption of HPV vaccination in the sample. In this study, 53% of the participants reported future intent for HPV vaccination. Further, Allen and colleagues reported the strongest factor for HPV vaccine acceptance was determined by peer acceptance (OR 4.15, Confidence Interval [CI] 2.71- 6.36, $p < .05$). These authors encouraged future studies focused on interventions which encourage social norms, such as the influence of peers, as predictive of acceptance to adopt HPV vaccination. The authors also described misconceptions regarding participant's report of less need for continued cervical cancer screening in the future.

Although Allen et al.'s (2009) participants were an ethnically/racial diverse sample, this group of single women (age ranging from 18 to 22, mean not reported) reported 38.6% as never sexually active. Further, those with a history of HPV and

abnormal cervical cancer screening were excluded, although most would still benefit from the vaccine as co-infection with HPV is generally estimated between 20 to 50% (Spinillo et al., 2009).

Self-Reporting Screening Behaviors

In the literature that was reviewed for this research effort, a preponderance of the studies regarding screening behavior relied on self-report for previous behavior. A study on mammography adherence in female veterans over the age of 50 years old (n = 2,910) also described social norms as a reliable and a valid measure for the prediction of breast cancer screening (Tiro et al., 2005). However, the authors noted a weakness in their study in terms of the dependence on self-report for mammography, as other researchers have noted a tendency for women to over report breast cancer screening exams. Duffett-Leger et al. (2008) noted nearly a third of participants reported a need for repeat screening examination, far greater than expected by the authors for follow up of abnormal screening. Caseky et al. (2009) also noted a concern that social desirability could lead participants to over-report vaccination behavior.

In a sample of low income African American women (n = 229), Champion, Menon, McQuillen, and Scott (1998) compared participant's self-reported screening mammograms with the participant's medical record. Champion and colleagues reported that an arm of an interventional study regarding mammography screening, the lower income, African American women (n = 229) recruited to participate tended to over report previous screening behavior. Champion et al. reported only 49-60% could be verified by the participant's medical record. These researchers also reported verification of

screening exams such as mammography frequently depend on self-report due to the labor and cost that would be required to verify exams, but that future research should include verification of behavior, particularly in minority populations.

Vernon, Briss, Tiro, and Warnecke (2004) additionally reported this phenomenon as having a greater incidence for cervical cancer screening than for breast cancer screening. In a retrospective record review, Stark et al. (2008) found a propensity for women previously treated for cervical cancer to over report cervical cancer screening, indicating a possibility for either social desirability or participant's inability to distinguish all pelvic exams from pelvic exams that included cervical cancer screening.

An interventional study by Johnson, O'Rourke, Burris, and Warnecke (2005), conducted with women greater than 50 years of age (mean 64.3, SD = 10.2), noted a concordance rate for cervical cancer screening in the previous three years as .79 (n = 588). Participant education was positively associated with concordance for clinical gynecologic exams (OR 1.20, $p < .01$). However, of those women who reported a Pap smear, 25% were not found in the medical record. Johnson and colleagues found that a medical record may be incomplete, warranting caution in presenting a medical record review as a "gold standard" for past behavior. Of interest, based on the interventional study arm of this study, improvement in behavior reporting was significantly influenced by asking women about future intent prior to asking about past behavior.

In a sample of younger urban women seeking care at a hospital-base adolescent clinic, Kahn, Goodman, Kaplowitz, Slap, and Emans (2000) reported that 14% of the women (n = 447) had incorrectly self-reported past cervical cancer screening exams. The

mean age for the respondents in the quantitative study was 18 years (SD = 2.1). Comparisons for self-reported screening were conducted via a review of the electronic laboratory results maintained at the hospital. These investigators determined that respondents with incorrect self-reporting had lower HPV knowledge scores (OR 2.4), low perceived communication with the healthcare provider (OR 2.1), and no contraception use at their last time of intercourse (OR 5.5).

Military Research

Sexually transmitted infections historically have been a problem among military forces (Gaydos & Gaydos, 2008). However, because many contemporary infections are not associated with decreasing combat capability or severe morbidity, Gaydos and Gaydos (2008) suggest a decreased interest in military health care priorities aimed at the treatment and prevention of STIs. Abnormal cervical cancer screening, most often a result of the most common sexually transmitted infection, HPV, has been identified as a significant problem for deployed military women and their units (Ollayos et al., 2002; Pierce et al., 1999; Yamane, 2006).

Based on the recommendations of the American Society for Colposcopy and Cervical Pathology (2006) and Army Regulation 40-501 Standards of Medical Fitness (AR 40-501, 2008), one study of deployed female service members found 44% of those surveyed (n = 275) did not meet the recommendations for cervical cancer screening (Thomson & Nielsen, 2006). During the time of Thomson and Nielsen's study, deployed women who required follow up for abnormal cervical cancer screening were flown back to Spain or Germany and removed from their units for an average of seven to 10 days.

Of note, 22% of the women in this study reported that they had not received an annual cervical cancer screening exam a full year prior to deployment.

Two studies have reported an increased risk for cervical cancer in female service members. By conducting a retrospective pathology chart review, Ollayos et al. (2002) reviewed 126,024 cervical cancer smear completed by the Department of Defense in a six month period. These researchers reported an unequal distribution of clinically significant cervical lesions (high and low grade squamous intraepithelial lesions and overt carcinoma) in both younger women and younger active duty women. However, these investigators were unable to distinguish the active duty population from retired women, therefore the ages for cervical cancer incidence in military women in this study ranged from 17 to 80 years of age.

Yamane (2006), in a 12 year retrospective review of all cancers reported for active duty Air Force personnel, similarly reported a significant difference in active duty Air Force women for cervical cancer as compared to their civilian counterparts. Ages for the active duty Air Force population with diagnosed cervical cancer ranged from age 19 to 55 years of age. Using standardized rates and reviewing all reported cases of cancer for active duty airmen, Yamane reported cervical cancer as the second most common disease among female airmen (23.6%), who had a mean age of diagnosis as 28.4 year old (SD = 6.8), and a median age of 27 years. In contrast, the median age for cervical cancer in the civilian population is 48 years of age (Balasubramanian et al., 2008).

Few studies that have recruited military women have been published regarding barriers to cervical cancer screening. A master's thesis prepared by Herberger (2000),

focused on non-adherence to Well Woman Exams (to include breast and cervical examination) in a military population. The age range for active duty female Soldiers in this study was 18 to 54 years in age, with a mean of 33.2 years. The investigator found that 20% were non adherent in terms of Pap screening and only 20% of participants were aware of the Army regulation regarding cervical cancer screening. Herberger's descriptive study found the provider had the biggest influence on adherence, and time wasted while waiting and difficulty in scheduling an appointment were the strongest barriers. Of interest, although most of the participants were adherent with screening, only 63% of the participants reported intent for screening in the next year. Limitations with Herberger's study are directly related to her sample selection. The size was rather small (n = 63) and included women in-processing at a large military teaching facility. Over 50% of the sample had a minimum of a bachelor degree and 30% were at the rank of captain or major. This sample is not reflective of the majority of women currently serving in today's Army in terms of either rank or education. Finally, the study was conducted in 1999, prior to the current American Society for Colposcopy and Cervical Pathology recommendations for cervical cancer screening and prior to the Global War on Terrorism. In this study, only 5% of the sample reported deployment in the previous year.

A second unpublished Master's thesis by Kuehner (2001) described the lived experience of women, ages ranging from 32 to 64 years in age, who received a diagnosis of an abnormal cervical cancer screening exam in a military health care facility. This sample (n = 6), included only 3 women who were currently serving on active duty in the Navy. Although limited in number of service members, this phenomenological study did

reveal themes concerning knowledge, acceptability and contextualizing regarding the screening process. Most of the women had not addressed the acceptability of the possibility they might have an abnormal exam. In the theme "Contextualizing", the military healthcare system was clearly identified and themes included frustration regarding delayed delivery of abnormal results and difficulty in negotiating with gate keepers to obtain gender specific care. The military women also described difficulty in addressing their health care needs while attempting to prove that they were not weak, unworthy, or unequal to male sailors.

Other researchers suggest that when considering healthcare interventions for the military population, adolescent development and knowledge, as well health care activities, should be considered, since the military population has relatively high numbers of adolescents (Hardoff & Halevy, 2006). Researchers have also demonstrated that many female Soldiers engage in behaviors that put them at a high risk (i.e., mean lifetime number of sexual partners greater than 9 and poor consistent condom use) for STIs, including HPV, and consequently they are at increased risk for cervical cancer (von Sadszky & Ryan-Wenger, 2007). Yauger et al. (2005), reported non-compliance further evaluation after the diagnosis of an abnormal Pap smear in females seeking care in a military healthcare OB/GYN clinic. The researchers conducted telephone surveys with 55 women who failed to keep their appointments or cancelled within 24 hours of their appointment. Military women comprised 45% of the participants. Military women reported the primary cause for non-adherence was related to work conflict (28%), rather

than the other reasons cited by non-military service members, such as menses (33%) and unplanned events (22%).

Research regarding military women and cervical cancer must also be mindful of influences on this population prior to joining the military. Cervical cancer incidence is higher and survivability is lower for most minority groups (Howe et al., 2006). Members of the military, particularly those who are younger and of enlisted rank, tend to be over represented by minority populations, as the military is a device to gain financial independence, additional education and for some, citizenship (Quester, 2005). Further, although the overall incidence of cervical cancer continues to decrease, recent research has found an increasing incidence of cervical cancer in younger women, and in particular those from rural areas (Jemal et al., 2007).

Younger age of sexual debut is linked to an increased likelihood for cervical cancer and military women report a history of childhood sexual abuse at a significantly earlier age and for a longer period of time as compared to civilians (Schultz, Bell, Naugle, & Polusny, 2006). In a sample of young African American women (ages 18 to 29 years of age, n = 665) who took part in a longitudinal interventional educationally based study to decrease STI acquisition, Wingood, Seth, DiClemente, and Robison (2009) reported that women between the ages of 18 to 24 years of age who reported sexual abuse were 4.5 times more likely to test positive for high risk HPV. Additionally, a quantitative study by Coker, Hopenhayn, DeSimone, Bush and Crofford (2009) with women who joined the Kentucky Women's Health Registry (n = 4,732) reported women who experienced violence had a higher risk of cervical cancer (OR 2.6, 95% CI 1.7 – 3.9,

$p < .05$). Those who reported intimate partner violence and child sexual abuse had the greatest risk, OR 2.7 and OR 2.4, respectively. Therefore, researchers must consider significant risk factors for developing cervical cancer for service members prior to their joining the military.

Significance

Most studies regarding cervical cancer and HPV in the same age group as the majority of military women are elicited with a sample population of college students or one specific targeted racial/ethnic group. Unfortunately, these studies are not reflective of military women who may hail from lower socioeconomic backgrounds, lower overall levels of education, and/or greater varieties of racial/ethnic diversity. Women serving in the military are at a higher risk for cervical cancer and at a much younger age, yet the paucity of research regarding cervical screening in the military indicates a tendency for female Soldiers to avoid screening or to cancel follow up appointments due to work related conditions. Even less has been published regarding military member's acceptability or adherence to the HPV vaccination guidelines, a primary tool to prevent cervical cancer.

The inclusion of subjective norms in determining heath promotion behavior has been tested in the literature in several health promotion milieus and has been described as valuable to provide insight for adherent behavior. In particular, the inclusion of subjective norms can often identify the strongest salient other identified by the participant to motivate adherent behavior (e.g., health care provider or peer). However, other

researchers have reported reliance on self-reported behavior as a potential threat to the reliability of such research endeavors.

To generate a broader scope of understanding regarding health promoting behavior related to cervical cancer in military women, this review of the literature concentrated on the most common themes found in previous studies. However, these previous studies provide only a minimal understanding of the factors that influence cervical cancer screening and HPV vaccination behavior in military women and rarely include a sample reflective of the majority of Soldiers that are currently serving.

Greater understanding of those factors which influence health promotion can then be utilized to develop effective interventional strategies to promote screening and vaccination. Health promotion, in terms of completion of cervical cancer screening prior to deployment and less incidence of high risk HPVs by vaccination, can ultimately result in a reduction of required follow up before and during deployment. Of interest, the HPV vaccine is recommended, but is not a mandatory requirement for women serving the Army (Kiley, 2007). AR 40-501 "Standards of Medical Fitness" (2008) notes the permissive nature of such screening. Consequently, Army healthcare policy regarding cervical cancer prevention leans more towards a reactive rather than the preemptive approach to care in this respect.

The focus of this research effort will be to measure attitudes and social norms among female Soldiers for cervical cancer screening outside of a hospital setting. Upon measurement, the dominate attitudes and social norms will identified to predict screening behaviors. The secondary focus of this research effort will be to measure the social

norms for HPV vaccination among female Soldiers less than 27 years old to predict vaccination behavior. The tertiary focus of this research effort will be to compare female Soldier's self-reported behaviors for cervical cancer screening and HPV vaccination with their electronic medical records maintained by the Department of Defense.

CHAPTER III

Methodology

This chapter describes the methodology utilized in the study. The purpose, design, research questions, hypothesis, pilot data, variables and instrumentation, setting, sample, procedure, protection of human subjects, and data analysis are reviewed and explained.

Purpose

The primary purpose of this study was to measure the effect of attitudes and subjective norms regarding cervical cancer, as well as intent for screening, on a female Soldier's behavior to complete a cervical cancer screening exam per current U.S. Army regulations. The secondary purpose of this study was to measure the effect of subjective norms regarding HPV and intent for HPV vaccination on female Soldiers less than 27 years old for adherent behavior to complete HPV vaccination per current U.S. Army policy. The tertiary purpose of this study was to compare the Soldier's self-reported previous cervical cancer screening and HPV vaccination with their electronic medical record. Based on an understanding those factors, this research describes those factors which are most predictive of female Soldier's to completion of cervical cancer screening and HPV vaccination.

Design

A predictive correlational study design was utilized to predict cervical cancer screening and HPV vaccination behavior among female Soldiers based on their beliefs, attitudes, and intent. A comparative descriptive design was utilized to describe the

difference between female Soldiers' self-reported previous cervical cancer screening exam, HPV vaccination for female Soldier's less than 27 years old, and their electronic medical record.

Research Questions

The following primary research questions were formulated to measure the relationship between female Soldiers' attitudes, social norms, and intent to predict cervical cancer screening behavior. The following secondary research questions, designated by brackets, were formulated to measure the relationship between female Soldiers' attitudes, social norms, and intent to predict HPV vaccination. The final research question examined the difference between self-reported behavior and the electronic medical record.

In the military healthcare system:

Q_1. Primary- What was the past behavior (adherence) of female Soldiers regarding cervical cancer screening [and HPV vaccination]?

Q_2. Primary- What is the future planned behavior (intent) of female Soldiers regarding cervical cancer screening [and HPV vaccination]?

Q_3. Primary- What were female Soldiers' attitudes towards cervical cancer screening?

Q_4. Primary- What were female Soldiers' subjective norms towards cervical cancer screening [and HPV vaccination]?

Q_5. Primary- Which of the above factors were the best predictive factors for female Soldiers to be non-adherent in yearly screening for cervical cancer [and initiate and complete the HPV vaccine series]?

Q_6. Tertiary- What was the difference between what female Soldiers self report for last previous cervical cancer screening exam and HPV vaccination and the reported exam per their electronic medical record?

Research Hypotheses

$H_{1[P]}$ Adherence for cervical cancer screening in for female Soldiers was greater than

U. S. national goals set forth per Healthy People 2010 (HP2010).

$H_{1[S]}$ Adherence (initiation and completion) for HPV vaccination in eligible female Soldiers (i.e., less than 27 years old) was less than 50%.

$H_{2[P]}$ Future planned behavior (intent) by female Soldiers for cervical cancer screening was greater than the HP2010 goals.

$H_{2[S]}$ HPV vaccination planned behavior (intent) in female Soldiers was less than cervical cancer screening planned behavior (intent).

$H_{3[P]}$ Female Soldiers report generally positive attitudes (likelihood and acceptability) towards cervical cancer screening.

$H_{4[P]}$ The healthcare provider and chain of command provide greatest encouragement and motivation for Soldiers to adhere to annual cervical cancer screening exams, while the media provides the least motivation to comply with cervical cancer screening.

$H_{4[S]}$ The healthcare provider and peers provide the greatest encouragement and motivation for Soldiers to comply with HPV vaccination initiation and completion, while the chain of command provides the least encouragement and motivation to initiate and complete HPV vaccination.

$H_{5[P]}$ Subjective norms (in particular, the healthcare provider) predicted more adherent behavior with cervical cancer screening, attitude predicted non-adherent cervical cancer screening behavior.

$H_{5[S]}$ Subjective norms (in particular the healthcare provider) predicted more adherent behavior with HPV vaccination initiation and completion, attitude predicts non-adherent HPV vaccination initiation and completion.

$H_{6[T]}$ Female Soldiers tended to over self-report their last cervical cancer screening exam and HPV vaccination.

Pilot Data

In December 2008, the selected instrument (Cervical Cancer Questionnaire for Military Women) was piloted to determine conceptual framework suitability, reliability of the instrument after modification, and site suitability. Two instruments were utilized in the pilot, Awareness of HPV and Cervical Cancer (Ingledue, Cottrell, & Bernard, 2004) and a modified Mammography Questionnaire (Michels, Carter, Taplin, & Kugler, 1995). The Awareness of HPV and Cervical Cancer instrument is based on the Health Belief Model and includes constructs of knowledge, beliefs regarding perceived susceptibility and severity for cervical cancer, and behavior.

The second instrument evaluated in the pilot was the Mammography Questionnaire, modified to address cervical cancer rather than breast cancer, and is supported by the Theory of Reasoned Action (TRA). Constructs of the TRA include assessing participant's attitudes regarding likelihood and acceptability for cervical cancer, subjective norms regarding cervical cancer screening, intent for screening, and behavior.

Because most previous research with military women regarding cervical cancer screening behaviors has been limited to women who work in the hospital setting, the site was purposively selected to be away from the hospital setting. A convenience sample at a soldier support center (SSC) in the southeastern region of the U.S. was employed to reflect a sample of typical female Soldiers in terms of occupation, age, and rank, with minimal impact on day to day unit operations. Measurements included a pencil and paper survey, consisting of both instruments. Participants were asked to rate their perceptions using a 6-point scale: "Strongly Agree," "Agree," "Somewhat Agree," Somewhat Disagree," "Disagree," and "Strongly Disagree". Participants were also asked to provide written or verbal feedback regarding the survey.

Pilot Results

Demographics.

Upon gaining letters of support from the Garrison Commander, Chief Deployment Health, and establishing a site principal investigator (LTC Melonie Quander), Institutional Review Board approval was granted by the Womack Army Medical Center and The Catholic University of America. Data collection began the first week in December 2008 and was completed in less than eight hours. The sample (n = 48)

for the pilot was reflective of the female Soldier population in terms of rank, age, and military occupational specialty. The participants ranged in age from 19-44 years (mean 29 years). Years served in the Army ranged from 1-23 years (mean 7 years) and well over half reported a prior overseas deployment. Less than 15% of the pilot sample were officers, and most (57%) were lower enlisted ranks (Sergeant /E5 and below). A majority of the sample included military occupations from support specialties, such as personnel administration, supply, and maintenance.

The participants reported several risk factors for cervical cancer and HPV. Over 20% reported currently using tobacco products. For most, age of first intercourse was less than 18 years of age (mean 17.1 years, SD 2.7, range 11-23 years old) and number of life time sexual partners ranged from 2-37 partners (mean 11.8, SD 9.2). The pilot data regarding sexual behavior was similar to other reported sexual health information research with army women (von Sadovszky & Ryan-Wenger, 2007; Stafford et al., 1996).

Surprisingly, most participants (92%) reported having a screening exam within the previous 12 months. Of these respondents, 44% reported an abnormal exam and only 60% of the population with an abnormal cervical screening exam reported follow up (e.g., colposcopic exam). Although not all abnormal screening exams require colposcopy, in women less than 35 years old, over 75% are conservatively estimated to require colposcopy due a high risk HPV type (Maxwell et al., 2002). Thus, it can be conservatively estimated that at least a minimum of 15% of all the participants had not completed a follow up exam with colposcopy as recommended by the American Society for Colposcopy and Cervical Pathology. Of those participants in the pilot that reported

non-adherence with follow up, all were enlisted Soldiers and a majority (80%) self identified as belonging to a minority population.

Pilot Instruments

Awareness of HPV and Cervical Cancer.

For this pilot, the threshold for instrument reliability was an $\alpha \geq .60$ and ideally > .70 or greater; item analysis was employed to reach this threshold when required. For the knowledge construct in the Awareness of HPV and Cervical Cancer instrument, the full complement of questions resulted in an original $\alpha = .53$. To obtain an $\alpha = .735$ required the elimination of five questions. The questions eliminated did not render the instrument unstable in terms of examining key concepts for knowledge of HPV or cervical cancer. The remaining 11 questions demonstrated a mean of 8.49 correctly answered (SD 2.24). Although test-retest reliability was reported in the literature as greater than .90 for this instrument, subscale reliability for this instrument have not been published.

The original knowledge score (including all of the knowledge questions) was consistent with the previous research completed by Denny-Smith et al. (2006) with nursing students, and greater than research conducted by Ingledue et al., (2004), with college students, both researchers using the same instrument. For the perceived beliefs, based on severity and susceptibility, the original $\alpha = .58$. By eliminating three items, an $\alpha = .62$ was obtained.

When calculating the severity and susceptibility using the same ranged scale employed by Denny-Smith et al. (2006) and Ingledue (2004), the perceived susceptibility

reported by Soldiers was less than previously reported in the college student samples. However the Soldiers tended to report a greater number of risk factors for cervical cancer and HPV as compared to both college groups. The Soldier's perception of severity was between the nursing students and college students, with the college students reporting the strongest perception for seriousness of cervical cancer.

Cervical Cancer Questionnaire for Military Women.

This instrument was originally developed to investigate screening behavior for breast cancer. However, the instrument was selected for this pilot because it had been used in the military setting previously and also enabled the researcher to consider additional constructs afforded in the TRA such as the influence of subjective norms (salient others and motivation to comply with their recommendations) and intent for behavior, which are not present in the Health Belief Model. A majority of the participants (92%) reported a high ("Somewhat "or "Extremely") likelihood to complete a cervical cancer screening exam in the next year (intent).

The belief in outcome and evaluation of the outcome items, the two subscales for Attitude, were modified from concepts of breast cancer and mammography to cervical cancer and screening and consisted of thirteen and ten questions respectively. The modified instrument demonstrated an $\alpha = .70$ (original instrument, .60) for belief in outcomes and evaluation of outcome as $\alpha = .76$ (original instrument, .79). Upon elimination of two questions based on the item analysis, the α for belief in outcome

increased to .72. Item analysis for the evaluation of outcomes demonstrated little difference in the α when any of these questions were eliminated.

Social Norms were measured by two subscales with six questions each. The first Social Norm subscale measured the respondent's perceptions of recommendations made by salient others. The second subscale measured the respondent's motivation to adhere to the recommendations of the salient other. During the pilot, additions to the instrument included incorporating the chain of command as a salient other, e.g., "My chain of command recommends that I get a Pap smear"/ "When it comes to my health, I generally try to do what my chain of command recommends." The subjective norms subscale, salient other and motivation to comply with the recommendations of others items demonstrated an α = .75 and .85 respectively, with minimal improvement as a consequence of item analysis. See Table 3, Comparison of Subscale Reliability from Original to Modified Tool (Pilot).

Pilot Discussion

This pilot study demonstrated the usefulness and limitations of the underpinning theoretical models and potential reliability of each subscale associated with each instrument. After modification, the newly named Cervical Cancer Questionnaire for Military Women, formally the Mammography Questionnaire, demonstrated acceptable subscale reliability in this population. Further, the TRA was found to contain valid theoretical constructs for future research describing the potential unique variety of influences of behaviors of female Soldiers. When directly compared, The Cervical

Cancer Questionnaire for Military Women demonstrated stronger reliability in this sample than the Awareness of HPV and Cervical Cancer Instrument.

Further, this pilot was able to capture a sample population that was more reflective of the typical female Soldier in terms of age, education, rank, and job skills that are traditionally seen in a soldier support center (SSC) setting. The sexual behavior and risk factors for cervical cancer reported by this sample is similar to other studies involving military women and therefore direct questions regarding sexual behavior can be collapsed to assess risk factors (i.e., number of lifetime sexual partners greater than five, and requesting exact number of sexual partners, as 23% of the sample declined to answer this question). Soldiers tended to report greater knowledge of HPV and cervical cancer in comparison to prior research findings. This increase in knowledge may be a function of the availability and direct marketing advertising for the HPV vaccination since the original design and testing of the Awareness of HPV and Cervical Cancer instrument.

Although underpowered to predict behavior, the preliminary data suggested that lower ranking enlisted and lower officer ranks were less likely to complete annual cervical cancer screening as required per current Army policy. The data also suggested that more military women who identified themselves as from a racial/ethnicity minority group and younger Soldiers were more likely to have abnormal cervical cancer screening. Further, of those who reported an abnormal exam (20 participants, including 4 officers) and reported no colposcopic follow up (10 participants), 100% were enlisted and 80% were self identified as members of a minority group. The potential lack of follow up may

be a function of misunderstanding of abnormal cytology results or echo previous research indicating possible health disparity for minority groups in the military healthcare setting (Balasubramanian et al., 2008; Howe et al., 2006).

In comparing this pilot with previous studies, the present adherence and future intent for cervical cancer screening was much greater than other studies with military women (Herberger, 2000; Thomson & Nielsen, 2006). This may be a function of greater command influence to complete screening exams prior to military deployment in this highly deployable population. Researchers have also demonstrated other populations of women may misunderstand the purpose and meaning of cervical cancer screening (Stark et al., 2008; Mays et al., 2000) or tend to over report completion of screening exams (Champion, 1998; Rauscher, O'Malley, & Earp, 2002; Vernon, Briss, Tiro, & Warnecke, 2004). However, the potential poor follow up with colposcopy in military women following an abnormal finding is consistent with the literature (Yauger, Rodriguez, & Parker, 2005).

The site for the study was deliberately selected by the researcher to be located away from the hospital. Data was collected while Soldiers waited to complete administrative tasks. The site for the pilot demonstrated an ability to capture a diverse population of female Soldiers reflective of the typical female solider currently serving in the U.S. military. Most Soldiers indicated that they were interested in participating in the study when approached by the researcher. Total pilot enrollment (n=48) was completed in approximately eight hours, demonstrating feasibility for total enrollment for the proposed project.

Pilot Conclusions

Upon evaluation of this pilot, the TRA and associated modified instrument were found to be acceptable for a larger dissertation endeavor. The participants reported the instrument was understandable and none of the pilot participants reported confusing or ambiguous questions. All of the Soldiers in the pilot completed the instrument in less than 15 minutes. The pilot did reveal a significant concern for military healthcare providers regarding the possibility of poor follow up in abnormal Pap smears, particularly in enlisted personnel.

Of note, several participants had questions regarding the availability and safety of the HPV vaccine offered in military treatment facilities. In order to address HPV questions, the instrument and overall research plan was subsequently enlarged to incorporate a second health promotion concept related to the HPV vaccine. The research questions regarding the HPV vaccine were considered secondary research questions and remained underpowered for the dissertation effort. A large portion of the participants in the pilot reported adherence with screening exams, contradictory to previous research, also suggested the possibility for over reporting. Therefore a review of the participants' electronic medical record to confirm the last cervical cancer screening exams completed was subsequently addressed in the dissertation study.

Variables and Instrumentation

Variables.

The dependent variable of interest was Behavior (past), measured in terms of the completion of cervical cancer screening in the previous 12 months and completion (or

appropriate partial completion, i.e., completed the initial and follow up HPV vaccination and not due for final vaccination for 2 months) of the HPV vaccination. Because this research effort included a review of the Soldier's electronic medical record, the electronic medical record was considered the actual behavior. However, analysis was performed for both self-report and electronic medical record behavior. If the Soldier reported their previous exam or vaccination as performed in a civilian setting, the self-reported examand/or vaccination was considered accurate for analysis.

The independent variables of interest included Behavioral Intention, Attitude, and Subjective Norms. The variables included in this study, which included subscales and selected demographics, are listed in Table 2. Behavioral Intention for cervical screening and HPV vaccination was measured with two single item questions, the likelihood for a participant to complete cervical cancer screening in the following year, and for participants less than 27 years old, their reported likelihood to complete the HPV vaccination in the following year. The measurement was completed with a 7 point Likert scale, anchored with extremely unlikely and extremely likely, and neither likely nor unlikely in the center.

Attitude was measured by two subscales, the belief that cervical cancer or HPV infection may occur (likelihood) and the evaluation (acceptability) of the outcome. Specific attributes of both subscales were paired and include: pain, embarrassment, inconvenience, testing for cancer, testing for a sexually transmitted infection, finding cancer, finding a sexually transmitted infection, thinking about cancer, thinking about a

sexually transmitted infection, thinking about the possible loss of fertility, and thinking about the possibility of radiation or chemotherapy.

The measurement for Attitude was completed with a 7 point Likert scale. Anchors for the likelihood belief were strongly disagree and strongly disagree and centered with the term neither; anchors for the evaluation of acceptability were unacceptable and acceptable and centered with the term neither. There were a total of 15 questions for the likelihood subscale, with a total score range of 15 to 105; 14 total questions were used to assess acceptability, with a total score range of 7 to 98. The paired Attitude attributes were then multiplied (Σ likelihood * acceptability) and the sum was correlated with the linear assumptions for Behavior (past).

Subjective Norms were also measured with two subscales, the recommendations of salient others and the motivation by an individual to comply (or adhere) with the salient others recommendation. Salient others included friends and neighbors, husband/boyfriend/partner, other relatives, supervisor/chain of command, healthcare provider, media, and the Internet. The measurement for Subjective Norms was based on a 7 point Likert scale. Anchors for the recommendations of salient others and the evaluation of an individual's motivation to comply with the recommendations of salient others were strongly disagree and strongly agree and centered with the term neither. The total questions for recommendations by others and motivation to adhere with other's recommendations subscales was 7, with a total score ranging from 7 to 49 for each. The individual Subjective Norms were then paired and the sum of the multiplication for the

paired scores (Σ recommendations *adherence) was correlated with the linear assumptions for Behavior (past).

Table 2.

Variables of Interest

Independent [Secondary]	**Subscales**	**Variable Measurement**
Attitudes	Likelihood Acceptability	Scaled- forced choice 1-7 Scaled-forced choice 1-7
Subjective Norms	Recommendation by others Motivation to Comply	Scaled- forced choice 1-7 Scaled-forced choice 1-7
Cervical Cancer Screening Intent [HPV Vaccination Intent]		Scaled- forced choice 1-7 Scaled- forced choice 1-7
Dependent -Primary [Secondary]		
Screening Adherence [HPV Vaccination Adherence]		Dichotomous or May be forced categorical

Instrumentation

As described in the literature review and pilot data, the Theory of Reasoned Action, a middle range psycho-social theory, served as the conceptual framework to guide this study and also undergirded the selected instrument, Cervical Cancer Questionnaire for Military Women (modified Mammography Questionnaire). The Questionnaire includes dependent constructs of attitude, social norms, and intent as correlated with past behavior, and is summative in nature.

The original instrument, the Mammography Questionnaire, was developed to predict mammography behavior for female beneficiaries at a large Army military treatment facility by Michels, Carter, Taplin, & Kugler (1995). The original instrument has 62 questions and a test-retest reliability reported as 0.85 (Link, 1998). The instrument was also used in a master's thesis conducted by Link and used in a large Air Force facility with primarily Air Force beneficiaries greater than 40 years of age. Features of this instrument include military relevant themes, in terms of demographics such as rank. The original reliability, which has only been reported by Michels et al., is presented in Table 3.

Table 3.

Comparison of Subscale Reliability from Original to Modified Tool

	Original Tool α	Modified Tool α	Best α (item analysis)
Attitude: Belief will occur (Likelihood)	.60	.70	.72
Attitude: Belief regarding outcome (Acceptability)	.79	.76	.78
Subjective Norm: Recommendations (Other recommend behavior)	.71	.75	.77
Subjective Norms: Compliance (Adherence with recommendations)	.73	.85	.85

For the pilot and dissertation, modifications of the original instrument included establishing judgments regarding knowledge of cervical cancer screening, rather than

breast cancer, and inclusion of themes consistent with previous research, such as inclusion of fertility within the attitude sentiments subscale and supervisors/chain of command influence within the social norms subscale. Modification also included ensuring questions continued to reflect an 8th grade reading level, inclusion of questions assessing HPV acquisition (such sexual behavior risk factors for cervical cancer/HPV acquisition), and contemporary militarily relevant demographic themes, such as length of previous deployments.

The belief in outcome and evaluation of the outcome measures, the two subscales for Attitude, were reworded from original breast cancer and mammography items to cervical cancer and Pap screening questions and consisted of thirteen and ten questions respectively. Based on an item analysis, questions in the modified instrument were found to mildly threaten the overall subscale reliability. Because the questions were not essential to the overall Attitude subscale constructs, a few questions were eliminated. The modified instrument used in this study demonstrated an $\alpha = .70$ (original instrument, .60) for belief in outcomes and $\alpha = .76$ evaluation of outcome as (original instrument, .79). With elimination of one to two questions in each subscale, the α for belief in outcome increased to .72 and belief regarding acceptability of outcome increased to .78.

Subjective Norms, consisting of seven questions in each subscale, recommendations of salient others and motivation to comply with salient others, demonstrated an $\alpha = .75$ and .85 respectively. Modification included an addition to the salient other subscale, chain of command. Example of questions within the Subjective

Norm construct includes “My chain of command recommends that I get a Pap smear” (recommendation of salient others) / “When it comes to my health I generally try to do what my chain of command recommends” (motivation to comply with salient other's recommendations). Item analysis for the evaluation of Subjective Norms demonstrated minor differences in the α by elimination of one question regarding the recommendations of others; however, the question was retained in the instrument to preserve the utility of the Subjective Norm construct.

This instrument was selected for utilization in this dissertation effort based on its previous performance in a military population, TRA constructs congruent with the dissertation conceptual framework, and favorable reliability achieved during the December 2008 pilot. The original instrument also included an additional construct introduced by Michels et al. (1995), “facilitating conditions” which included six questions related to the heath care system (i.e., ease of scheduling an appointment and distance from the individual home to the MTF). However, the reliability was poor in the pilot, inconsistent with the framework, and therefore removed from the final dissertation instrument. With the inclusion of HPV considerations, the total number of questions for the current survey was 70.

Limitations associated with the use of the Cervical Cancer Questionnaire for Military Women, a modification of the Mammography Questionnaire, included the original instrument’s less than ideal reliability and concerns regarding conversion from

breast cancer to cervical cancer themes. However, upon modification and subsequent piloting, the instrument demonstrated an improvement in reliability.

For the final dissertation effort, the CCQMW demonstrated continued stability and reliability. The Attitude subscale for likelihood decreased from .72 to α =.68, but remained greater than the original tool measurement of α =.60. The Attitude subscale for acceptability increased from an α =.79 to .84. The Social Norm subscale for recommendation includes recommendations by salient others for all participants to complete an annual cervical cancer screening exam. During the pilot, the α =.75, for the final dissertation effort, the reliability increased to α =.84. For participants less than 27 years old, recommendations for the HPV vaccine were included as a second set of questions for the Social Norm subscale recommendations. The reliability for this subscale was calculated as α =.86. The second subscale for Social Norms was the compliance or adherence to the recommendations by others reported by participants, "When it comes to my health, I tend to do what the [salient other] recommends I should do." The adherence subscale for Social Norms remained stable, with no change from the pilot, α =.85. Table 4 summarizes the original, pilot, and final subscale reliabilities as determined throughout this dissertation effort.

Table 4.

Comparison of Subscale Reliability

	Original Tool	Pilot	Dissertation
Attitude: Belief will occur (Likelihood)	.60	.72	.68
Attitude: Belief re: outcome (Acceptability)	.79	.78	.84
Subjective Norm: Recommendations (Other recommend Annual Pap / (*Other recommend HPV vaccination*)	.71	.75	.84 / .86
Subjective Norms: Compliance (Adherence with recommendations)	.73	.85	.85

Setting

The ideal location for the collection of surveys was an Army post with a large military population. A large army base in the southeastern region of the U.S. was found to be an excellent setting to capture a large sample of female Soldiers with a variety of Military Occupational Specialties (MOS) and lengths of time in the service, rather than new Soldiers with little contact with the military healthcare system. Collection of data at the SSC, also enabled the researcher to recruit participants in an unstructured manner and capitalize on "down time" while Soldiers were waiting for administrative procedures such as ID card processing. The research setting was purposively away from the hospital setting to enable this study to include those Soldiers who may normally avoid medical treatment facilities. Based on personal observations, and the December 2008 pilot, on a daily basis over 60 women were engaged in ID card processing, in and out processing

briefings, and deployment exams. In order to conduct research away from the hospital setting, permission was gained from the building manager and the post commander (See Appendix A, Letter of Support from Post Commander).

Sample

For this study, a convenience sample of a total of 209 female Soldiers agreed to serve as research participants. The target population consisted of active duty females in the U.S. Army or activated Reserve and National Guard members (greater than 11 months) who required cervical cancer screening. Activated Reserve and National Guard members with less than 11 months of continuous service were excluded because their health care is primarily obtained in civilian health care clinics. The duality in health care for those serving less than eleven months of active duty was assumed to potentially skew the results and would have been difficult to control in the study. However, after eleven months, those who require annual screening exams were assumed to likely seek or consider seeking health care in the military setting, rather than waiting to redeploy to their civilian system. Therefore, after 11 months of activated service, this population was included into the study.

A sample proportionally reflective of the female population was desired, but this study was not stratified to meet this condition. For this dissertation endeavor, the sample was limited to women serving in the Army, but may later be used with other populations. In previous research, women with a previous history of cervical cancer or HPV did not demonstrate a greater knowledge or participation in cervical cancer screening, consequently they were not excluded from the study.

Criteria for Inclusion

The following criteria for participant inclusion were established:

1. Active duty women serving in the Army (female Soldiers) for greater than 6 months; or women serving as Activated Reservist / National Guard member for greater than 11 months;
2. Participant requires yearly cervical cancer screening (to include those who stated that they were unsure);
3. Able to read English at an 8th grade level; and
4. Older than 17 years of age.

Criteria for Exclusion

The following Soldiers were excluded from inclusion in this research study:

1. Service members who do not require cervical cancer screening
    - All males.
    - Female Soldiers who have had a hysterectomy and state they no longer require screening.
2. Women who serve in other military branches (i.e., Sailors, Airmen, Marines).
3. Civilian, retired, and all other designated (non active duty) military healthcare beneficiaries.
4. Women serving in the Reserves or National Guard for less than 11 months.

5. Women who cannot read at an 8th grade level.
6. Women less than 18 years old.

Sample Size

Logistic regression analysis was performed to predict participants' cervical cancer screening Behavior (past), the primary dependent variable, with their attitudes and social norms towards cervical cancer and intent for future screening (independent variables). Table 2 summarizes these variables of interest. Importantly, no agreement in the literature was readily found regarding the appropriate estimation of sample size with logistic regression (Hsieh, Bloch, & Larsen, 1998). The independent variable can be expanded from a dichotomous question to a categorical question and calculation of sample size for stepwise multiple regression may then be calculated if required. Pallant (2007) suggested stepwise regression include 40 cases for each independent variable: 5 x 40 = 200; Cohen (1992) suggested multiple regression with the same number of predictors as 91 (power .80, medium effect, and $\alpha = .05$); Long (1997) encouraged a sample size for logistic regression as ranging from 100-500; Stata powerlog program (UCLA, n.d.) for logistic regression (power .80, one-tailed): 170; and multiple regression per Soper (2009) with 5 predictors (power .80, medium effect, and $\alpha = .05$): 91 and with 10 predictors (i.e., sexual risk factors and 4 selected demographics): 118.

The estimation for stepwise regression based on Pallant's formulation is 200 participants, and is within a reasonable range for most of the suggested power analyses by various authors for logistic and multiple regression, and feasible based on the number

of participants enrolled during the pilot testing (n=48 in less than eight hours). Given the current estimations from various statistical sources and post hoc analysis in previously described studies for screening behaviors, an expected medium effect size (.15), $\alpha = 0.05$, and power of .80 was established and a conservative sample size, with additional 5% for incomplete surveys, established a total target sample size as 210 participants. This number also enabled the researcher to include several demographics variables as independent variables of interest for adequately powered multiple regression calculations. Unfortunately, the secondary dependent variable of interest was not adequately powered, but gave a preliminary estimate of the scope and nature of the vaccination adherence for female Soldiers.

During the collection phase, an attempt to identify factors that led female Soldiers to decline to participate in the study was not feasible because several women received the flyer earlier in the morning and returned in the afternoon and stated that they wanted to complete the survey. However, after completion of the consent process, only 152 Soldiers completed the CCQMW questionnaire. This represented a much higher dropout rate than originally anticipated. Despite the higher than anticipated dropout rate, the final number of participants was sufficient according to the parameters established by Cohen (1992), Long (1997), and Soper (2009), to conduct a logistic regression analysis.

Procedure

Recruitment.

Following approval from CUA Committee for the Protection of Human Subjects, the researcher submitted the identical proposal to Womack Army Medical Center (WAMC) for IRB approval prior to collection of data. Secondary review was conducted by the Department of the Army Clinical Investigation Regulatory Office and the Uniformed Services University of the Health Sciences. Minor changes to the consent were made and approval for the changes was granted by CUA. Recruitment information regarding the study was posted in the SSC building.

All women entering the SSC building front entrance were verbally greeted at the front desk area by the researcher and asked if they were serving in the military. Those who identified themselves as serving in the Army were asked if they were interested in completing a short research survey while they are waiting to conduct their activities (See Appendix B, Verbal Invitation Script). Activities in the SSC are typically unscheduled (first come, first serve) and involve 15 – 45 minutes of waiting time in a waiting room. Upon identification as a female service member, the researcher presented a flyer describing the study which included the eligibility requirements (See Appendix C, Invitational Flyer).

The researcher identified herself as nurse, but was not in uniform and did not refer to rank to avoid perceived coercion for the participants to serve in the study. If the prospective participant voiced interest in participating in the study, the researcher referred to the Invitation Flyer (See Appendix C, Invitational Flyer) and invited the participant to

complete the survey. The Invitation Flyer included a brief description and purpose of the survey, assurance of participant confidentiality, and the voluntary nature of participation.

Sampling Technique.

A private area in the Medical One Stop Office located in the SSC was available for the researcher to review and obtain written consent to participate in the study (See Appendix D, Letter of support from Medical One Stop Noncommissioned Officer In Charge; Appendix E, Letter of support from Chief Deployment Health). However, most of the female Soldiers stated they were interested in the study and reviewed the flyer and consent on a bench located near the front desk of the SSC.

Participants were informed that the questionnaire would ask questions about their attitudes regarding cervical cancer and HPV, as well a few questions about their behavior. Participants were encouraged to leave blank any questions that made them feel uncomfortable. Participants were also informed about the tertiary purpose of the study, to compare their self-report for cervical cancer screening and their electronic medical record via a second questionnaire, the Removable Section for Sensitive Data (RSSD). Participants were informed that they could complete either questionnaire or both.

Upon verbally consenting to participate in the study, the participant was asked to review the written consent and asked to complete the written consent and HIPPA form (See Appendix F, Written Consent/ See Appendix G WAMC HIPPA form). The written consent included the HIPPA form and RSSD. After consent, the researcher placed a unique study number on the RSSD, CCQMW, and the interior flap of an envelope to be mailed back to the participant. This unique study number was the only link between the

consent, the CCQMW (See Appendix K, Cervical Cancer Questionnaire for Military Women), and the envelope. The envelope was available for participants to receive a reminder for their next exam.

Upon completion of the written consent, participants received a copy of the consent and HIPPA form. The consent was then signed by the participant and researcher and placed in a secured (locked) box. For those females who elected to complete the RSSD, the RSSD was also placed in the same secured box as the consent form.

Participants received the RSSD and CCQMW, a clipboard, a pen which they could keep, and a handout regarding cervical cancer. They were encouraged not to read the cervical cancer handout until after they had completed the survey (See Appendix H, Cervical Cancer Handout). A blank cover sheet was used as the top sheet for the clipboard to ensure greater privacy. The participants received the handout in advance, so that in the event the researcher was unavailable (i.e., reviewing the consent with another person), the participant would receive the educational handout prior to leaving the SSC.

Participants could choose to complete the survey in one of three ways. First, they could stay in the Medical One Stop office or in the hallway and complete the survey in complete privacy or limited privacy in the hallway. Second, the participant could choose to complete the survey while in the waiting room of the SSC. Third, the participant could elect to complete the survey at home in which case they received a plain pre-stamped and addressed envelope to drop at a local mail box. The vast majority of women (96%) elected to complete the consent on the bench in the hallway. The women that were not sure if they would complete the survey while waiting received the pre-stamped envelope

and if they completed the survey before they left they could leave the envelope in a box at the front desk.

Upon completion of the survey, the participant could return the survey and clipboard to the researcher, or place the survey in a clearly marked, locked box at the front desk which was separate in color and placement from the box containing the completed consents and RSSDs.

The CCQMW did not ask participants for identifiable information and participants were instructed not to place any identifiable marks (i.e., name or phone number) on the CCQMW. The researcher remained available throughout the day if the participant has any further questions. The Cervical Cancer Handout also included the phone number of an Army Medical Center Patient Advocate if the participant had any difficulty in scheduling cervical cancer screening or any other medical appointments. The phone number to the Patient Advocate was confirmed the week prior to data collection and placed on the handout. If a participant reported difficulty navigating the military health care system for problems that required more than routine scheduling of appointments (i.e., unable to book an appointment and have a CIN I or greater Pap smear result in a previous test) they were referred to an executive military nurse for assistance (See Appendix I, Letter of support by site PI). During this dissertation effort, one participant reported dysfunctional uterine bleeding lasting greater than four months and had been unable to obtain an appointment at the medical center. This participant was assisted by the Site PI (LTC Quander) and the patient advocate and obtained an appointment with a provider within one week after enrolling in the study.

Questionnaires

Cervical Cancer Questionnaire in Military Women.

Authorization to use and modify the Mammography Questionnaire by the author, LTC Michels was obtained, and after piloting, has been renamed the Cervical Cancer Questionnaire in Military Women (See Appendix J, Instrument Authorization). Modification included substitution of cervical for breast cancer and inclusion of susceptibility to infertility related to cervical cancer (fertility) rather than body image (breast cancer). The influence of "supervisor/chain of command" was included as a subjective norm factor. Each modification was directly linked to previous research that has been described as influencing screening behavior in female Soldiers and within the constructs of the TRA. An open-ended question at the end of the survey also served as a "snap shot" of general, unprompted thoughts regarding cervical cancer screening and HPV vaccination. The reading level for the tools was estimated to be a Flesch-Kincaid Reading Index of eighth-grade level of readability.

Removable Sensitive Data Section.

Based on the December 2008 pilot and review of the literature, a concern for potential for error in self-reporting for the dependent variable, behavior, may be distorted due to (a) participant's tendency for over reporting screening behavior, or (b) misunderstanding between a pelvic exam and a cervical cancer screening exam, or (c) misunderstanding of results by the participant. In the Military Healthcare System, electronic medical records are retrievable via a service member's name and social security number. Therefore, in order to conduct a limited electronic medical chart review, participants were asked by the

researcher to provide identifiable personal information to include the participant's name, social security number, and phone number.

The electronic medical chart review was conducted by the researcher and site principal investigator (LTC Quander) and included the date and results of the participant's last cervical cancer screening exam (limited to only the previous five years) and HPV vaccination (for Soldiers less than 27 years old). This information enabled the researcher to compare participant's self-reported results with those reflected in their actual electronic medical record. No other portion or section of the participant's electronic medical record was reviewed. If an inappropriate plan for follow up was reflected in the patient's medical record, the participant's primary care manager was contacted. As a benefit, the participants were able to provide their address on an envelope supplied by the researcher and receive a confirmation of the date and results of their last cervical cancer exam.

One participant reported an abnormal screening exam, but no plan for follow up. A review of her electronic medical record revealed a CIN III Pap smear result. The participant was contacted telephonically and reported that she was aware of the results and would call to make a follow up appointment. The participant reported that she did not require any additional assistance. The provider was notified in writing (See Appendix M, PCM Notification) and a note was placed in the participant's electronic medical record by the LTC Quander regarding the conversation and encouragement for follow up.

Because of the sensitive nature of the questions (particularly those of a sexual nature, i.e., number of sexual partners) contained in the CCQMW, identifiable personal information was collected separately and included as a removable section attached to the consent (See Appendix L, Removable Section for Sensitive Data). Referred to as the Removable Section for Sensitive Data (RSSD) or "Removable Section", this questionnaire was purposively separate from the CCQMW in order to provide the greatest anonymity for the participants. The RSSD was a one page questionnaire which asked the participant about the date and results of her last cervical cancer screening exam (Pap), plan for follow up, and HPV vaccination (for those participants less than 27 years old). The RSSD was completed by the participant immediately after consent was obtained and stored in the same locked box as the consent and HIPPA form. The total number of questions for this research endeavor (CCQMW and Removable Section) was 70, and all items were expected to be completed in less than 15 minutes. Nearly all of the participants completed the CCQMW and RSSD in less than 15 minutes.

Upon review of the electronic medical record in the site PI's private office each week, the RSSD was coded by the researcher only and then destroyed by shredding. The survey results were coded separately by the researcher only and on a separate day. Only the researcher had the ability to link the written consent, WAMC HIPPA form, RSSD, CCQMW, and the envelope via the participant's unique identification number (located at the bottom of the CCQMW, top of the Removal Section, and interior flap of the envelope).

Electronic Medical Record Review

A review of participant's electronic medical records was conducted each week with the site PI in the site PI's private office. Results for the limited chart review fell into five categories: Normal Results, Non Adherent- HPV Vaccine, Non Adherent Screen-Normal Results, Abnormal Screen Results (Has Plan for Follow Up), and Abnormal Results (No Follow Up Plan/ or Self Reported Normal). The following categories for participants will be addressed as described below:

1). Normal Results (Cervical Cancer Screening and HPV Vaccination).

a). Immediate coding per unique participant number by researcher

b). Immediate destruction of Removable Section (by shredding) by researcher

c). Letter sent to participant:

- Thanking the participant for their participation
- Normal results noted
- Date of next recommended annual exam per AR 40-501 (2008)
- Date of for next recommended HPV vaccination (if required)

2). Non Adherent- HPV Vaccination and History of Normal Pap.

(i.e., under 27 years old and not started or out of adherence for second/third injection)

a). Immediate coding per unique participant number by researcher

b). Immediate destruction of Removable Section (by shredding) by researcher

c). Letter sent to participant:

- Thanking the participant for their participation
- Normal results noted
- Date of next recommended annual exam per AR 40-501 (2008)
- Encouraged to discuss starting HPV vaccination with Primary Care Manager (PCM)
- Encourage to complete HPV vaccination (if 2nd and 3rd injection not completed)

3). Non Adherent Screen- Normal Results or No History of Pap.

(i.e., reports normal exam, confirmed by means of the limited chart review, but date greater or less than 2 months difference than self report)

a). Immediate coding per unique participant number by researcher

b). Participant contacted via phone number provided on Removable Section and informed of actual date, results of last exam, and vaccination (if required).

c). Immediate destruction of Removable Section (by shredding) after researcher contact with participant

d). Letter sent to participant:

- Thanking the participant for their participation
- Normal results noted, but discrepancy noted between self-report and electronic medical record (If no Pap then No Pap was noted)
- Date of next recommended annual exam per AR 40-501 (2008) and last exam reported by electronic medical record
- If less than 27 years old, encouraged to discuss starting HPV vaccination with PCM
- Encourage to complete HPV vaccination (if 2nd and 3rd injection not completed)
- If no Pap encouraged to make appointment for Pap as soon as possible

4). Abnormal Screen Result (Has Plan for Follow Up).

(Has follow up plan consistent with current American Society for Colposcopy and Cervical Pathology (ASCCP) 2006 guidelines)

a). Immediate coding per unique participant number by researcher

b). Participant contacted via phone number provided on Removable Section and informed of actual date of last exam, results of last exam, confirm plan for follow up and vaccination (if required).

c). Nursing note placed by site PI in participants' electronic medical record, stating date and time of contact, participation in study, review of

abnormal results, and patient's verbalization of plan to complete follow up as directed by PCM. [Note: If the participant reported PCM direction was inconsistent with current ASCCP guidelines, a letter was also sent to PCM stating that the patient has been contacted after enrollment in the study and encouraged to follow up with PCM to clarify. (See Appendix M, PCM Notification).]

d). Immediate destruction of Removable Section by shredding after researcher contact with participant.

e). Letter sent to participant:

- Thanking the participant for their participation.
- Abnormal results noted, but follow-up plan noted and encouraged (according to ASCCP guidelines).
- Abnormal results noted, but follow-up plan inconsistent with ASCCP guidelines encourage participant to contact PCM.
- Date and results of last exam reported in the Soldier's electronic medical record.
- If less than 27 years old, encouraged to discuss starting HPV vaccination with PCM.
- Encourage to complete HPV vaccination (if 2nd and 3rd injection not completed).

5). Abnormal Results (No Follow Up Plan/ or Self Reported Normal).

(i.e., has no follow-up plan or self reported normal results for last exam)

a). Immediate coding per unique participant number by researcher.

b). Participant contacted via phone number provided on Removable Section and informed of actual date, results of last exam, and vaccination (if required). Participant encouraged to follow up with PCM regarding results and follow-up plan.

c). PCM contacted via email or telephonically regarding enrollment in study, and participant's self report of normal results (See Appendix M, PCM Notification).

d). Nursing note placed by site PI in participant's electronic medical record, stating date and time of contact, participation in study, review of abnormal results, benefits for follow-up, and patient's verbalization of instruction and instructions to complete follow up with PCM in less than 30 days. Nursing note also stated contact with PCM initiated with date, time, and name of provider. A follow- up note was placed by the site PI upon contact with the PCM.

e). Immediate destruction of Removal Section was accomplished by shredding after contact with Participant and PCM by the researcher.

f). Letter sent to participant:

- Thanking the participant for their participation.

- Abnormal results noted per electronic medical record.
- Date abnormal exam reported by electronic medical record.
- Encouraged to follow- up with PCM in next 30 days.
- Phone number and email of site PI noted to assist with contact with PCM, scheduling of appointment, and/or discussion with chain of command if participant requested.
- If less than 27 years old, encouraged to discuss starting HPV vaccination with PCM.
- Encouraged to complete HPV vaccination (if 2nd and 3rd injection not completed).

Protection of Human Subjects

Risk.

The risks involved to the participants in this study were minimal and were primarily related to psychosocial and potential loss of privacy. However, specific steps were employed by the researcher to reduce or mitigate these potential risks.

In terms of psychosocial issues, questions about cervical cancer, HPV, or sexual behavior could cause discomfort for some women. They may feel uncomfortable answering questions related to sexual behavior. The risks of revealing feelings about HPV or cervical cancer may include potential embarrassment, psychological stress, stigmatization, and invasion of privacy. Finally, the questionnaire may bring up negative feelings women have about their experiences with cervical cancer and screening in the

past. In addition to psychosocial risk, a second risk included a potential loss of privacy, since protected health information was collected and reviewed during the course of this study.

Several measures were prescribed by the dissertation plan to mitigate the psycho-social risks. Potential participants were approached in a non-threatening manner and could elect to discontinue the study at any time. Potential participants were informed that commanders would not be appraised as to their participation nor was there a penalty for not participating.

Prior to participation, the women were informed that questions on cervical cancer, HPV, and sexual behavior were part of the questionnaire. Participants were reminded that they did not have to answer any questions that they do not wish to answer. Participants were informed prior to participation that they would be referred to a counselor at the medical facility if they felt the need to discuss their reactions or if they voiced any mental distress. The researcher would have stopped the proceedings if a participant displayed any undue distress and would then immediately refer the participant to a counselor at the medical facility. During the course of this dissertation effort, no referrals to the mental health counselor were required.

The researcher has extensive clinical experience in diagnosing and treating women with abnormal cytology, diagnosing and treating sexually transmitted infections, and is comfortable in discussing cervical and reproductive anatomy, gender specific issues, normal and abnormal cytology, and follow-up recommendations. The researcher is a nationally board certified family nurse practitioner and is capable of monitoring the

participant's affect, speech, emotional reactions, and body language for signs of distress during the interview. However the researcher functioned primarily as a researcher to gather and evaluate data, rather than a clinician, during the course of data collection.

To provide greater anonymity and reduce potential loss of privacy, several mechanisms were also employed throughout the study. Demographics, such as rank, were purposely grouped to avoid identification of specific ranks with low density Military Occupational Specialties (MOS), as well as sexual risk factors (i.e., number of sexual partner(s) was categorized rather than asking for an exact number). Additionally, the CCQMW was collected separately from the written consent, WAMC HIPPA form, and the RSSD. The researcher and site PI conducted a limited review of the electronic medical record to ascertain the participant's last cytology exam date and results and HPV vaccine in the previous five years.

The only link between the Removable Section and CCQMW was the unique research number assigned by the researcher. This unique number was also placed by the researcher in the interior flap of the envelope. Participant's who elected to receive a follow-up letter regarding their individual cervical cancer screening results and review of their HPV vaccination record were instructed to place their current address on the front of the envelope so they would receive a reminder of their results. This also served as a back up mechanism, if the researcher, site PI, and PCM were unable to contact the participant via phone or email. In the event the participant was unable to be contacted, then a letter was sent to the participant via registered mail with signature, and a second follow-up

nursing note was placed in the participant's electronic record as was the signature release for the letter.

Physical measures were employed to reduce potential loss of privacy. The researcher ensured the surveys were handled in a secure fashion. During data collection at the SSC, the box with participant identifiable information (i.e., the consent and RSSD) was secured behind the counter out of the direct line of sight. The box to collect the CCQMW survey was placed on top of the counter. Privacy for data is described in greater detail below in Data Management and Safety.

Benefits.

No monetary incentives were offered for participation. Participation did not incur any costs to the participants. Participants did receive a handout on cervical cancer and a pen encouraging cervical cancer screening exams and HPV vaccination. Any person who approached the researcher also could receive the handout when requested. Participants' also received a personalized letter to remind them to schedule their next cervical cancer screening exam and encouraged to them to consider or complete HPV vaccination, when appropriate.

Although some participants may not have received direct personal benefit from participating in this study, knowledge that was gained from this study will be used to further evaluate female Soldier's healthcare needs related to cervical cancer screening (a mandatory requirement per regulation) and HPV vaccination (currently a encouraged behavior per policy). This research may be used to develop guidelines for providers and administrators to

address female Soldier's concerns regarding screening and vaccination, as well as preliminary framework to construct interventional strategies and research.

Data Management and Safety.

Data collection occurred in accordance with the CUA Committee for the Protection of Human Subjects protocols, Womack Army Medical Center's (WAMC) Institutional Review Board (IRB) requirements, and Health Insurance Portability and Accountability Act (HIPAA) guidelines. Following a detailed discussion of the purposes, procedures, risks and benefits of the research, and HIPPA counseling, written consent was obtained prior to participant enrollment in the study. Upon completion of the data collection at the SSC, all of the collected study data were kept separately and secured in a locked, fire/water proof box. Data were entered in SPSS v.16 by the researcher. Data were saved in the electronic SPSS files and was secured on a dedicated laptop computer by the researcher. A backup SPSS file of the data was placed on the researcher's school network computer that has password protection and network security. The researcher's laptop computer was password protected and had a security firewall provided by CUA. The CCQMW and RSSD was collected and stored in a locked box at all times. No linkage of data to other databases was conducted in during this study.

Data collected at the SSC used paper and pencil format. Data were then transcribed by the researcher to SPSS v.16 on the researcher's laptop computer. Data were stored on an external hard drive that was locked when not in the possession of the researcher. The paper surveys that were collected were stored in a locked cabinet. The direct and indirect identifiers collected were secured at all times by the researcher.

Data Analysis

Analysis included descriptive statistics for all interval data and frequencies for categorical data. Descriptive statistics allowed the researcher to describe the sample in terms of demographics and means for each construct: attitude, social norms, intent and behaviors (past) regarding cervical cancer screening and HPV vaccination [Research Question (RQ) 1,2,3, and 4]. Chi-squared and ANOVA analyses were utilized to determine the differences in demographic data and subscale constructs when highly correlated. T-test were utilized to compare the self-report of exams and exams as reported via the electronic medical record [RQ 6]. Using Pearson's Correlation, the constructs were compared with each other as well as each subscale of attitude and social norms. Using logistic regression, the sum scores for attitude and social norms and sum paired scores for the subscales were compared with adherence and intent to determine if prediction was possible among the combined effects of the constructs for screening [RQ 5]. Significance for all statistical tests were set at an alpha level of .05. Content analysis was conducted for the open-ended question.

This chapter has reviewed the study design that was employed in the dissertation effort. A predictive correlational study was utilized to predict cervical cancer screening and HPV vaccination among female Soldiers. A total of 209 female Soldiers were recruited to complete the Cervical Cancer Questionnaire in Military Women. Data analysis was completed using logistic regression and content analysis to determine the role of Attitudes and Social Norms for female Soldiers to complete screening and vaccination in the military healthcare system.

CHAPTER IV

Data Analysis

Purpose

The purpose of this study was to measure the attitudes and subjective norms of female Soldiers regarding cervical cancer and HPV vaccination behavior. The primary purpose was to measure Soldier's attitudes and subjective norms in order to predict future intent for cervical cancer screening and past behavior for screening. The predictions were based a sample of female Soldiers who completed the Cervical Cancer Questionnaire for Military Women (CCQMW) in the winter of 2009-2010. Hypothesis for cervical cancer screening behavior were based on the goals as set forth by Health People 2010.

The secondary purpose of this study was to measure the subjective norms of female Soldiers less than 27 years in age for HPV vaccination intent and past behavior. Predictions for HPV vaccination based on past behavior included vaccine initiation only and included participants less than 30 years of age. Future behavior was based on those women who were less than 27 years of age (i.e., still within the window to receive the vaccine) who completed the CCQMW and seven additional questions regarding recommendations by salient others for initiating the use of the HPV vaccine. Hypothesis for HPV vaccination behavior were based on previous literature regarding HPV vaccination behavior in similarly aged young adult women.

The tertiary purpose of this study was to measure the difference between self-report for cervical cancer screening and HPV vaccination and the Department of Defense

electronic medical record (EMR). Differences between the self-report and EMR were based on those Soldiers who completed the Removable Section for Sensitive Data (RSSD), a single page questionnaire. Hypothesis for HPV self-reporting of screening and vaccination were based on previous literature regarding repeated cancer screening test among women and parental recall of vaccination for their children.

Research Questions

This research effort proposed to answer the following questions: What is the past behavior (adherence) of female Soldiers regarding cervical cancer screening? What is the past behavior (adherence) of female Soldiers less than 30 years in age regarding HPV vaccination? What is the future planned behavior (intent) of female Soldiers regarding cervical cancer screening? What is the future planned behavior (intent) of female Soldiers less than 27 years in age regarding HPV vaccination? What are female Soldiers' attitudes towards cervical cancer screening? What are female Soldiers' subjective norms towards cervical cancer screening? What is the influence of subjective norms for HPV vaccination in female Soldiers' less than 27 years in age? Which attitudes or subjective norms best predict female Soldiers to be non-adherent in yearly screening for cervical cancer? Which attitudes or subjective norms best predict female Soldiers less than 27 years in age to initiate and complete the HPV vaccine series? What is the difference between what female Soldiers self-report for their previous cervical cancer screening exam (Pap) and their reported exam per their electronic medical record maintained by the Department of Defense? What is the difference between what female Soldiers less than

27 years in age self-report for their HPV vaccination and the reported vaccination per their electronic medical record maintained by the Department of Defense?

Data Collection

The data for the study was collected over a three month period at a large military installation on the East Coast of the United States. The female Soldiers were approached by the researcher in the hallway or near the front desk of the soldier support center (SSC) and asked to review the recruitment flyer. Participants who expressed an interest in enrolling in the study were escorted to a private area near the front desk to review the consent and HIPPA form. Upon consent, the participants could immediately complete the questionnaire, take the questionnaire with them and return it to a locked box at the front desk, or elect to mail the questionnaire back to the author. In several instances, a Soldier initially reported that they were not interested in participation in the study but later in the day they returned and asked to complete the questionnaire while they were waiting in the waiting area of the various offices they were visiting. Upon reviewing the recruitment flyer, six Soldiers reported that they had had a hysterectomy. Those who reported they no longer required a cervical cancer screening were thanked and received a token gift pen.

A total of 209 participants met the study criteria and completed the informed consent form. Participants could elect to complete the main quantitative instrument, Cervical Cancer Questionnaire for Military Women (CCQMW), and/or the Removable Section for Sensitive Data (RSSD). The majority of participants completed both

portions. However, 32 participants completed the RSSD only, 12 participants completed the CCQMW only, and 24 consented but did not complete either questionnaire.

In total, the sample for this study consisted of 152 completed CCQMW surveys. Because the HPV vaccine has only been available for three years and is recommended for women less than 27 years in age, past behavior for HPV vaccination was based on 103 completed CCQMW surveys of women less than 30 years in age. Future intended behavior to initiate or complete the HPV vaccine was based on 69 completed CCQMW surveys. The sample describing the difference between self-reported cervical cancer screening behavior included172 participants who completed the RSSD. For the women less than 30 years old, 74 participants completed the RSSD to self-report their vaccination history.

Descriptive statistics were used to describe the sample. Logistic regression was used to (a) predict those factors which had the greatest influence on past cervical cancer screening and planned cervical screening for active duty Army women, (b) for those women less than 30 years in age, to predict those factors which had the greatest influence on past HPV vaccination initiation and (c) for those women less than 27 years in age, to predict those factors which have the greatest influence on planned future HPV vaccination. Measured factors included attitudes regarding perceived likelihood and acceptability for cervical cancer, and subjective norms to included recommendations by salient others and the influence of salient others for cervical cancer screening and HPV vaccination. Demographic variables of interest included the Soldier's age, ethnicity/race, education, marital status, rank, years served on active duty, and total months of

deployment. Other variables of interest included the Soldier's total number of cervical cancer risk factors and gender of the Soldier's supervisor and commander. The Soldier's military occupational specialty (MOS) was also collected as demographic data in order to describe the sample in comparison to other women who serve as active duty (full time) Soldiers in the Army.

The collection of demographic data was included in the CCQMW only. The Soldier's attitudes towards cervical cancer and subjective norms for screening for cervical cancer or HPV vaccination behavior were also determined via the CCQMW. To gain the greatest reliability for screening behavior, for women who reported their last exam was conducted within the military healthcare system, past screening behavior was analyzed via the last cervical cytology exam report in the electronic medical record, rather than self-reported behavior. For respondents who reported past screening or vaccination behavior at a civilian clinic, analysis was based on self-report.

With the exception of one, all of the participants completed the RSSD prior to departing the building and returned the RSSD to the researcher. However, 16.4 % of the total sample returned the CCQMWs to the researcher via the mail in a prepaid postage envelope that had been provided. For those women less than 30 years of age, 16.5% returned the surveys via the mail.

Description of the Sample

Demographics will be described for the total sample, which includes all Soldiers, as well as the subsample of Soldiers less than 30 years and less than 27 years old to illustrate the similarities and differences within the groups. Demographic variables

describe the respondents in terms of age, years on served active duty, total months deployed in the past three years, ethnicity/race, total education achieved, current marital status, and rank. The demographic variables also described the Soldier's cervical cancer risk factors, military occupational specialty (MOS), and the gender of the Soldier's supervisor and commander.

The total sample of respondents ranged in age from 18 to 54 years, with a mean of 28.5 years in age, standard deviation (SD) 7.7 years, and a mode of 26.0 years. For those women less than 30 years in age (hereinafter, subsample A) included in the secondary analysis for HPV vaccination, the mean and median age was 24 years in age (SD = 3.1). For the women less than 27 years in age (hereinafter, the subsample B), the mean age was 22.9 (SD = 2.3).

In terms of years served in the active duty Army, the total sample reported a mean of 6.8 years (SD = 6.1). Time in service ranged from 4 months to 26 years, with a median time in service as 4 years. For subsample A, the mean was 3.8 years of active duty service (SD = 2.8); time in service ranged from 4 months to 11 years, with a median time in service of 3 years. For subsample B, time in service ranged from 6 months to 8 years, with a mean of 3.1 years (SD = 2.1).

The majority of respondents reported no history of deployment in the previous three years. For the total sample, 51% reported no deployment; 58.8% in subsample A, and 63.8% in subsample B. For the women that had deployed, the mean for number of month deployed in the previous three years was 15 months for the complete sample and subsample A. The complete sample of respondents reported lengths of deployment in the

previous three years ranging from 1 to 36 months (SD = 7.0). In subsample A, the mean length of deployment was 15 months (SD = 7.3). In subsample B, months of deployment ranged from 1 to 28 months with a mean of 14.3 months (SD = 6.4). A summary is presented in Table 5.

Table 5

Descriptive Statistics for Demographic Data for Total Sample, Subsample A, and Subsample B

Variable	Range	Mean	SD
Age[a]	18-52	28.5	7.7
Less than 30 years old[b]	18-29	24.1	3.1
Less than 27 years old[c]	18-26	22.9	2.4
Years served active duty[a]	.3-26	6.82	6.2
Less than 30 years old[b]	.3-11	3.78	2.8
Less than 27 years old[c]	.5- 8	3.14	2.1
Total months deployed[d]	1-36	14.7	7.1
Less than 30 years old[e]	1-36	15.5	7.3
Less than 27 years old[f]	1-28	14.3	6.4

[a] N = 152
[b] N = 103
[c] N = 72
[d] Note, those respondents who reported no deployment were excluded, N = 70
[e] Note, those respondents who reported no deployment were excluded, N = 40
[f] Note, those respondents who reported no deployment were excluded, N = 26

Most of the women were Caucasian (49.3%), followed by African Americans (30.3%), Hispanic (5.9%), Asian/Pacific Islander (3.3%), and Native American (1.3%).

Other included those who identified more than one ethnicity/race (6.7%). Missing data for ethnicity/race was 3.3% and included into the other category for analysis.

For the sample of Soldiers who were less than 30 years in age, ethnicity/race was nearly identical as the complete sample. Most of the women were Caucasian (52.4%), followed by African American (28.2%), Hispanic (4.9%), Asian/Pacific Islander (2.9%), and Native American (1.9%). Others included those who identified more than one ethnicity/race (7.8%). Approximately 2% of respondents did not indicate their ethnicity/race.

For the complete sample, 25.7 % reported completing high school or general education equivalency. Most reported some college or technical school 43.4%. Fewer participants, 18.4%, reported completing four years of college and the smallest proportion (10.5%) included those who reported some graduate college work. In the subsample A, 34.0 % reported completing high school or a general education equivalency degree, 38.8% reported completion of some college or technical school, 15.5% reported completing four years of college, and 9.7% reported completing any graduate college work.

Nearly half of the complete sample reported being married (46.1%), followed by those who were single or never married (28.3%), divorced (20.4%), separated (2.6%), or widowed (.7%). In subsample B, nearly half the sample was married (48.5%), followed by those who were single or never married (35.9%), divorced (10.7%), and separated (2.9%).

Most of the complete sample of participants were enlisted; 81.9% in the entire sample and 85.1% in the subsample A. More than half (52%) of the complete sample were the rank of Sergeant (E-5) or lower. In the subsample A, 68% were E-5s or lower. A summary is presented in Table 6.

Table 6

Frequency Distribution of Demographic Data for Complete Sample[a] and Subsample A[b]

Variable	Total Sample		Less than 30 years old	
	Frequency	Percent	Frequency	Percent
Ethnicity/Race[a]				
Caucasian	75	49.3	54	52.4
African American	46	30.3	29	28.2
Hispanic	9	5.9	5	4.9
Other	16	10.5	13	12.6
Education[b]				
High School graduate/ GED	39	25.7	35	34.0
Sm college/technical school	66	43.4	40	38.8
Bachelors Degree	28	18.4	16	15.5
Graduate school	16	10.5	10	9.7
Marital Status[c]				
Single	43	28.3	37	35.9
Married	70	46.1	50	48.5
Divorce/Separated/Widow	36	23.7	14	13.9
Rank				
Officer	30	19.7	19	18.4
Enlisted	122	80.3	84	81.6
E1-3	26	17.1	25	24.3
E4-5	53	34.9	45	43.7
E6+	43	28.3	14	13.6

[a] Missing values = 5
[b] Missing values = 3
[c] Missing values = 3

In terms of Military Occupation Specialties (MOS), the sample reflected a variety of skill sets. The most frequently reported MOS was 42A, which is a human resources specialist (19), followed by 68W (healthcare specialist or more communally referred to as a medic) (15). Other occupations which frequently were reported (6) were 35M, 88M, and 92G, imagery analysts, motor transport operators, and food service specialists, respectively.

Due to the wide variety of individual MOSs reported by the participants, the occupations were recoded and grouped into general occupational categories, such as intelligence, personnel, medical, and logistics. The most common general occupation was logistics (27%), which included mechanics, truck drivers, and other occupational specialties which support the supply delivery aspects of the Army (i.e., ammunition, food, and fuel). Medical occupations accounted for 23% of the complete sample and included nurses, medics, and medical logistical support personnel (i.e., transportation and delivery of blood products). The intelligence grouping included analysts and linguists and accounted for 15.8% of the complete sample. A summary of the grouped MOSs for the complete sample and subsample B is presented in Table 7.

Cervical Cancer Risk Factors

Participants reported their personal risk factors for cervical cancer. Each response that was considered an elevated risk factor for cervical cancer was assigned one point so that an aggregate score for cumulative risk factors could be determined for each participant. The range for possible risk factors was 0 -7. Elevated risk factor responses included reporting age of first sexual intercourse as less than 17 years old; greater than

five lifetime sexual partners; greater than one partner in the previous year; condom use less than always for those participants who were sexually active with one partner and single/separated/divorced, or married and reporting more than one partner in the previous year; currently smoking; history of a sexually transmitted infection; current tobacco use, and use of oral contraceptives greater than five years.

Table 7

Military Occupational Specialties for Complete Sample[a] *and Subsample A*[b]

MOS	Total Sample		Less than 27 years old	
	Frequency	Percent	Frequency	Percent
Logistics	41	27.0%	21	29%
Cooks	6	4.2%	2	2.8%
Truck Drivers	6	4.2%	2	2.8%
Mechanics	6	4.2%	5	7.0%
Supply Clerk	5	3.5%	2	2.8%
Medical	35	24.6%	10	13.9%
Medics	18	12.6%	6	8.4%
Nurses	7	4.9%	1	1.4%
Intelligence	23	15.1%	14	19.4%
Analyst	6	4.2%	3	4.2%
Human Resources	23	15.1%	14	19.4%
Communications	11	7.2%	3	4.2%
Other	13	8.6%	7	9.7%
Chemical	4	2.8%	3	4.2%
Military Police	4	2.8%	2	2.8%

[a] N = 151
[b] N = 71

In the complete sample, the age for first sexual encounter ranged from 4 to 23 years old. [Two participants reported first sexual encounters as occurring prior to age 7 years old, with one stating that she was molested.] The mean age for sexual debut was 16.4 years, old with a standard deviation of 2.5 years. When the two previous mentioned participants were removed from the total sample, the mean age increased to 16.5 years old, with a standard deviation 2.1 years. Therefore these two participant responses were retained in the sample. About half, 48% of the complete sample reported first sexual intercourse as occurring prior to the age of 17.

For subsample A, the age for first sexual encounter ranged from 10 to 23 years old. The mean age for sexual debut was 16.4 years old with a standard deviation of 2.2 years. Nearly half (49.5%) of subsample A, reported first sexual intercourse as occurring prior to the age of 17 years old.

In the complete sample, the lifetime number of sexual partners greater than 10 was reported by 37.5% of the respondents. Nearly a third (33.6%) of the complete sample of respondents reported more than four and less than 10 partners, and 25.7% reported less than 5 total lifetime sexual partners. For subsample A, 35.8% reported having 10 or more partners; 30.1% reported more than four and less than 10 partners; and 32.0% reported less than five total lifetime sexual partners.

Most of the complete sample reported having only one sexual partner in the previous year. For the complete sample, 22.4% reported more than one partner in the past year. For subsample A, 22.3% reported more than one partner in the past year. For both the total sample and the subsample, who reported more than one partner in the past

year, always using a condom with the additional partner was reported in only 9.9% of the time (complete sample), and 10.7% in subsample A.

It was recognized by the researcher that lack of condom use in married respondents should not result in the assignment of a risk factor. Therefore, the researcher recoded those participants who were married and not using condoms as not having a risk factor for cervical cancer. With recoding for marriage taken in account for (i.e., married participants without additional partners in the previous year), 57.2% of the complete sample reported condom use as less than always (i.e., usually, sometimes, occasionally, rarely, or never). However, 27.6% of the complete sample reported condom use as less than half the time (i.e., occasionally, rarely, or never). In subsample A, 61.2% reported condom use as usually, sometimes, occasionally, rarely, or never. Condom use reported as less than 50% (i.e., occasionally, rarely or never), in the subsample A was 26.2% .

In the complete sample, 25% reported they were currently smoking. In subsample A, 26.2% reported that they were current smokers. In the complete sample, 36.8% reported a previous history of a STD. In subsample A, 34.0% reported a previous history of an STD. In regards to OCP use greater than five years, the complete sample reported nearly a third or 30.3% as taking OCPs greater than five years and 9.9% as more than 10 years. In subsample A, 27.2% reported more than five years of OCP use and 4.9% reported more than 10 years.

When aggregated, the mean number for total risk factors for the complete sample was 2.8, with a standard deviation of 1.4 and a range from 0 to 7. The mean number of risk factors identified for subsample A was 2.8, with a standard deviation of 1.5, and

range from 0 to 7. The most frequently reported risk factor for cervical cancer in the complete sample was more than 5 life-time sexual partners, condom use less than always, and sexual debut prior to the age of 17 years of age. A summary of risk factors for cervical cancer in the sample are presented in Table 8 and 9.

Table 8

Frequency Distribution for Cervical Cancer Risk Factors

Variable	Total Sample		Less than 30 years old	
	Frequency	Percent	Frequency	Percent
Age for first intercourse[a]				
Less than age 17	71	46.7	51	49.5
≥17 years old	73	48.0	48	46.6
Number of life time partners[b]				
Less than 5	39	25.7	33	32.0
≥5 less than 10	51	33.6	31	30.1
Greater than 10	57	37.5	37	35.9
More than one partner in last year	34	22.2	23	22.3
Condom use[c]				
Always	12	14.8	11	20.8
Usually	13	16.0	7	13.2
Sometimes	9	11.1	5	9.4
Occasionally	8	9.9	6	11.3
Rarely/Never	34	42.0	19	35.9
Pregnant or want to be	5	6.1	5	9.4
Currently smoke[d]	38	25.0	27	26.2
History of a STD[e]	56	36.8	35	34.0
OCP use[f]				
Less than 5 years	75	49.3	55	53.4
More than 5 less than 10 yr	31	20.4	23	22.3
More than 10 years	15	9.9	5	4.9

[a] Missing values = total- 8, under 30yo- 4
[b] Missing values = total- 5, under 30yo- 2
[c] Missing values (Married and with one partner excluded) = total- 71, under 30yo- 50
[d] Missing values = total- 5, under 30yo- 4
[e] Missing values = total- 6, under 30yo- 4
[f] Missing values = total- 30, under 30yo- 20

Table 9

Descriptive Statistics for Cervical Cancer Risk Factors for Complete Sample[a] *and Subsample*[b]

Variable	Range	Mean	SD
Age of first intercourse	4-23	16.4	2.5
Less than 30 years old	10-23	16.4	2.2
Number of risk factors	0-7	2.78	1.4
Less than 30 years old	0-7	2.68	1.5

[a] N = 149
[b] N = 99

Most of the sample reported male supervisors and commanders. The complete sample reported 67.8% of their supervisors as male and 66.4% of their commanders as males. In subsample A, 67.0% reported a male supervisor and 65% reported a male commander. With a lower score indicating strong disagreement, most of the Soldiers reported that they did not tend to forget to schedule their cervical cancer screening exam. On a scale from 1 (strongly disagree) to 7 (strongly agree) with four indicating neither, the mean for the complete sample regarding forgetting to schedule was 2.95 and for the subsample it was 2.96, with a standard deviation of 2.1 and 2.0, respectively. Using the same scale, as to using AKO as a reminder for their next screening exam, the entire sample reported a mean 4.7 and for subsample A, 4.45 with a standard deviation of 2.2 for both samples, indicating AKO was not influential as a reminder for cervical cancer screening exams. Finally, respondents interest in a test which could be used at home to

screen for cervical cancer, the complete sample reported agreement with interest for a home test, with a mean of 5.2 and 5.1, respectively, for the complete sample and subsample A, with a standard deviation of 1.9 for both.

Instrumentation Data

The Cervical Cancer Questionnaire for Military Women (CCQMW) was used in this study to determine the attitudes and subjective norms of female Soldiers regarding cervical cancer, cervical cancer screening, and HPV vaccination. The reliability for both instruments will be described for the complete group and the population less than 27 years in age.

Attitude Scales.

The CCQMW included two subscales for Attitudes and Subjective Norms regarding cervical cancer and screening. Attitudes included a measurement for likelihood for of cervical cancer and acceptance for cervical cancer.

The likelihood subscale was measured via 15 questions, with a possible score ranging from 15-105. Higher scores indicated a greater level of agreement for a respondent's belief regarding cervical cancer screening, i.e., embarrassment or thinking about infertility. Reliability for the Likelihood subscale for the complete sample was an $\alpha = .683$ and subsample less than 27 years in age, $\alpha = .681$. Descriptive statistics for the Likelihood subscales are presented in Table 10.

Table 10

Descriptive Statistics for CCQMW Likelihood Subscale

	Range	Mean	SD	Alpha
Complete sample[a]	15-105	58.09	11.75	.683
Less than 27 years old[b]	15-105	59.59	11.54	.681

[a] N = 149
[b] N = 71

The second subscale for Attitude in the CCQMW was acceptability. Acceptability for cervical cancer screening was measured via 14 questions with a possible score from 14-98. Higher overall scores indicated a greater level of agreement for the acceptability of a belief of the outcome related to cervical cancer screening exam to occur. Reliability for the Acceptability subscale for the complete sample was an α = .841 and for the subsample less than 27 years in age, α = .876. Descriptive statistics for the acceptability subscale are presented in Table 11.

Table 11

Descriptive Statistics for CCQMW Attitude Acceptability Subscale

	Range	Mean	SD	Alpha
Complete sample[a]	14-98	72.18	13.2	.841
Less than 27 years old[b]	14-98	71.54	14.2	.876

[a] N = 143
[b] N = 67

Social Norms Scales.

The CCQMW Social Norms scale included two subscales; the first, recommendations by salient others, and the second, motivation to adhere to the recommendations by salient others. For this research effort, recommendations included annual cervical cancer screening for the complete sample, for subsample less than 27 years in age, recommendations for HPV vaccination.

Recommendations for cervical cancer screening were measured via seven questions, with a possible score from 7-49. Higher overall scores indicated a greater level of agreement for the recommendation by a salient other. Reliability for the Recommendation subscale for this complete sample was an $\alpha = .840$. For subsample less than 27 years in age, recommendations for HPV vaccination reliability was $\alpha = .863$. Descriptive statistics for the Recommendation subscale for cervical cancer screening and HPV vaccination are presented in Table 12.

Table 12

Descriptive Statistics for CCQMW Social Norm Recommendations Subscale

	Range	Mean	SD	Alpha
For Annual Pap Test				
Complete sample[a]	7-49	34.58	9.4	.840
For HPV Vaccination				
Less than 27 years old[b]	7-49	29.82	8.4	.863

[a] N = 150
[b] N = 68

The motivation reported by respondents to adhere to recommendations by salient others was measured by the second subscale of Social Norms. This scale was measured via seven questions, with scores ranging from 7-49. Higher overall scores indicated a greater level of motivation to adhere to the recommendations made by a salient other. Reliability for the Social Norm subscale, adherence, for the complete sample was an α = .845. For the subsample less than 27 years in age, motivation to adhere to the recommendation by salient others was an α = .828. Descriptive statistics for motivation for adhere to the recommendation by salient others subscale are presented in Table 13.

Table 13

Descriptive Statistics for CCQMW Social Norm Recommendation Adherence Subscale

	Range	Mean	SD	Alpha
Complete sample[a]	7-49	31.71	7.9	.845
Less than 27 years old[b]	7-49	32.27	7.0	.828

[a] N = 150
[b] N = 71

Attitudes Towards Cervical Cancer and Screening

Likelihood Subscale.

Respondents reported the greatest agreement with the Pap testing them for cancer that the provider could not see, the Pap tested them for cervical cancer even if they did not have symptoms, and that the Pap tested them for HPV. See Table 14 and 15 for a complete summary of the strength reported by respondent for the likelihood constructs.

Table 14

Highest Attitude Variables for CCQMW Attitude Perceived Likelihood Subscale

	Disagree	Neither	Agree	Mean	SD
Finding cancer provider cannot					
Complete sample[a]	7.2%	7.2%	85.6%	5.84	1.6
Less than 27 years old[b]	9.7%	8.3%	81.9%	5.65	1.7
Tests me without symptoms					
Complete sample[a]	11.2%	14.5%	74.3%	5.49	1.9
Less than 27 years old[b]	12.5%	19.4%	68.1%	5.31	1.8
Tests me for HPV					
Complete sample[a]	11.3%	13.2%	75.5%	5.41	1.7
Less than 27 years old[b]	9.7%	11.1%	79.2%	5.46	1.6
Test me for all other STDs					
Complete sample[a]	25.8%	9.4%	64.9%	4.85	2.2
Less than 27 years old[b]	16.8%	8.5%	74.6%	5.23	1.9
Think about cancer					
Complete sample[a]	24.3%	27.0%	48.7%	4.49	2.0
Less than 27 years old[b]	20.8%	33.3%	45.8%	4.60	1.8
Lead to radiation/chemo					
Complete sample[a]	23.0%	38.8%	38.2%	4.15	1.6
Less than 27 years old[b]	20.8%	43.1%	36.1%	4.13	1.6
Pain or discomfort					
Complete sample[a]	38.2%	20.4%	41.4%	3.82	1.8
Less than 27 years old[b]	37.5%	20.8%	41.7%	3.83	1.9
Think about STDs					
Complete sample[a]	38.2%	25.0%	36.8%	3.78	2.1
Less than 27 years old[b]	31.9%	33.3%	45.8%	4.13	2.1

[a] N = 149
[b] N = 71

Table 15

Lowest Attitude Variables for CCQMW Perceived Likelihood Subscale

	Disagree	Neither	Agree	Mean	SD
Exposes me to other infections					
Complete sample[a]	75.0%	23.0%	2.0%	2.02	1.3
Less than 27 years old[b]	76.4%	23.6%	0.0%	2.00	1.3
Surgery that would change how I look					
Complete sample[a]	72.4%	21.7%	5.9%	2.24	1.5
Less than 27 years old[b]	66.7%	23.6%	9.7%	2.46	1.6
Inconvenient					
Complete sample[a]	55.3%	27.0%	17.8%	2.77	1.7
Less than 27 years old[b]	54.2%	27.8%	18.1%	2.85	1.7
Embarrassing					
Complete sample[a]	52.6%	21.1%	26.3%	3.05	1.9
Less than 27 years old[b]	54.2%	20.8%	25.0%	3.0	1.7
Think about infertility					
Complete sample[a]	48.0%	32.2%	19.7%	3.19	2.0
Less than 27 years old[b]	41.7%	30.6%	27.8%	3.60	2.0
Evaluate ability to have a baby					
Complete sample[a]	48.0%	24.3%	27.6%	3.30	2.1
Less than 27 years old[b]	38.9%	26.4%	34.7%	3.76	2.1
Surgery to decrease fertility					
Complete sample[a]	40.4%	31.8%	27.8%	3.54	1.9
Less than 27 years old[b]	37.5%	31.9%	30.6%	3.67	1.9

[a] N = 149
[b] N = 71

Acceptability Subscale.

When reporting those constructs with the greatest acceptability by respondents regarding cervical cancer screening, the total sample group and the subsample B reported the greatest acceptability for cervical cancer screening as Pap testing for other STDs, Pap testing for HPV, and Pap testing to detect cancer that the provider could not see. Conversely, each group reported the same lowest acceptability for cervical cancer screening exams related to thinking about not being able to have children (infertility), thinking that they would need surgery that would change the way they look, and thinking that they might have an STD. See Table 16 and 17 for a complete summary of the acceptability constructs in each sample group.

Attitude Paired Subscales

In following the TRA model, matched subscales variables can be summed to enable the researcher to simultaneously describe the strength of the combined subscales. The Attitudes scale had 12 paired variables. A higher score in this scale indicated a participant's agreement with both likelihood and acceptability of a specific construct. The individual scores ranged from 1 to 49 for each variable. In the complete group, the highest mean scores for the paired Attitude variables were finding cancer that the provider could not see, test without symptoms, and test for HPV; with summed scores of 39.9, 35.6, and 35.6, respectively. In subsample B, testing for HPV and testing without symptoms were the second and third strongest variables, respectively.

In contrast, the Attitude variables in the complete sample that were found to be least likely and acceptable for the complete sample were surgery that would change how

the respondents looked, thinking about infertility, and inconvenience, with summed scores of 8.6, 11.9, and 14.4, respectively (See Tables 18 and 19 for a summary of the paired Attitude variables).

Table 16

Highest Attitude Variables for CCQMW Attitude Perceived Acceptability Subscale

	Disagree	Neither	Agree	Mean	SD
Test me for all other STDs					
Complete sample[a]	2.0%	2.7%	95.3%	6.63	0.9
Less than 27 years old[b]	4.3%	5.7%	90.0%	6.48	1.1
Tests me for HPV					
Complete sample[a]	1.3%	5.3%	93.3%	6.58	0.9
Less than 27 years old[b]	2.8%	7.0%	90.1%	6.46	1.1
Finding cancer provider cannot					
Complete sample[a]	2.7%	5.4%	91.9%	6.48	1.2
Less than 27 years old[b]	0.0%	8.6%	91.4%	6.42	1.0
Tests me without symptoms					
Complete sample[a]	2.0%	7.3%	84.1%	6.48	1.1
Less than 27 years old[b]	4.2%	9.9%	85.9%	6.30	1.3
Embarrassing					
Complete sample[a]	11.3%	29.1%	59.6%	5.24	1.6
Less than 27 years old[b]	12.7%	32.4%	54.9%	5.12	1.6
Inconvenient					
Complete sample[a]	11.4%	32.9%	55.7%	5.19	1.6
Less than 27 years old[b]	12.9%	35.7%	51.4%	5.13	1.6
Pain or discomfort					
Complete sample[a]	16.6%	19.2%	64.2%	5.16	1.6
Less than 27 years old[b]	21.1%	21.1%	57.7%	5.03	1.7

[a] N = 148, [b] N = 71

Table 17

Lowest Attitude Variables for CCQMW Perceived Acceptability Subscale

	Disagree	Neither	Agree	Mean	SD
Think about infertility					
Complete sample[a]	41.3%	26.7%	32.0%	3.73	2.2
Less than 27 years old[b]	50.0%	27.1%	22.9%	3.25	2.1
Surgery that would change how I look					
Complete sample[a]	34.2%	40.9%	24.8%	3.85	1.8
Less than 27 years old[b]	37.1%	35.7%	27.1%	3.87	1.8
Think about may have STD					
Complete sample[a]	32.5%	31.8%	35.8%	4.08	2.1
Less than 27 years old[b]	26.8%	31.0%	42.3%	4.46	2.0
Think about radiation/chemo					
Complete sample[a]	22.0%	38.0%	40.0%	4.41	1.8
Less than 27 years old[b]	20.0%	38.6%	41.4%	4.61	1.8
Male provider					
Complete sample[a]	26.4%	25.0%	48.6%	4.63	2.0
Less than 27 years old[b]	28.6%	22.9%	48.6%	4.60	2.1
Think about may have HPV					
Complete sample[a]	1.3%	5.3%	93.3%	4.80	1.8
Less than 27 years old[b]	15.5%	38.0%	46.5%	4.87	1.8
Think about may have ca					
Complete sample[a]	13.3%	34.7%	52.0%	4.92	1.8
Less than 27 years old[b]	2.9%	38.6%	48.6%	4.94	1.7

[a] N = 148
[b] N = 71

Table 18

Highest CCQMW Paired Attitude Variables Sums

	Likelihood Mean	Acceptability Mean	Sum
Finding cancer provider cannot			
Complete sample[a]	5.84	6.48	39.94
Less than 27 years old[b]	5.65	6.42	36.27
Tests me without symptoms			
Complete sample[a]	5.49	6.48	35.58
Less than 27 years old[b]	5.31	6.30	33.45
Tests me for HPV			
Complete sample[a]	5.41	6.58	35.60
Less than 27 years old[b]	5.46	6.46	35.27
Test me for other STDs			
Complete sample[a]	4.85	6.63	32.16
Less than 27 years old[b]	5.23	6.48	33.89
Think about cancer			
Complete sample[a]	4.49	4.92	22.09
Less than 27 years old[b]	4.60	4.94	22.72
Pain or discomfort			
Complete sample[a]	3.82	5.16	19.71
Less than 27 years old[b]	3.83	5.03	19.26
Lead to radiation/chemo			
Complete sample[a]	4.15	4.41	18.30
Less than 27 years old[b]	4.13	4.61	19.04

[a] N = 149
[b] N = 71

Table 19

Lowest CCQMW Paired Attitude Variables Sums

	Likelihood Mean	Acceptability Mean	Sum
Surgery that would change how I look			
Complete sample[a]	2.24	3.85	8.62
Less than 27 years old[b]	2.46	3.87	9.52
Think about infertility			
Complete sample[a]	3.19	3.73	11.90
Less than 27 years old[b]	3.60	3.25	11.70
Inconvenient			
Complete sample[a]	2.77	5.19	14.38
Less than 27 years old[b]	2.85	5.13	14.62
Think about STDs			
Complete sample[a]	3.78	4.08	15.42
Less than 27 years old[b]	4.13	4.46	18.42
Embarrassing			
Complete sample[a]	3.05	5.24	15.98
Less than 27 years old[b]	3.00	5.12	15.36

[a] N = 149
[b] N = 71

Social Norms

Recommendations Subscale for Cervical Cancer Screening.

The complete sample reported the strongest agreement for a recommendation for annual exam by their healthcare provider, the media, and other family members. The salient others which were reported as the least likely to recommend annual cervical

cancer screening were friends, chain of command, and the Internet. See Table 20 for a complete summary of the Social Norm recommendations by salient others for annual cervical cancer screening exam.

Table 20

Recommendations for Annual Exam CCQMW Recommendations Subscale[a]

	Disagree	Neither	Agree	Mean	SD
Healthcare provider	4.6%	9.9%	85.4%	6.01	1.4
Media	12.6%	27.2%	60.3%	5.08	1.8
Other family members	14.7%	30.7%	54.7%	4.97	1.9
Husband/boyfriend/partner	17.9%	34.4%	47.7%	4.69	2.0
Internet	14.6%	39.1%	46.4%	4.68	1.8
Chain of command	19.2%	33.1%	47.7%	4.70	2.0
Friends	21.2%	37.1%	41.7%	4.45	2.1

[a] N = 150

Recommendations Subscale for HPV Vaccination.

When reporting those salient others to recommend HPV vaccination, the sample included those only less than 27 years old (subsample B). This subsample reported strongest impact as recommendation by their healthcare provider, the media, and other family members. The salient others which were reported as least likely to recommend HPV vaccination were friends, chain of command, and the Internet. See Table 21 for a complete summary of the Social Norm recommendations by salient others for HPV vaccination in subsample B.

Table 21

Recommendations for HPV Vaccination CCQMW Recommendations Subscale[a]

	Disagree	Neither	Agree	Mean	SD
Media	14.3%	35.7%	50.0%	4.59	1.6
Other family members	15.9%	37.7%	46.4%	4.53	1.7
Healthcare provider	11.6%	56.5%	31.9%	4.47	1.7
Internet	17.1%	44.3%	38.6%	4.19	1.6
Friends	18.8%	47.8%	33.3%	4.16	1.5
Husband/boyfriend/partner	20.3%	52.2%	27.5%	4.12	1.7
Chain of command	20.3%	62.3%	17.4%	3.76	1.6

[a] N = 68

Adherence Subscale for Adherence to Recommendations by Others.

When reporting the adherence to the recommendations by salient others for healthcare, the complete sample reported strongest motivation with adhering to the recommendations by their healthcare provider, their other family members, and husband/boyfriend/partner, respectively. For subsample B, adherence to the recommendations by others was reported the strongest agreement with their healthcare provider, their other family members, and chain of command.

In the complete sample and subsample B, motivation to adhere to the recommendations by salient others was reported as the weakest for the Internet, media, and friends. See Table 22 for a complete summary of the Social Norms subscale adherence to recommendations by salient others for healthcare.

Table 22

Recommendations Adherence for Healthcare CCQMW Subscale

	Disagree	Neither	Agree	Mean	SD
Healthcare provider					
Complete Sample[a]	3.3%	7.2%	89.5%	6.21	1.2
Less than 27 years old[b]	4.2%	8.3%	87.5%	6.07	1.2
Other family members					
Complete Sample[a]	12.0%	23.3%	64.7%	5.05	1.6
Less than 27 years old[b]	5.6%	21.1%	73.2%	5.41	1.3
Chain of command					
Complete Sample[a]	6.4%	23.7%	59.9%	4.97	1.8
Less than 27 years old[b]	15.3%	25.0%	59.7%	4.96	1.6
Husband/boyfriend/partner					
Complete Sample[a]	13.8%	22.4%	63.8%	4.89	1.8
Less than 27 years old[b]	11.1%	20.8%	68.1%	5.03	1.6
Friends					
Complete Sample[a]	27.6%	46.1%	26.3%	3.83	1.5
Less than 27 years old[b]	25.0%	47.2%	27.8%	4.03	1.4
Media					
Complete Sample[a]	33.6%	52.6%	13.2%	3.45	1.5
Less than 27 years old[b]	36.1%	52.8%	11.1%	3.48	1.3
Internet					
Complete Sample[a]	38.8%	47.4%	13.8%	3.31	1.6
Less than 27 years old[b]	41.7%	47.2%	11.1%	3.30	1.5

[a] N = 150
[b] N = 71

Social Norms Paired Subscales

In concert with the pairing of the Attitudes subscales, the Social Norms scale had seven paired variables. A higher score in this scale indicated a participant's perception of the salient other's recommendations for an annual cervical cancer screening exam and the strength for the motivation of the participant to adhere to the salient other's recommendation. Individual summed scores ranged from 1 to 49. Cervical cancer screening was calculated for the complete population. For the women less than 27 years of age, subsample B, recommendations for HPV vaccination was calculated. Consistent with the screening exam, a higher score in this scale for this subsample indicated the participant's perception of the recommendations made by the salient other for HPV vaccination and motivation for the respondent to adhere to the recommendations of the salient other.

In regards to annual cervical cancer screening, the Social Norm variable with the overall greatest strength in the complete sample were the healthcare provider, other family members, and chain of command, with summed scores of 37.3, 25.0, and 23.4, respectively. In subsample B, the strongest variables for HPV vaccination were the healthcare provider, other family members, and husband/boyfriend/partner. In contrast, the Social Norm variables that were found to be lowest for annual cervical cancer screening were Internet, friends, and the media, with scores of 15.5, 17.0, and 17.5, respectively in the complete sample; for HPV vaccination in subsample B, Internet, media, and friends, were the lowest, 13.8, 16.0, and 16.8, respectively. See Tables 23 and 24 for a summary of the paired Attitude variables summation.

Table 23

Sum for Social Norms for Annual Cervical Cancer Screening Exam[a]

	Recommendations Pap Mean	Adherence Mean	Sum
Healthcare provider	6.01	6.21	37.32
Other family members	4.97	5.05	25.01
Chain of command	4.70	4.97	23.36
Husband/boyfriend/partner	4.69	4.89	22.93
Media	5.08	3.45	17.53
Friends	4.45	3.83	17.04
Internet	4.68	3.31	15.49

[a] N = 150

Table 24

Sum for Social Norms for HPV Vaccination[a]

	Recommend Vaccine Mean	Adherence Mean	Sum
Healthcare provider	4.47	6.07	27.13
Other family members	4.53	5.41	24.51
Husband/boyfriend/partner	4.12	5.03	20.72
Chain of command	3.76	4.96	18.65
Friends	4.16	4.03	16.76
Media	4.59	3.48	15.97
Internet	4.19	3.30	13.83

[a] N = 68

Relationship Among the Variables

Relationships between the variables were determined using Pearson Product moment correlations for the Attitude and Social Norms Variables. Spearman's rho was

used to describe ordinal demographic data. In the complete sample, for the selected demographics there was a significant relationship between ethnicity and months deployed (r_s = -.206, *n* = 146, p = .013). Using Chi-squared, Caucasians were determined to be less likely to have been deployed in the past three years and those in the "Other" category (multiracial, Asian, Native American, and Hispanic) were more likely to have been deployed for more than one year in the last three years. However, this relationship was not demonstrated in the subsample B. Table 25 presents a correlation matrix for the demographic data for the complete sample. Table 26 presents a correlation matrix for the demographic data for subsample A and Table 27 for subsample B.

Table 25

Correlations (Spearman's Rho) among demographics for complete sample[a]

	1	2	3	4
1 Rank	-	-.042	.138	.044
2 Race/Ethnicity[b]		-	-.206*	.077
3 Months deployed			-	-.090
4 Supervisor gender[c]				-

*Significant at 0.05 level
[a] N = 152
[b] Missing values = 6
[c] Missing values = 7

Table 26

Correlations (Spearman's Rho) among demographics for Sample less than 30 years old[a]

	1	2	3	4
1 Rank	-	.104	.202	.061
2 Race/Ethnicity[b]		-	-.118	.130
3 Months deployed			-	-.063
4 Supervisor gender[c]				-

[a] N = 103
[b] Missing values = 2
[c] Missing values = 5

Table 27

Correlations (Spearman's Rho) among demographics for Sample less than 27 years old[a]

	1	2	3	4
1 Rank	-	.104	.202	.061
2 Race/Ethnicity[b]		-	-.118	.130
3 Months deployed			-	-.063
4 Supervisor gender[c]				-

[a] N = 71
[b] Missing values = 2
[c] Missing values = 4

The relationships between the Attitude and Social Norm variables were based on their composite subscales scores. Relationships between the variables were determined

using Pearson Product moment correlations for the Attitude and Social Norms Variables. Spearman's rho was used to describe ordinal demographic data.

In the complete sample with all variables entered, the relationship between race/ethnicity and deployment was the same as described above. There was a significant relationship within the subscales between Attitude likelihood and acceptability ($r = -.274$, $n = 152$, $p = <.01$). As the total score for likelihood increased the overall score for acceptability decreased. A significant relationship within the Social Norm subscales, recommendation and adherence, also demonstrated a significant positively correlated relationship ($r = .569$, $p <.01$). As the scores for recommendations to complete an annual screening exam increased, the scores for adhering to the recommendations by salient others increased.

Rank was correlated with the Attitude subscale, likelihood ($r_s = -.210$, $p < .05$) and Social Norm subscale Adherence ($r_s = -.163$, $p <.05$). Using ANOVA, this inverse relationship indicated that higher ranks tended to have lower scores for likelihood regarding cervical cancer and adherence to the recommendations of others. There were no significant relationships between the intention for cervical cancer screening in the next year, gender of the Soldier's supervisor, months deployed in the previous three years, and cervical cancer screening in the previous year and any the study variables. Table 28 summarizes the correlations between the various study variables for the complete sample and annual cervical cancer screening exam intention and completion.

Table 28

Correlations Among Study Variables for Complete Sample[a]

	1	2	3	4	5	6	7	8	9	10
1 Attitude – Likelihood[b]	-	-.27**	.09	.09	-.08	-.21*	.04	.07	-.01	-.09
2 Attitude- Acceptability[c]		-	.13	.10	.05	.12	.03	-.01	-.02	-.08
3 Social Norm- Recommend Pap			-	.57**	-.09	-.06	-.16	.08	.02	.05
4 Social Norm- Adherence				-	.03	-.16*	-.04	-.02	.04	.03
5 Future Pap Intention[d]					-	.01	<-.01	.03	<-.01	.05
6 Rank						-	-.04	.14	.04	-.03
7 Race/Ethnicity[e]							-	-.21*	.08	.02
8 Months deployed								-	-.01	.04
9 Supervisor gender[f]									-	-.08
10 Pap in last year										-

* Significant at 0.05 ** Significant at 0.01 [Note 1-5 Pearsons, 6-10 Spearman's rho]

[a] N = 152

[b] Missing values = 1

[c] Missing values = 7

[d] Missing values = 11

[e] Missing values = 4

[f] Missing values = 5

In this study, none of the women less than 27 years of age completed the HPV vaccine and four women reported that they had completed the HPV vaccine between the ages 27 and 30 years of age. Therefore, the correlations were limited to those that had initiated the vaccine . There was only one significant relationship between the Attitude subscale likelihood and rank (r_s = -.240, p = <.05). Using ANOVA, as rank increased, the respondent's Attitude subscale likelihood score decreased. Table 29 summarizes the correlations between the various study variables for the subsample A and vaccine initiation.

Table 29

Correlations Variables for Sample Less than 30 years of age[a]

		1	2	3	4	5	6	7
1	Attitude – Likelihood	-	-.17	-.24*	.02	.15	-.13	.16
2	Attitude- Acceptability[b]		-	.04	.03	.04	.10	.08
3	Rank			-	-.05	.13	.08	-.16
4	Race/Ethnicity[c]				-	-.18	.02	.15
5	Months deployed					-	-.09	-.07
6	Supervisor gender[d]						-	.10
7	Initiate the vaccine							-

*significant at 0.05, [Note 1-2 Pearsons, 3-7 Spearman's rho]
[a] N = 102
[b] Missing values = 5
[c] Missing values = 1
[d] Missing values = 4

Relationships between the variables for the subsample of those Soldiers less than 27 years old (subsample A) were determined using Pearson Product moment correlations for the Attitude and Social Norms Variables. Spearman's rho was used to describe ordinal demographic data. In regards to vaccination intention for subsample A, there was a significant relationship between Attitude likelihood and rank (r_s = -.290, p = <.05). Using ANOVA, as rank increased, the Attitude subscale score for likelihood decreased. Significant correlations between the subscales was also observed between Attitude acceptability and Social Norm recommendations for vaccine (r = .264, p < 0.05) and Social Norm adherence (r = .257, p <.05). As acceptability regarding cervical cancer screening increased, the scores for vaccine recommendations and adherence increased.

Within the subscale Social Norm, there was a positive correlation between vaccine recommendations and adherence ($r = .678$, $p<.01$), indicating that when scores for vaccine recommendation increased, the scores for adhering increased. Future intent and past behavior for the HPV vaccine had a positive correlation, ($r_s = .309$, $p < .01$). Those who reported future intent towards the vaccine had received at least one HPV vaccine in the past. Future intent for the vaccine also had a positive correlation with the Social Norm adherence ($r = .261$, $p <.05$), indicating that those with a higher score for adhering to the recommendation of salient others had an increased intent to receive the HPV in the future.

There were no significant relationships between race/ethnicity, gender of the Soldier's supervisor, and number of months deployed in the previous three years, and any of the other study variables. Table 30 summarizes the correlations between the various study variables for the sample less than 27 years in age and HPV vaccination intent and behavior.

Table 30

Correlations among Subscales for Sample Less than 27 years old for HPV Vaccination [a]

	1	2	3	4	5	6	7	8	9	10
1 Attitude – Likelihood	-	-.19	.22	.10	.06	-.29*	-.12	.20	-.10	-.02
2 Attitude- Acceptability[b]		-	.26*	.26*	.15	.08	.03	.06	-.02	.09
3 Social Norm- Recommend Vac[c]			-	.68**	.14	-.08	-.14	.12	.23	-.22
4 Social Norm- Adherence				-	.26*	-.21	-.20	.01	.14	-.12
5 Future Intention Vaccine[d]					-	-.11	-.01	.12	.06	.31**
6 Rank						-	.10	.20	.06	.01
7 Race/Ethnicity[c]							-	-.12	.13	-.05
8 Months deployed								-	-.06	.11
9 Supervisor gender[e]									-	<.00
10 Initiated Vaccine (Past Behavior)										-

*significant at 0.05, **significant at 0.01 [Note 1-5 Pearsons, 6-10 Spearman's rho]
[a] N = 71
[b] Missing values = 4,[c] Missing values = 1
[d] Missing values = 2,[e] Missing values = 3

Independent Variables

The independent variables for the analysis were selected as defined by the TRA. The independent variable for the complete sample was cervical cancer screening behavior. Within the TRA construct, this includes analysis of future intent and past behavior, although later in the analysis future intent for behavior is included as a dependent variable. For the sample less than 27 years of age (subsample B), analysis includes future intent and past behavior regarding HPV vaccination initiation. In determining past behavior, the date of any prior HPV vaccination or a planned appointment that was indicated on the participant's electronic medical record was the date utilized to determine behavior. However, for those respondents who reported their last cervical cancer screening exam in a civilian clinic (10.5% of the complete sample),

self-reported exam was used for analysis. Two participants reported that they were unsure where their last screening exam was completed.

Cervical Cancer Screening.

Most women, 81.6% in the complete sample, had completed cervical cancer screening in the previous year and most (87.8%) reported their last exam was completed in the military healthcare system. Of the group that had not completed a screening exam in the past year, two reported no history of ever having an exam and two reported that they were two to but less than three years overdue. Of those who were overdue, most (85.7%) were greater than one year, but less than two years overdue for an annual cervical cancer screening exam. The mean for intent to complete a screening cervical cancer exam in the next year was reported as 6, on a scale from Extremely unlikely (1) to Extremely likely (7), with a standard deviation of 2.0.

A majority of the sample (93.3%) reported their last cervical cancer screening exam was at a military treatment facility (MTF). Of the sample that reported their last exam at an MTF, a small portion (15.0%) reported they were not sure of the date of their last exam. Of the remaining 132 respondents who reported the date last exam and reported that exam was completed at an MTF, 16.4% reported dates that were inconsistent with the last exam indicated on their electronic medical record (EMR). In the sample of 18 inconsistent cases, four (22%) had no history of a screening exam, and 9 (50%) reported their last exam as occurring earlier that what was recorded in the EMR.

HPV Vaccination.

In the subsample of those Soldiers less than 27 years of age, most women (73.6%) had not initiated the HPV vaccination. Of this subsample, 4.2% reported their last vaccine at a civilian clinic and 19.4% were not sure whether they received their vaccine at a civilian or military clinic. Over half this subsample (54.2%), reported that they were interested in the HPV vaccine and only 4.2% were told that they did not need the vaccine. Additionally, 54.0% reported that they would likely get the HPV vaccine in the following year.

In the subsample of those less than 27 years of age, most of the women reported that they had received their HPV vaccination in the military healthcare system. As small portion of the respondents (19.0%) reported they had completed the HPV vaccine series. With the exception of one respondent that was not sure, all of those respondents who reported vaccine completion indicated they received their last vaccine at an MTF. However, only 10.7% of subsample A had completed the HPV series. In the subsample of women between the ages of 27 to 29 years old, 8.3% reported completing the HPV vaccine. However, this was based on self-report only, as the EMR review for the vaccine was conducted only for those Soldiers under the age of 27 years. (See Table 31 for a summary of past vaccine behavior).

Table 31

Past HPV Vaccine Behavior

	Started Vaccine (%)	Completed Vaccine (%)	Vaccine Start at Military Clinic (%)
Less than 27 years old[a,c]	19.0	10.7%	75.0
Between 27 and 29 years old[b,d]	24.0	-	83.3

[a] Based on EMR or Self-reported at civilian clinic
[b] Based on Self-report only
[c] N = 84
[d] N = 25

Predicting Behavior

Cervical Cancer Screening

Logistic regression was used to determine which of the independent variables could predict female Soldier's behavior for cervical cancer screening and HPV vaccination. All of the assumptions for regression were reviewed prior to data analysis. In terms of cervical cancer screening, smaller groups (i.e. ethnicity/race) were collapsed in order to provide an adequate number of cases to include in the model. Multicollinearity was not demonstrated among the variables, as the tolerance for correlation was greater than .60 for each variable for screening behavior and greater than .30 for vaccination behavior. The presence of outliers was reviewed via direct observation and inspection of the residuals, and all data were determined to be acceptable

for inclusion. All of the assumptions for regression were found acceptable prior to data analysis.

Direct logistical analysis was performed to assess the impact of a number of factors on the likelihood for a female Soldier to complete cervical cancer screening in the previous year. The model contained seven independent factors (rank, months deployed, race/ethnicity, supervisor gender, intent for future exam, total score for Attitude, and total score for Social Norm scale). The full model containing all predictors was not significant, χ^2 (11, N = 117) = 12.59, p > .05, indicating the model was not able to distinguish between respondents who completed and did not complete their annual cervical cancer screening exam (See Table 32).

Table 32

Predictor Variables as a Function for Screening Completion

Variable	B	SE	Wald	p	95% CI
Rank	1.81	.88	4.19	.04	1.1 - 34.4
Race/Ethnicity	.08	.82	.01	.93	.2 - 5.4
Months deployed	-.68	.74	.86	.35	.1 - 2.1
Supervisor gender	-.26	.58	.21	.65	.3 - 2.4
Attitude	-.03	.02	2.50	.11	.9 - 1.0
Social Norm	.01	.02	.75	.38	.98 - 1.0
Future Exam Intention	.11	.12	.74	.39	.87- 1.4

Direct logistical analysis was performed to assess the impact of the pair subscale values on the likelihood for a female Soldier to complete cervical cancer screening in the

previous year. For the Attitude scale, the model contained twelve factors (pain, embarrassment, inconvenience, cancer provider could not see, no symptoms, test for STD, test for HPV, think about cancer, think about STD, think about fertility, would lead to surgery, would lead to radiation/chemotherapy). The full model containing all predictors was not significant, χ^2 (12, N = 142) = 13.08, p > .05, indicating the model was not able to distinguish between respondents who completed and did not complete their annual cervical cancer screening exam (See Table 33).

Table 33

Paired Attitudes as Predictor Variable as a Function for Screening Completion

Variable	B	SE	Wald	p	95% CI
Pain	-.01	.03	.15	.70	.93 - 1.1
Embarrassment	.03	.03	.85	.36	.97 - 1.1
Inconvenience	-.04	.03	1.74	.19	.91 - 1.0
Cancer provider could not see	-.03	.02	2.02	.16	.93 - 1.0
No symptoms	<-.01	.02	.01	.93	.96 - 1.0
Test for STD	-.01	.02	.07	.79	.96 - 1.0
Test for HPV	.03	.02	1.43	.23	.93 - 1.1
Think about cancer	<-.01	.02	.01	.93	.96 - 1.0
Think about STD	.01	.02	.30	.59	.97 - 1.1
Think about fertility	-.04	.03	2.63	.11	.92 - 1.0
Lead to surgery	-.05	.04	2.34	.13	.87 - 1.0
Lead to radiation/chemotherapy	<0.1	.03	.01	.92	.96 - 1.1

Direct logistical analysis was performed to assess the impact of the pair subscale values on the likelihood for a female Soldier to complete cervical cancer screening in the previous year. For the Social Norm scale, the model contained seven factors (friends, husband/boyfriend, other family, chain of command, healthcare provider, media, and

Internet). The full model containing all predictors was not significant, χ^2 (7, N = 148) = 3.12, p > .05, indicating the model was not able to distinguish between respondents who completed and did not complete their annual cervical cancer screening exam (See Table 34).

Table 34

Paired Social Norms as Predictor Variable as a Function for Screening Completion

Variable	B	SE	Wald	p	95% CI
Friends	.01	.03	.23	.63	.96 - 1.06
Husband/Boyfriend	.02	.03	.54	.46	.97 - 1.07
Other Family	-.04	.02	2.35	.13	.92 - 1.01
Chain of Command	<-.00	.02	.01	.93	.96 - 1.03
Healthcare Provider	.01	.02	.13	.72	.97 - 1.05
Media	.03	.04	.41	.52	.97 - 1.05
Internet	-.01	.04	.06	.81	.95 - 1.11

Vaccination Behavior

Direct logistical analysis was performed to assess the impact of a number of factors on the likelihood for a female Soldier to initiate HPV vaccination before the age of 27 years of age. Completion of the HPV vaccination was excluded in from analysis, as the case size was too few in number. The model contained seven independent factors (rank, months deployed, race/ethnicity, supervisor gender, intent for future vaccine, total score for Attitude, and total score for Social Norm scale). The full model containing all predictors was not significant, χ^2 (11, N = 58) = 10.72, p > .05, indicating the model was

not able to distinguish between respondents who initiated and did not initiate the HPV vaccine (See Table 35).

Table 35

Predictor Variables as a Function for Vaccine Initiation less than 27 years in age

Variable	B	SE	Wald	p	95% CI
Rank	-.30	1.11	.07	.79	.09 - 6.48
Race/Ethnicity	-1.84	1.43	1.66	.20	.01 - 2.61
Months deployed	2.03	1.30	2.42	.12	.59 - 96.65
Supervisor gender	-.03	.83	<.01	.97	.19 - 5.00
Attitude	-.01	.03	.17	.68	.94 - 1.04
Social Norm	<-.01	.03	.02	.90	.94 - 1.06
Future Vaccine Intention	.37	.22	2.88	.09	.94 - 2.23

Direct logistical analysis was performed to assess the impact of a number of factors on the likelihood for a female Soldier to initiate HPV vaccination under the age of 30 years of age. The model contained four independent factors (rank, months deployed, race/ethnicity, supervisor gender, and Social Norm Adherence subscale). The full model containing all predictors was not significant, χ^2 (13, N = 88) = 17.88, p > .05, indicating the model was not able to distinguish between respondents less than 30 years in age who initiated and did not initiate the HPV vaccine (See Table 36).

Table 36

Predictor Variables as a Function for Vaccine Initiation less than 30 years old

Variable	B	SE	Wald	p	95% CI
Rank	-.30	1.11	.07	.79	.09 - 6.48
Race/Ethnicity	-1.66	.90	3.37	.07	.03 - 1.12
Months deployed	1.68	1.61	1.09	.30	.23 -126.37
Supervisor gender	-.02	.64	<.01	.98	.28 - 3.45
Social Norm Adherence)	-.01	.04	.02	.90	.92 - 1.07

Direct logistical analysis was performed to assess the impact of the paired Social Norms values on the likelihood for a female Soldier to initiate HPV vaccination under the age of 27 years of age. For the paired Social Norm scale, the model contained seven factors (friends, husband/boyfriend, other family, chain of command, healthcare provider, media, and Internet). The full model containing all predictors was significant, χ^2 (7, N = 68) = 17.75, $p < .05$, indicating the model was able to distinguish between respondents who initiated and did not initiate HPV vaccination based on the paired Social Norms. The model as a whole explained between 23.0% (Cox and Snell R square) and 33.5% (Nagelkerke R squared) of the variance in vaccination in women less than 27 years of age, and correctly classified 72.1% of cases. As shown in Table 37, only the healthcare provider made a uniquely significant contribution to the model. The strongest predictor of initiated the vaccine was a person who reported a strong agreement with being told by

a healthcare provider they needed the HPV vaccine and stronger agreement to follow the healthcare providers recommendation.

Table 37

Paired Social Norms as Predictor Variable as a Function for Vaccine Initiation

Variable	B	SE	Wald	p	95% CI
Friends	.03	.05	.47	.49	.94 - 1.13
Husband/Boyfriend	-.07	.04	2.19	.14	.86 - 1.02
Other Family	.05	.04	1.97	.16	.98 - 1.13
Chain of Command	-.02	.04	.14	.70	.90 - 1.07
Healthcare Provider	.09	.04	5.66	.02*	1.02 -1.29
Media	.08	.09	.95	.33	.92 - 1.29
Internet	-.18	.10	3.17	.08	.92 - 1.29
Constant	-2.78	1.08	6.65	.01	

* Significant at <.05

Hypothesis Testing

The following discussion provides a description of each hypothesis and the specific findings related to that hypothesis.

Primary Research Hypothesis

$H_{1:}$ Adherence for cervical cancer screening in for female Soldiers is greater than U. S. national goals set forth per Healthy People 2010 (HP2010). When using a combination of self-report and review of the EMR, female soldiers reporting that they had ever received a screening cervical cancer exam was 98.6%, which exceeds the 97% goal set by *HP2010*. For women who had received an exam in the past three years, 100%

of the sample reported a cervical cancer screening exam in the previous three years, exceeding the *HP2010* goal of at least 90%. This research hypothesis was supported.

$H_{2:}$ Future planned behavior (intent) by female Soldiers for cervical cancer screening is greater than the *HP2010* goal. Although the *HP 2010* goal is a cervical cancer screening exam at least every three years, the Army Regulation 40- 501 is more stringent than the *HP 2010* goal and states female Soldiers should receive an exam every year. The future intent for an annual cervical cancer screening exam reported by female Soldiers was less than the *HP 2010* goal of 90% screening for all women. Of the 139 women who answered the question, 83.5% reported that they planned to complete a screening exam in the next year, 2.6 were neutral, and 13.7% reported they were not planning on a cervical cancer screening exam in the next year. Therefore, when replacing the *HP 2010* cervical cancer screening goal with Army regulations, this hypothesis was not supported.

$H_{3:}$ Female Soldiers will report generally positive attitudes (likelihood and acceptability) towards cervical cancer screening. The sample of military women reported generally positive attitudes towards the likelihood and acceptability of cervical cancer associated with a screening exam. With a range of 15-105, the mean score for the Attitude subscale, likelihood was 58.09 (SD 11.75). The mean score for the subscale, acceptability was greater 72.18 (13.2) with a range from 14-98. Therefore this hypothesis was supported.

$H_{4a:}$ The healthcare provider and chain of command provide greatest encouragement and motivation to adhere to annual cervical cancer screening exams.

Most of the participants reported the healthcare provider, followed by the media, and other family members as the strongest salient other to encourage annual cervical cancer screening, 85.4%, 60.3%, and 54.7%, respectively. In terms of adherence for the recommendations by the salient others, the sample reported the strongest adherence with the recommendation made by the healthcare provider, other family members and the chain of command, 89.5%, 64.7%, and 59.9%, respectively.

Utilizing the paired subscale constructs for recommendations and adherence to the recommendations, the healthcare provider, other family members, and the chain of command were the strongest influence for behavior. Therefore, this hypothesis was not supported as other family members had greater influence than the chain of command.

$H_{4b:}$ The media will provide the least encouragement and motivation to adhere to annual cervical cancer screening exams. In terms of recommendations for annual cervical cancer screening, friends (41.7%), chain of command (47.7%), and Internet (46.4%) were generally reported by participants as less likely to recommend. Participants reported the lowest adherence to the recommendations by the media (13.2%), the Internet (13.8%), and friends (26.2%). Within the paired social norm subscale constructs, the participants indicated the Internet, friends, and media as the weakest influence of screening behaviors. Therefore, this hypothesis was supported.

$H_{5a:}$ Subjective norms, in particular the healthcare provider, predict more adherent behavior for cervical cancer screening, while attitude predicts non-adherent cervical cancer screening behavior. However, when entered into a regression model, none of the salient others could demonstrate significant ability to predict cervical cancer

screening behavior for the female Soldiers, χ^2 (7, N = 148) 3.12, p>. 05.; nor could Attitudes predict non-adherence, χ^2 (7, N = 148) = 3.12, p > .05. This hypothesis was not supported.

Secondary Research Hypothesis

$H_{1:}$ Adherence (initiation and completion) for HPV vaccination in eligible female Soldiers (i.e., less than 27 years old) is less than 50%. In the subsample of those Soldiers less than 27 years old, most women (26.4%) had initiated the HPV vaccination. This hypothesis was supported.

$H_{2:}$ HPV vaccination planned behavior (intent) in female Soldiers is less than cervical cancer screening planned behavior (intent). Over half the subsample less than 27 years old, 54.2%, reported that they were interested in the HPV vaccine and 54.0% reported that they would likely get the HPV vaccine in the following year. In the same subsample less than 27 years old, 84% reported that they planned to complete a screening exam for cervical cancer in the next year. This hypothesis was supported.

$H_{4a:}$ The healthcare provider and friends will provide the greatest encouragement and motivation to comply with HPV vaccination initiation and completion. Most of the participants reported the media, followed by the other family members, and the healthcare provider as the strongest salient other to encourage HPV vaccination, 50.0%, 46.4%, and 31.9%, respectively. In terms of adherence for the recommendations by the salient others, in the subsample less than 27 years old, the participants reported the strongest adherence with the recommendation made by the

healthcare provider, other family members and husband/boyfriend, 87.5%, 73.2%, and 68.1%, respectively. Within the paired Social Norm subscale constructs, participants indicated that the healthcare provider, other family members, and husband/boyfriend were the strongest influence for vaccine behavior. Therefore, this hypothesis was not supported.

H_{4b} The chain of command will provide the least encouragement and motivation to initiate and complete HPV vaccination. Participants reported the chain of command (17.4%), husband/boyfriend (27.5%), and friends (33.3%) as less likely to recommend HPV vaccination. Participants reported the lowest adherence to the recommendations by the media (11.1%), the Internet (11.1%), and friends (27.8%). Within the paired Social Norm subscale constructs, participants indicated that friends, the media, and the Internet were the weakest influence for vaccine behavior. Therefore, this hypothesis was not supported.

$H_{5:}$ Subjective norms, in particular the healthcare provider, predict more adherent behavior with HPV vaccination initiation and completion. When all the paired social norms were entered into a model, the model was significant to predict HPV vaccination past behavior. The healthcare provider made a significant unique contribution (B =.09, p .02, CI 1-1.29). Therefore, this hypothesis was supported.

Tertiary Hypothesis

$H_{6a:}$ Female Soldiers tend to over self-report their last cervical cancer screening exam.

Of the respondents who completed their last exam at an MTF and who reported knowing the date of their last cervical cancer screening exam (N = 132), 86.4% were able to correctly report their last exam within a period of two months. Therefore, Soldiers did not tend to over report their last cervical cancer screening exam. This hypothesis was not supported.

$H_{6b:}$ Female Soldiers tend to over self-report their last HPV vaccination. Of the respondents who initiated the HPV vaccine (N = 29), most (89.7%) reported their last vaccine at an MTF. However, most of the HPV vaccinations were not verified via the EMR, only 38.5% correctly reported their vaccine history as compared to the EMR. Of the 10 participants that over reported their vaccines, 90% were less than 27 years of age. Most participants reported completing the series, when the EMR had no HPV vaccine history recorded. Therefore, this sample of Soldiers did tend to over report their HPV vaccination history. This hypothesis was supported.

Summary of the Hypothesis Testing

The hypothesis testing for this sample illustrates a better understanding of the potential influences for female Soldiers towards health promotion behaviors. See Table 38 for a summary of the primary hypothesis testing and Table 39 for the secondary and tertiary hypothesis testing.

Table 38

Summary of Primary Hypothesis Testing

Hypothesis	**Concept: Cervical Cancer Screening**	**Supported**
H1	Past Behavior: Greater than *HP2010*	Yes
H2	Future Behavior: Greater than Army Regulation	No
H3	Positive Attitude towards screening	Yes
H4a H4b	HCP and CoC strongest Social Norm Media weakest Social Norm	No Yes
H5a H5b	Social Norms predict adherent behavior Attitudes predict non adherent behavior	No No

Table 39

Summary of Secondary and Tertiary Hypothesis Testing

Hypothesis	**Concept:** HPV Vaccination	**Supported**
H1	Adherence is less than 50%	Yes
H2	Vaccine intent is less than screening intent	Yes
H4a **H4b**	HCP and friends strongest Social Norm CoC weakest Social Norm	No No
H5a **H5b**	Social Norms predict adherent behavior Attitude predicts non adherent behavior	Yes No
Tertiary	**Concept:** Self-report	
H6a **H6b**	Over report previous screening Over report previous HPV vaccination	No Yes

Other Analysis

Content analysis was performed for the comments at the end of the survey. Content analysis serves to describe the frequency of words and phrases (Burns & Groves, 2005). The comments, and in some cases figures, were directly transcribed from the survey. Reoccurring themes and comments were quantified as either being positive,

neutral to positive, neutral, neutral to negative, and negative. The words and figures were then divided into comments and figures which conveyed a global meaning such as comfort, empathy, access. The global meanings were grouped into five categories to generate a context for the comments. The categories included Provider, Exam, System, Unit, and Free Association. Nearly all of the comments were directed towards the cervical cancer screening exam.

Most of the comments (97) were negative or neutral towards negative in nature, as compared to 62 positive or neutral to positive comments, and 8 comments were considered neutral. In some instances, the participant would report both positive and negative comments. Nearly two-thirds of all the participants made comments in the CCQMW. Comments were occasionally placed throughout the survey or on the RSSD. Those comments were included for analysis, unless they were directed at the question only.

Comments regarding the healthcare provider garnered the most comments, both positive and negative. Participants reported generally negative comments regarding the provider as not giving enough information about the procedure (6), or not providing empathy during the exam (5). Participants also reported that they felt the provider was "rushed" (4). Participants also reported directions from the healthcare provider as conflicting with Army Regulations (2). In the words of a participant with more than 20 years of experience as a Soldier, "Last time I scheduled my annual exam I was told [this] Clinic only does PAP's every 3 years. This conflicts with Army regs that say annual."

Participants (2) reported that the provider engaged in what they perceived to be inappropriate behavior, i.e. talking to them when their breasts were exposed. In the words of one participant, "But while he was talking to me my boobs were still exposed[sp]. I had to have the hospital gown on backwards. After that I felt violated."

In regards to the category Exam, discomfort was the most frequently appearing word 13 times, followed by pain (7), and negative feelings towards the speculum (i.e., cold and placement). Participants also reported frustration regarding the exam not yielding sufficient cells to complete the test, (4). Within the category System, access was a frequently appearing word associated with the negative comments. Participants reported that appointments were not available (10) or with a provider that they preferred, i.e., GYN, or female. Participants also reported a desire not to be seen by a Resident Physician, the Physician Assistant (PA) assigned to their unit, or a co-worker.

Other issues placed in the category System, included long waits in the clinic and not having STD testing. In the words of one participant,

> They would not screen for STDs, which upset me. They asked me to go to another place to do that. It was too inconvenient for me and for my chain of command. So, I remain unscreened for STD's since first joining 3 years ago.

The category Unit appeared in 11 negative comments regarding the participant's assigned unit or military place of work. Participants reported their unit as non supportive (3) or reluctance by the respondents or unit to take time away from their military work site (3). Privacy at the unit, as some units have the medical records maintained at their work site, was also an issue for participants to seek care. One participant stated, "If S1/Records

dept. isn't locked down, anyone can go in and access your medical records." Another participant commented regarding an annual exam revealing a STD, "Awesome that they found it and I was able to get treatment; however the command and my supervisors were notified." Finally, coworker comments were also indentified as a negative in the context of the Unit category. In the words of a participant, "Because the men know when you have to go they make fun and jokes about your 'baby maker' needing a check-up."

In terms of positive comments, the Provider category again had the most comments. Participant terms associated with the provider included professional (5), explained (4), and addressed other issues (3). Comments regarding the category Exam included quick (3) and without discomfort (3). Participants reported they preferred distraction during the exam (2) and also preferred the exam annually (2).

In terms of the category Unit, participants reported their unit as supportive (2). As described by one participant, "While deployed my mainly male unit made sure all of the females in support of them got the HPV vaccine." Participants (3) reported unit tracking mechanisms (i.e., MEDPRO's) in positive terms as well.

In the category Free Association, positive comments outnumbered negative comments. Positive comments included, "No problems[3]"; "No Issues[2]"; "Pretty good"; "Don't have a lot to complain about"; "Never had a bad experience[2]"; and "Not bad." Negative comments included statements such as, "I hate them"; "Sucks"; "Scary"; and "Not the most pleasant thing." Neutral comments included two participants that reported no experience with Paps. Other terms that were categorized as neutral included "Needs to get done[2]"; "What I expect"; and "Just like home."

Summary

During the course of this research, demographics and cervical cancer risk factors were collected and analyzed with descriptive statistics. Frequency data were reported to describe the ages, education, race/ethnicity, and marital status. Military relevant descriptive data was reported, which included rank, length in service, months of deployment, and gender of supervisor and commander. Participants completed a quantitative questionnaire while conducting business at the SSC, typically while seated in a waiting room. Data was entered in SPSS 16 and Microsoft Excel. The review of the EMR was conducted one week to 10 days following the respondent's completion of the RSSD. No statistical differences were noted between the questionnaires which were turned in at the SSC or mailed to the researcher.

The bulk of the data was collected via the CCQMW and generally took respondents less than 15 minutes to complete. The CCQMW included two scales, Attitudes and Social Norms, regarding cervical cancer and cervical cancer screening. Logistic regression was used to determine predominate attitudes and social norms for female Soldiers regarding cervical cancer and cervical cancer screening to predict past cervical cancer screening behavior. For the participants less than 27 years in age, an additional subscale for Social Norms regarding HPV vaccine recommendation was collected. Logistic regression was utilized to determine HPV vaccination behavior. In Chapter Five, a discussion of the scales and data will be provided.

CHAPTER V

Summary, Findings, and Conclusions

Introduction

The primary purpose of this study was to measure the relationship between attitudes and subjective norms regarding cervical cancer on a female Soldier's completion of a cervical cancer screening exam. The secondary purpose of this study was to measure the effect of subjective norms regarding HPV and intent for HPV vaccination on female Soldiers less than 27 years old for adherent behavior to complete HPV vaccination. The tertiary purpose of this study was to compare the Soldier's self-reported previous cervical cancer screening and HPV vaccination with their electronic medical record.

Problem

Following breast cancer, cervical cancer is the second most common cancer in the world (WHO, 2009). Although slightly more common for women in minority populations, in the U.S. cervical cancer is not considered one of the top ten cancers in women (CDC, 2009). With screening and treatment of precancerous cells, cervical cancer is a disease which can be prevented (Germar, 2004). Therefore, the greatest incidence and mortality related to cervical cancer is found in developing counties with less access to cervical cancer screening (Nene et al., 2007).

U.S. military service members receive their healthcare in an open access system at no cost. Screening for cervical cancer is required annually for all female Soldiers under Army regulations (Army Regulation [AR] 40-501, 2008). However, researchers have

determined that cervical cancer is the second most common cancer among military women (Yamane, 2006). Further, although screening is both available and mandatory, nearly one in five military women are non-adherent to annual cervical cancer screening (Thomson & Nielsen, 2006).

Service members are unique in terms of job requirements, personal risk, commitments, and social support systems. Within the military, women are a minority population within a male dominated, hierarchal culture. In the Army, women account for approximately 15.4% of the total force (Maxfield, 2008). Even though access is available within the military healthcare system and regulations prescribe annual screening, the increased incidence of cervical cancer among military women suggests an urgent need for nurses to understand and address gender specific health promoting activities. Within this complex population, researchers must consider the influence of unique factors, such as attitudes and subjective norms, which may influence a military women's adherence to health promoting behavior such as cervical cancer screening. No previous research on social norms and cervical cancer screening behavior in female Soldiers was found in a systematic review of the literature.

Conceptual Framework

Ajzen's and Fishbein's Theory of Reasoned Action (TRA) served as the conceptual framework for this study. Major components of the TRA include constructs of attitudes and subjective (social) norms which influence a person's intention and behavior. Measurement of attitudes included two subscales. The first, likelihood, measured a respondent's evaluation of the consequences of a given behavior (i.e.,

cervical cancer screening). The second, acceptability, measured a respondent's evaluation of that consequence for the same given behavior. The measurement of subjective norms also included two subscales. The first, recommendations, was a measurement of a respondent's perception of the extent to which a salient other (i.e., friend) supported the performance of a given behavior (i.e., annual cervical cancer screening or HPV vaccination). The second, adherence, was a measurement of the respondent's likelihood to complete the behavior that was recommended by the salient other. Attitudes and subjective norms were measured by means of semantic scales (i.e., a 7 point Likert scales) and the product of the subscale scores indicated the respondent's attitude and social norm for a given behavior.

Methodology

The quantitative instrument, the Cervical Cancer Questionnaire in Military Women (CCQMW), was constructed to measure the TRA components, Attitude and Social Norms, among female Soldiers with respect to cervical cancer screening and HPV vaccination behavior.

The following research hypotheses were proposed in the study:

$H_{1\,[P]}$ Adherence for cervical cancer screening in for female Soldiers is greater than

U. S. national goals set forth in *Healthy People 2010* (HP2010).

$H_{1[S]}$ Adherence (initiation and completion) to HPV vaccination in eligible female Soldiers (i.e., less than 27 years old) is less than 50%.

$H_{2\,[P]}$ Future planned behavior (intent) by female Soldiers for cervical cancer screening is greater than the *HP 2010* goals.

$H_{2[S]}$ HPV vaccination planned behavior (intent) in female Soldiers is less than cervical cancer screening planned behavior (intent).

$H_{3\,[P]}$ Female Soldiers will report generally positive attitudes (likelihood and acceptability) towards cervical cancer screening.

$H_{4[P]}$ The healthcare provider and chain of command provide the greatest encouragement and motivation to adhere to annual cervical cancer screening exams, while media provide the least motivation to comply with cervical cancer screening.

$H_{4[S]}$ The healthcare provider and peers will provide the greatest encouragement and motivation to comply with HPV vaccination initiation and completion, while the chain of command will provide the least encouragement and motivation to initiate and complete HPV vaccination.

$H_{5\,[P]}$ Subjective norms (in particular the healthcare provider) predict more adherent behavior with cervical cancer screening, attitude predicts non-adherent cervical cancer screening behavior.

$H_{5[S]}$ Subjective norms (in particular the healthcare provider) predict more adherent behavior with HPV vaccination initiation and completion, attitude predicts non-adherent HPV vaccination initiation and completion.

$H_{6\,[T]}$ Female Soldiers tend to over self-report their last cervical cancer screening exam and HPV vaccination.

Logistic regression analysis was utilized to predict the likelihood for female Soldiers to complete cervical cancer screening and HPV vaccination. A correlation matrix was completed to describe the relationship between study variables.

Findings

Logistic regression analysis identified no significant relationships between attitude and social norms for cervical cancer screening, including when the subscales for attitude and social norms, race/ethnicity, months deployed, rank, supervisor's gender, and future cervical cancer screening intention were entered into the analysis. Additionally, the paired constructs of the Attitude and Social Norms subscales did not demonstrate a significant relationship with cervical cancer screening.

Logistic regression analysis identified a significant relationship for the paired social norms constructs and HPV vaccination behavior. The healthcare provider made a uniquely significant contribution to the model. The strongest predictor for a respondent to initiate the HPV vaccine was the perceived social norm by the Soldier for HPV vaccination per the encouragement of a healthcare provider. Otherwise, logistic regression analysis identified no significant relationships between attitude and social norms for HPV vaccination, including when the subscales for attitude and social norms, race/ethnicity, months deployed, rank, supervisor's gender, and future HPV vaccination intention were entered into the analysis.

Discussion of Primary Hypotheses

Interpretation of findings from hypothesis testing are discussed below.

Primary Hypothesis One: Cervical Cancer Screening Adherence.

The first hypothesis stated that female Soldiers would have an adherence rate for cervical cancer screening greater than the Healthy People 2010 goals (i.e., 90% reporting at least one exam in the past three years and 97% reporting at least one exam in their lifetime). When using a combination of the self-report for civilian exams and review of the electronic medical record (EMR) for those exams in the military treatment facilities, 98.6% of the female Soldiers reported that they had received at least one screening cervical cancer exam in their lifetime, exceeding the 97% goal set by *HP 2010*. For women who had received an exam in the past three years, 100% of the sample reported a cervical cancer screening exam in previous three years, exceeding the HP 2010 goal of at least 90%. Based on these findings, primary H_1 was supported.

Although the respondents reported annual cervical cancer screening exams at higher rates than the HP 2010 goals, 18% of the respondents reported their last exam as occurring greater than the previous 12 months, indicating that they were not in compliance with the current Army Regulations (AR 40-501). In the comment portion of the CCQMW, respondents reported system access as limited and that they had received conflicting recommendations for future cervical cancer screening exams. Limitations to access included no appointment availability for preventive examinations such as Pap smears and/or with a provider that the respondent was uncomfortable seeing (i.e., a coworker).

Two respondents reported their healthcare provider had recommended their next exam in two to three years, most likely reflecting the latest recommendations by various agencies (i.e., American College of Obstetricians and Gynecologists, American Cancer Society, and Centers for Disease Control). These respondents also reported they recognized there was incongruence between the recommendations by the healthcare provider and the most current Army regulations. This disconnect is further compounded by the recent addition of cervical cancer screening mandates to the unit readiness report (Medical Protection System or MEDPROS). Using the data reported by MEDPROS, the chain of command may determine a female Soldier is out of compliance for their cervical cancer screening, although the healthcare provider indicates otherwise.

The finding that nearly one in five female Soldiers had not had a cervical cancer screening exam in the previous 12 months is nearly identical to the previous research by Thomson and Nielsen (2006) and Herberger (2000). The conflict between unit leadership and healthcare providers is also highlighted by Jennings, Loan, Heiner, Hemman, and Swanson (2005) in terms of military healthcare providers not fully understanding the healthcare needs for Soldiers and the role of unit leadership to determine healthcare outcomes as well. The Army regulation clearly states a requirement for annual cervical cancer screening. Yet, when instructed during a clinic visit that screening may be extended for 24 to 36 months, the Soldier is placed in a position of conflict with the chain of command.

Primary Hypothesis Two: Cervical Cancer Screening Intention.

The second hypothesis stated that future planned behavior (intent) by female Soldiers for cervical cancer screening would be greater than the HP 2010 goals. Although the HP 2010 goal is a cervical cancer screening exam at least every three years, the Army Regulation 40- 501 supersedes the HP 2010 goal and states female Soldiers should receive an exam every year. The future intent for an annual cervical cancer screening exam reported by female Soldiers was less than the HP 2010 goal of 90% screening for all women. Of the 139 women who answered the question, 84% reported that they planned to complete a screening exam in the next year, 3% were neutral, and 14% reported they were not planning on a cervical cancer screening exam in the next year. Therefore, when replacing the HP 2010 cervical cancer screening goal with Army regulations, this hypothesis was not supported.

During the development of this research study, the recommendation by several agencies evolved and annual requirement for cervical cancer screening was changed to every two to three years for some women. Therefore, this discrepancy in future planned behavior may be a reflection of those women who had been told by their healthcare providers that they no longer require an annual exam. However, in Herberger's (2000) study of a sample of mostly active duty personnel assigned to a large healthcare facility, 63% of the respondents reported future intent for a Pap in the following year in spite of an annual requirement mandated by the Army regulations. Importantly, a significant increase in future intent for cervical cancer screening among female Soldiers was demonstrated by this current study.

Primary Hypothesis Three: Cervical Cancer Screening Attitudes.

The third hypothesis stated that female Soldiers would report generally positive attitudes (likelihood and acceptability) towards cervical cancer screening. The sample of military women reported generally positive attitudes towards the likelihood and acceptability of cervical cancer associated with a screening exam. With a range of 15-105, the mean score for the Attitude subscale, likelihood was 58; the mean score for the acceptability subscale was 72, with a range of 14-98. Therefore this hypothesis was supported.

Dominant attitudes in this study for likelihood for cervical cancer screening included finding cancer that the provider could not see, being tested for cancer even when no symptoms were present, and being tested for HPV. Within the subscale acceptability for cervical cancer screening, dominant themes included testing for STDs, testing for HPV, and finding cancer a provider could not see. When summed, the multiplied scores for the paired constructs of likelihood and acceptability indicated the respondent's primary attitudes towards cervical cancer were, in order of frequency, finding cancer that the provider could not see; being tested for cancer even when no symptoms were present, and being tested for HPV. The scores for the paired attitude constructs with lowest summed values, indicating a perception of low likelihood and low acceptability, included that the Pap smear could lead to surgery that would change how someone would look, requires one to think about infertility, and that the Pap is inconvenient.

In contrast to previous studies, it would seem that female Soldiers were aware that cervical cancer screening involved testing for both cervical cancer and HPV. This is

fairly different than the interviews conducted by McMullin et al. (2005) and Mays et al. (2000), in which none or few respondents, respectively, indicated understanding the relationship between HPV, cervical cancer, and Pap smears. Additionally, this study is in direct contrast to the more recent qualitative study by Ackerman et al. (2008) which reported respondents reported generally negative feelings about their last Pap smear. Among the quantitative research studies that were reviewed, Jennings-Dozier (1999) reported that generally positive attitudes towards Pap smears were significantly correlated with a stronger intention for future cervical cancer screening.

The discrepancy between the previous qualitative work and this current study may be a result of the introduction of the HPV vaccine. The heightened awareness demonstrated by the respondents regarding cervical cancer as an asymptomatic sexually transmitted disease caused by HPV may be a result of the direct marketing advertising by the vaccine manufactures. The respondent comments in this study may also highlight the propensity for respondent comments to focus on comfort when describing the Pap smear. In the content analysis, the term “discomfort” or “pain” were the most frequently appearing words, recorded 13 and 7 times, respectively. However, when respondents were asked about the acceptability of Pap smear testing in terms of acceptability, unacceptable (scored as a 1), neutral (scored as a 4), and acceptable (scored as a 7), the mean score for discomfort was 5.2, indicating that most respondents reported the discomfort of a Pap test as generally acceptable. Therefore, although discomfort is common, most respondents found the discomfort acceptable which may not have been as

readily identifiable in the previous qualitative work or may reflect a striking difference in acceptability for Pap smears in military women.

Primary Hypothesis Four: Cervical Cancer Screening Social Norms.

The fourth hypothesis stated that female Soldiers would report the healthcare provider and chain of command as providing the greatest encouragement and motivation to adhere to annual cervical cancer screening exams, while the media will provide the least motivation to comply with cervical cancer screening. Most of the participants reported the healthcare provider (85%), followed by the media (60%), and other family members (55%) as the strongest salient others to encourage annual cervical cancer screening; while the least likely salient others to recommend an exam were the chain of command (47.7%) and the Internet (46.4%). In terms of adherence to the recommendations by the salient others, the sample reported the strongest adherence when the recommendation made by the healthcare provider (90%), other family members (65%), and the chain of command (60%); while adherence to recommendations by the media (13.2%), the Internet (13.8%), and friends (26.2%) were the lowest.

When the subscales for recommendations and adherence to the recommendations were paired, the sum of the scores indicated the strongest social norms to promote annual cervical cancer screening were healthcare providers, other family members, and chain of command. Therefore, although the perception by a respondent for the salient other to recommend an annual Pap smear may be lower (i.e., chain of command), when coupled with the respondent's motivation to adhere with the salient other's recommendation, the strongest social norm indicated the chain of command as a stronger influencing factor for

female Soldier cervical cancer screening intention as compared to a Soldier's husband/boyfriend, the media, friends, or the Internet.

The hypothesis regarding the healthcare provider and chain of command as the strongest proponent for screening was not supported as the healthcare provider and other family members were demonstrated the highest paired scores for screening recommendations and adherence. It was surprising that other family members were identified by the respondents. The respondents did not indicate which other family members encouraged screening behaviors. However, Choa, Slezak, Coleman, and Jacobson (2009) indicated that mothers who had a history of routine Pap smears were more likely to have their daughters vaccinated against HPV. Thus, a mother's behavior regarding cervical cancer screening may also influence a daughters screening behavior.

Prior research has determined that healthcare providers are a primary source for recommending and promoting routine cervical cancer screening (Ackerson et al., 2008). The positive role of the healthcare provider is more pronounced in the literature regarding HPV vaccination, as Casey et al. (2009) reported 80% of respondents indicated likelihood for future vaccination when it was promoted by a healthcare provider.

To this researcher's knowledge, this is the first study which measured the influence of the chain of command for gender specific healthcare needs in military women. Cervical cancer screening is tracked via MEDPROS. Given this mandate, the military chain of command has an interest in such screening due to its impact on unit medical readiness for deployment. Therefore, female Soldiers' exam status can result in a unit being classified as non-mission or non-deployment capable. The discrepancy by

the chain of command recommending and motivating female Soldiers less than family members may be inadvertently caused the healthcare provider indicating a different schedule for future screening contrary to the Army regulations and previous national screening recommendations, as described in Hypothesis Two.

In contrast, although the media had a higher impact in terms of recommendations for screening, the Internet received the lowest summed score for cervical cancer screening recommendations and motivation among the female Soldier respondents. Therefore, this hypothesis was not supported. This finding among military women is concerning as Bull, Phibbs, Watson, and McFarlane (2007) research with focus groups among women ages 15 to 24 years of age, reported most of the participants indicating a willing to use the Internet to receive education regarding condom use and STI/pregnancy prevention information. Thus, although women may receive education regarding health promotion topics such as cervical cancer screening, the Internet may do little to motivate the women to engage in health promotion behaviors.

Primary Hypothesis Five: Predicting Cervical Cancer Screening.

The fifth hypothesis stated that female Soldier cervical cancer behavior would be predicted by Social Norms and Attitudes. However, when entered into a logistic regression model, none of the salient others demonstrated a significant ability to predict cervical cancer screening behavior among the female Soldiers, χ^2 (7, N = 148) 3.12, p>. 05.; nor could Attitudes predict non-adherence, χ^2 (7, N = 148) = 3.12, p > .05. This hypothesis was not supported.

Difficulty in predicting adherence to cervical cancer screening behavior has been described in the literature by the meta-analysis conducted by Forbes et al. (2007). Ingledue et al. (2004) reported low knowledge of HPV and low perceived risk for HPV as correlates for reduced screening behavior. However, in a population of nursing students, Denny-Smith et al. (2006) reported no correlation between screening behavior and knowledge, although low perceived risk did correlate with less screening behavior. In contrast, Duffett-Leger (2008) reported social norms as significantly impacting a younger woman's self-reported likelihood for future intent for cervical cancer screening.

To the researcher's knowledge, this was the first inclusion of the chain of command in terms of gender and healthcare recommendation as correlates of cancer screening behavior in military women. Possible explanations for nonsignificance may include unknown confounders for female Soldier behaviors not measured by the instrument. Difficulty with access was frequently reported by respondents in the content analysis; however access was not measured in the quantitative analysis. It is possible that a Soldier may not complete screening or avoid screening due to other factors that were not assessed by the instrument.

Discussion of Secondary Research Hypothesis

Secondary Hypothesis One: HPV Vaccine Adherence.

The first hypothesis stated that eligible female Soldiers (those less than 27 years of age) would have an adherence rate (initiation and completion) for HPV vaccination that was less than 50%. In the sample of those Soldiers less than 27 years old, 26% had

initiated the HPV vaccination and 11% had completed the HPV vaccine series. This hypothesis was supported.

In light of the number of risk factors for cervical cancer that this sample reported, the limited number of female Soldiers who initiated or completed HPV vaccination indicates an area for greater understanding and intervention among military healthcare providers. In the current literature, vaccination rates for HPV are primarily reported for women ages 13 to 17 years of age or ages 13 to 26 years of age. In U.S. women ages 13-17 years old, approximately 37% have been vaccinated and 18% have completed the HPV series (CDC, 2009). In a study by Caskey et al. (2009) which included self-reports of women ages 13 to 26 years of age, 30% reported initiating the vaccine. However, the vaccination rate for the women ages 18 to 26 years of age, the age of most female Soldiers, was not reported by Caskey et al.

Research was conducted at large military healthcare facility with the women ages 13 to 17 years of age by Barry-Caban and Buenaventura (2009). Barry-Caban and Buenaventura found that that only 23% of respondents had started the HPV series and within this group, only 26% had completed the series (2009).

In summary, this current body of research suggests the rate of vaccination for women in the catch up period, ages 18 to 26 years of age, averages as one in four women. Further, this research indicates that female Soldiers have HPV vaccination rates substantially lower than the national averages for younger women who are vaccine eligible. Current research supports the benefit for HPV vaccination in women less than 27 years of age (ACIP, 2009; Goldhaber et al., 2008), therefore an effort understand and

remove the barriers for female Soldiers to receive the vaccine must garner greater attention in the military healthcare community.

Secondary Hypothesis Two: HPV Vaccination Intent.

The second hypothesis stated that female Soldiers would have lower planned behavior (intent) for HPV vaccination than cervical cancer screening. Among the female Soldiers less than 27 years old, 54.0% reported that they would likely get the HPV vaccine in the following year and 84% reported that they planned to complete a screening exam for cervical cancer in the next year. This hypothesis was supported.

Intention for the HPV vaccine has been reported in the literature as between 65% (Gerend & Maglorie, 2008) and 80% (Caskey et al., 2009). However, Caskey and colleagues reported less intent for future vaccination (55%) when a participant was encouraged by a friend rather than by a healthcare provider. In terms of discontinuation of cervical cancer screening after vaccination, 95% of the respondents in Caskey's study reported understanding the need for continued cervical cancer surveillance via Pap smears after completing vaccination.

Reluctance to initiate or complete the HPV vaccine may be as a result of women underestimating their personal risk for HPV. Multiple studies have indicated that women underestimate their risk for HPV acquisition (Denny-Smith et al., 2006; Ingledue et al., 2004; Gerend & Maglorie, 2008; Sandfort & Pleasant, 2009). In a sample of women who had been previously treated for cervical cancer, 64% reported that cervical cancer was not preventable and 81% did not identify HPV as the primary risk factor for cervical cancer (Stark et al., 2008).

Secondary Hypothesis Three: HPV Vaccination Social Norms.

The third hypothesis stated that female Soldiers would receive the greatest encouragement and motivation for HPV vaccination initiation and completion from healthcare providers and peers, while the chain of command would provide the least encouragement and motivation to initiate and complete HPV vaccination. The female Soldiers reported that the greatest encouragement for vaccination originated from the media, followed by family members, and healthcare providers; those least likely to recommend vaccination were the chain of command and husband/boyfriend. However, in contrast to the social norm for encouraging vaccination, the healthcare provider, other family members, and husband/boyfriend were reported by the Soldier as providing strongest motivation for HPV vaccination. The Soldiers reported the least likelihood to adhere to the advice of the media, the Internet, and friends.

When paired in terms of respondent reporting a perception of encouragement by a salient other and level of respondent motivation to adhere to the salient other's encouragement, the healthcare provider, other family members, and husband/boyfriend were identified as the strongest influence for vaccine behavior and media and Internet were described as the weakest. Therefore, this hypothesis was not supported. Although the healthcare provider recommended and encouraged the vaccine, friends were not identified as a strong influence as hypothesized. However, the chain of command was found to be a stronger influence than the media and Internet for HPV vaccination.

The finding that healthcare providers were a powerful influence on vaccination behavior is similar to the results obtained by Caseky et al. (2009). When including social

norms regarding other cancer screening behaviors among women, i.e. mammography, Allen et al. (2008) and Rutledge et al. (2001) also identified the healthcare provider as a strong advocate for screening behaviors. Allen and colleagues (2008) reported peers were quite influential in terms of HPV vaccine acceptance. However, in this study, friends were not identified by the female Soldiers as a strong determinant for initiation or completion of the HPV vaccine.

Secondary Hypothesis Four: Predicting HPV Vaccination Behavior.

The fourth hypothesis stated that female Soldier's subjective norms, in particular the healthcare provider, would predict more adherent HPV vaccination. When all the paired social norms and attitudes were entered into a model, the social norm model was significant to predict HPV vaccination past behavior. The healthcare provider made a significant unique contribution (B =.09, p .02, CI 1-1.29). Therefore, this hypothesis was supported.

As stated previously, several studies have identified the healthcare provider as the strongest promoter of HPV vaccination. However, research by Gerend and Maglorie (2008) was unable to determine a significant predictor for HPV vaccine behavior. Based on participant self-report, Caskey et al. (2009) determined that those who completed the vaccine had received information about the HPV vaccine from their healthcare provider. Allen et al. (2009) reported social norms as predictive of future vaccine intent rather than actual vaccine behavior.

Tertiary Hypothesis

The final hypothesis stated that female Soldiers would tend to over self-report their last cervical cancer screening exam and HPV vaccination. Of the respondents who completed their last exam at a MTF and who reported knowing the date of their last cervical cancer screening exam, 86% were able to correctly report their last exam within a period of two months before or after the actual date of their last exam. However, 11% respondents reported that they were not sure of their last exam.

Of the respondents who initiated the HPV vaccine, 90% reported their last vaccine at a MTF. However, only 39% of the HPV vaccinations were verified in the EMR. Most respondents who reported a vaccine history reported completing the series, although no history of any HPV vaccine was recorded in the EMR. Therefore, Soldiers did not tend to over report their last cervical cancer screening exam, however they did tend to over report their HPV vaccination history. Therefore, the hypothesis regarding cervical cancer screening was not supported. The hypothesis for Soldiers to over-report vaccination was supported.

The tendency to over report screening exams has been noted in the literature (Champion et al., 1998; Johnson et al., 2005; Trio et al., 2005; Vernon et al., 2004). Champion and colleagues reported between 49-60% of previous mammograms could be verified, while Johnson reported 25% Pap smears could not be verified. In younger populations, with a shorter lifetime history of consecutive cervical cancer screening exams, Kahn et al. (2000) reported 14% of the self-reported Pap smears as not verifiable in the medical record. Therefore, congruent with prior research in a population of

younger women, this finding regarding Pap smear self-reporting in female Soldiers is consistent with previous literature.

The literature regarding self report of vaccine history is limited to parental recall of child immunizations. However, Suarez, Simpson and Smith (1997) reported parents had difficulty remembering vaccines which have a need for repeated administration (i.e., diphtheria, tetanus, and pertussis vaccine). These investigators reported one-third of parents could accurately recall the number, while one-fourth overestimated the number of injections their child had received. A more recent study by Czaja, Crossette, and Matley (2004) reported agreement between parental self-report and pneumococcal vaccination in children less than 3 years of age as 59%.

To the author's knowledge, no research regarding self-report accuracy of HPV vaccination in a young adult population has been published. The discrepancy in female Soldiers over reporting HPV vaccination may be as a result of the Soldiers assuming that they have received the vaccine during basic military training when they normally receive other mandatory vaccines such as influenza, polio, meningococcal, measles, mumps, and rubella vaccines.

Additional findings

Most of the sample reported they were subordinate to male supervisors (68%) and commanders (66%). This finding supports previous literature regarding a propensity for military women to work in a male dominated hierarchy (Hopkins-Chadwick, 2006). Interestingly, although women represent 15% of the total active duty force, nearly one-

third of the sample of female Soldiers reported having a female supervisor and/or commander.

Most of the female Soldiers (63%) reported that they did not tend to forget to schedule their cervical cancer screening exam. Among the sample, 60% reported using Army Knowledge Online (AKO) as a reminder for their next Pap smear. However, one respondent reported that AKO was not updated in a timely manner. Since significant numbers of women do seem to be using the AKO system to ensure screening compliance, future research on improving this system may be warranted.

Most of the sample reported interest in self-testing for cervical cancer (68%) and STDs (73%). A device for testing for HPV via use of a self-collected dry vaginal swab has been developed and tested with military women and found to an acceptable alternative (Shah et al., 2001). Shah et al. (2001) reported the self-collected cervical swabs had nearly 100% sensitivity for SIL detection, indicating an ideal alternative to pelvic exam. Rose, Lawton, Bromhead, MacDonald, and Lund (2007) reported a sample of New Zealand women under the age of 24 years (N = 283) were significantly more interested in self collection than clinician collected swabs for Chlamydia screening. Rose and colleagues (2007) reported that self-collected swabs were both acceptable to the women and accurate. Additionally, they noted the self-collected swabs did not require cold storage and therefore could be utilized by women in remote locations.

The finding regarding willingness of female Soldiers to utilize self-collection techniques may address the concerns by respondents noted in the content analysis. Self-collection may enable more women to consider other healthcare providers previously

identified as unacceptable (i.e. a male provider) for their gender specific needs. Additionally, these self collected devises may allow female Soldiers to complete screening in remote locations.

Significance and Nursing Implications

Fostering health promotion and disease prevention are important to those who provide health care. In the military health care system, nurses, in their roles as administrators and clinicians, are at the forefront of health promoting activities for Soldiers that include gender specific activities such as cervical cancer screening and HPV vaccination.

The overarching goals of this research endeavor included: (a) increasing military healthcare provider knowledge regarding military women's attitudes and normative beliefs for cervical cancer screening and HPV vaccination, and (b) enabling healthcare providers to address the best risk reduction methods for cervical cancer for female Soldiers by understanding those attitudes and social norms which best predicting behavior.

Female Soldier attitudes were generally positive towards cervical cancer screening. Predominant attitudes included testing for cancer that the provider could not see and testing for an asymptomatic sexually transmitted infection, such as HPV. Social Norms, in particular the advice and encouragement of the healthcare provider, were identified by female Soldiers as inducing the greatest motivation to comply with cervical cancer screening and vaccination. Nurses should be proactive in engaging Soldiers and providers in discussions regarding health promotion in the military healthcare setting.

However, within the context of content analysis, it would seem that access to a desired clinician to receive gender specific healthcare in the military setting is lacking for some female Soldiers. Nurses, as both administrators and clinicians, should monitor gender specific healthcare requirements and ensure that female Soldiers have access to providers with the skills to provide adequate care to female Soldiers. Further, although several Internet and media sources (i.e., centers for disease control and Armed Forces Network) provide health promotion information for Soldiers, female Soldier health promotion behavior was not strongly influenced.

In terms of vaccination, a significant portion of variance was explained via the social norms perceived by the female Soldiers. The nurse should be cognizant that nearly every Soldier had at least one risk factor for cervical cancer. Cervical cancer is a preventable disease and healthcare providers should capitalize on every patient encounter to explain the benefits of completing HPV vaccination and continuing cervical cancer screening. Discussion of health promotion activities for preventing and detecting cancer should not be limited to just a well woman exam. Risk reduction strategies for HPV and cervical cancer should be reviewed during every patient encounter, with both male and female Soldiers. For women less than 27 years of age, HPV vaccination should be discussed and encouraged. In light of the discrepancies in self-reporting, nurses and all clinicians should be hesitant to fully depend on self-report by Soldiers as to previous screening and immunization behavior.

While this research supports the predominant role of healthcare providers, it also serves to caution healthcare providers. In terms of behavior, one in five Soldiers remain

non-adherent to the Army regulation for annual cervical cancer screening. Many Soldiers who would benefit from the HPV vaccination are failing to initiate or complete the vaccine series. Among administrators, research regarding barriers for vaccination may need to be recognized and addressed. Clinical training for medics, nurses, advanced practice nurses, physician assistants, and physicians should focus message framing for HPV vaccination risk and benefits. Training should also include developing a greater understanding for the multiple risk factors a majority of female Soldiers may have for cervical cancer.

Although the national guidelines have changed, advice on extending repeat testing without regard to the current annual Army regulation places the Soldier in conflict with their unit. Finally, clinicians may also recognize attitudes, such as beliefs regarding fertility and Pap smears, and address those misconceptions prior to and during cervical cancer screening exams. This research supports including additional salient others in efforts to develop health promotion throughout the military community. Although the healthcare provider generally has more impact on these healthcare decisions, other family members and the chain of command provide substantial encouragement and motivation for cervical cancer screening among female Soldiers and should be included in health promotion activities. Finally, it is important that nurses and other clinicians recognize that the media and the Internet also provide information, but may or may not drive cancer screening and HPV vaccination behaviors of patients.

Limitations and Recommendation for Future Research

There were a number of limitations identified in this study. Although the sample of female Soldiers was recruited outside of a hospital setting, the sample was limited to women that were willing and had the time to complete the questionnaire. Validation of respondent answers was limited to the portion of respondents who completed the qualitative portion of the research.

Due to the increased operational requirements at this particular site, generalization to all female Soldiers may be limited. Further, this sample only included active duty women serving in the Army. Therefore, caution should also be used when generalizing the findings to other service members (i.e., female Airmen and Sailors) or to women who are Reservist/National Guard members.

The constructs of the Theory of Reasoned Action may not adequately address unique female Soldier attitudes, social norms, and behaviors. However, the use TRA was supported in this research effort as a model to build future research efforts in female service members. Future research may select the Theory of Reasoned Action and Planned Behavior which affords a greater number of influences required to adequately predict behavior.

Recommendations for future research include testing and implementing interventional programs to increase Soldier cervical cancer screening and HPV vaccination. Implementation research should include the influence of the Soldiers, their chain of command, administrators, and healthcare providers. The TRA may be utilized to access healthcare provider attitudes and social norms regarding cervical cancer screening

and HPV vaccination among military women. Further, future research may seek to determine which healthcare provider, i.e. medic, nurse, or physicians, that influence female Soldier behavior the most to develop targeted clinical education.

A replication of this study should be considered with a mixed approach to further evaluate gender specific healthcare barriers in the military healthcare setting. Additionally, research on factors that encourage Soldier access to the AKO alerting system is advised. Finally, as Gardasil has recently been authorized in males, additional research should include evaluating the attitudes and social norms for male Soldiers regarding HPV and HPV vaccination.

Conclusion

This chapter presented a summary of the findings for this study and a comparison of the present findings to existing research on cervical cancer screening behavior and HPV vaccination. Additionally, this chapter describes the limitations of this effort, potential future research, and suggests implications for nursing practice, education, and theory. By gaining a greater understanding of the determinants for health seeking behaviors in female soldiers, future targeted evidence-based interventional strategies can confidently be developed by nurses to bolster healthcare seeking in this population and potentially reduce their overall incidence of cervical cancer.

Appendix A

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2175 REILLY ROAD, STOP A
FORT BRAGG, NORTH CAROLINA 28310

REPLY TO
ATTENTION OF:

06 NOV 2008

IMSE-BRG-ZA

MEMORANDUM FOR Commander, Womack Army Medical Center, Department of Research, Fort Bragg, North Carolina 28310

SUBJECT: Letter of Authorization

1. Request for authorization to conduct survey, Understanding Cervical Cancer Screening Delay in Female Soldiers at the Soldier Support center Bldg 4-2843 is approved.

2. Point of Contact is Major Meryia D. Throop, Family Nurse Practitioner, (202) 510-0032, Meryia.throop@us.army.mil. Catholic University of America, School of Nursing.

DAVID G. FOX
COL, SF
Garrison Commander

Appendix B

Appendix B Verbal Invitation and Consent Script

After the Vaccine: Cervical Cancer Screening in Military Women
Approach and Consent Script

1. Approach Script

Good morning/afternoon. Do you happen to be an active duty or activated soldier?
[No]: I am sorry, but I am looking for active duty women to complete a questionnaire.
[Yes- Activated NG/Reservist]: Ok- have you been activated more than 11 months?
[No-]: I am sorry, but I am looking for activated solider with greater than 11 months to complete a questionnaire.
[Yes]: I am inviting military women to fill out a questionnaire while they seated in the waiting rooms at the Soldier Support Center about their attitudes regarding cervical cancer and the Human Papillomavirus (HPV) vaccine. This questionnaire is completely voluntary and would take about 10-15 minutes of your time today. If you are interested, I have a flyer that explains a little more about the study (PI provides Invitational flyer).
[No]: No problem, would you like a handout on Cervical Cancer before you leave?
[Interested, but not right now]: No problem, if you would like to talk to me or have any questions about this study, please stop by to see me here at the Front Desk. I will be here today and on _____. Thank you for letting me talk to you about my study."
[Yes]: To describe the study in a more private area, I have an office in the Medical One Stop Office which is right down the stairs.

2. Consent Script
After reading the flyer do you have any questions?
Along with a handout regarding cervical cancer, I have a more detailed information sheet on my study and my phone number if you have any questions or concerns later. Because I am not a staff nurse at Womack Army Medical Center, I can not answer any specific questions about your healthcare, but if you have any questions about the study you can call me directly.
I have 2 forms to review with you: the written consent for the study and the Womack HIPAA form. You will get a copy of each today. If you like I can read it for you. The consent is the risk and benefits associated with this study and the HIPPA form describes exactly who look at your survey results.

Some keep points:

a. This is a research study about Army women's attitudes about cervical cancer and what they report as their behavior towards screening and HPV vaccination.

b. It is completely voluntary questionnaire and study. I will not share your answers with your supervisor or chain of command.

c. Today I will ask you for your name and last 4 of your social security number attached to the last page of the consent form (Called the "Removable Section on Sensitive Data"). This page provides information for me to conduct a limited chart review of your last pap result and vaccination record and also to contact you if the results are different from what you write down. However, only I will know the number that links your answers on this form to your survey.

d. After I complete the chart review, usually every Thursday afternoon, with a nurse (Melonie Quander) from Womack Army Medical Center, I will send you a letter to confirm your cervical cancer screening exam (pap smear). If the date is greater than 2 months different than what you reported, I will send you a letter and also call you to let you know by next Thursday.

e. If your results are abnormal I will call you. If you do not have a follow up plan Nurse Quander and I will help you set up a follow up appointment and we also send a letter to your healthcare provider to let them know that we are assisting you with a follow up appointment and they will know to anticipate your appointment.

f. Immediately after the chart review, I will destroy the portion of the consent with you social security number, contact information, and your reported last pap/HPV vaccine results. Only I will be able to link your name with your survey, by the assigned protocol number at the top of the consent form, envelope, and survey. After I destroy the private information, your name and survey number will be known by me and will not be linked in another way and not shared with anyone.

g. Please do not place your name, unit, or phone number on the questionnaire.

h. Some questionnaire may make you feel uncomfortable and you may leave questions blank.

i. Participants will not receive money to complete the questionnaire, however as a benefit for completing the study I will send you a reminder letter about your next cervical cancer exam and next vaccination (if you are due). Even if you do not complete the survey I will give you an informational handout on cervical cancer, as well as pen.

Once again thank you for your time, let's review the consent and all of the paperwork. The actual survey is 64 questions and the Removable Sensitive Data Section is only 7 questions.

Appendix C

Invitational flyer "After The Vaccine: Cervical Cancer Screening in Army Women" Study

Are you interested in participating in a study to help nurses gain a better understanding of why women serving in the Army complete screening and vaccination against cervical cancer?

Hello, my name is Meryia Throop.
I am an Army Nurse and currently working on my doctorate degree at Catholic University of America. I am conducting a study to better understand what Army women believe about cervical cancer screening and Human Papillomavirus vaccination in their military healthcare clinics. By completing this questionnaire you will help nurses, doctors, and administrative personnel understand the best way we can help Army women complete yearly screening and complete the HPV vaccination.

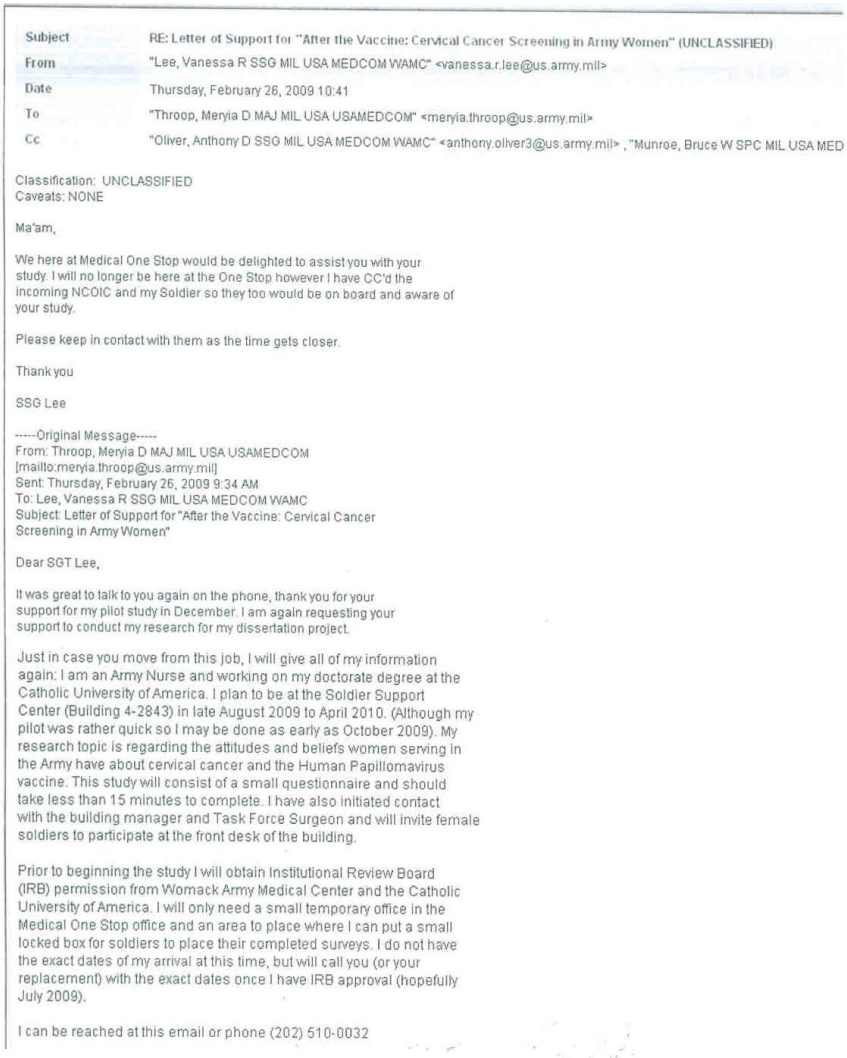
Who? *Any Active duty (or activated Reservist /National Guard greater than 11 months) women that are still required to get a cervical cancer screening exam ("pap smear test")*

What do you do? *Complete a questionnaire asking questions about what you know and feel about cervical cancer and human papillomaviruses (HPV). I am also interested in the dates and results of your last pap exam (for all women) and vaccination (for women under the age of 27 years old).*

Time Required? *About 15 minutes.* **When and Where?** *Here and Today!*

You should also know: *Your participation in this study is completely voluntary*. *I will not ask about your unit and none of your answers will be shared with your Chain of Command or your supervisors. If any of the questions make you feel uncomfortable you can leave that question blank.*
With your permission, on a separate paper I will also ask for your name and last 4 of your social security number to review only your vaccination record and last pap exam in your computerized medical record. As a benefit for participating in the study, I send you a letter confirming your last exam. [If the date you report is incorrect by greater than 2 months I will send you a letter and also call you to you know.] After I contact you I will destroy the paper with you social security number and personal information.

Appendix D



Subject	RE: Letter of Support for "After the Vaccine: Cervical Cancer Screening in Army Women" (UNCLASSIFIED)
From	"Lee, Vanessa R SSG MIL USA MEDCOM WAMC" <vanessa.r.lee@us.army.mil>
Date	Thursday, February 26, 2009 10:41
To	"Throop, Meryia D MAJ MIL USA USAMEDCOM" <meryia.throop@us.army.mil>
Cc	"Oliver, Anthony D SSG MIL USA MEDCOM WAMC" <anthony.oliver3@us.army.mil> , "Munroe, Bruce W SPC MIL USA MED

Classification: UNCLASSIFIED
Caveats: NONE

Ma'am,

We here at Medical One Stop would be delighted to assist you with your study. I will no longer be here at the One Stop however I have CC'd the incoming NCOIC and my Soldier so they too would be on board and aware of your study.

Please keep in contact with them as the time gets closer.

Thank you

SSG Lee

-----Original Message-----
From: Throop, Meryia D MAJ MIL USA USAMEDCOM
[mailto:meryia.throop@us.army.mil]
Sent: Thursday, February 26, 2009 9:34 AM
To: Lee, Vanessa R SSG MIL USA MEDCOM WAMC
Subject: Letter of Support for "After the Vaccine: Cervical Cancer Screening in Army Women"

Dear SGT Lee,

It was great to talk to you again on the phone, thank you for your support for my pilot study in December. I am again requesting your support to conduct my research for my dissertation project.

Just in case you move from this job, I will give all of my information again: I am an Army Nurse and working on my doctorate degree at the Catholic University of America. I plan to be at the Soldier Support Center (Building 4-2843) in late August 2009 to April 2010. (Although my pilot was rather quick so I may be done as early as October 2009). My research topic is regarding the attitudes and beliefs women serving in the Army have about cervical cancer and the Human Papillomavirus vaccine. This study will consist of a small questionnaire and should take less than 15 minutes to complete. I have also initiated contact with the building manager and Task Force Surgeon and will invite female soldiers to participate at the front desk of the building.

Prior to beginning the study I will obtain Institutional Review Board (IRB) permission from Womack Army Medical Center and the Catholic University of America. I will only need a small temporary office in the Medical One Stop office and an area to place where I can put a small locked box for soldiers to place their completed surveys. I do not have the exact dates of my arrival at this time, but will call you (or your replacement) with the exact dates once I have IRB approval (hopefully July 2009).

I can be reached at this email or phone (202) 510-0032

Again, thank you for your time and interest in this matter.

Sincerely,
MAJ Meryia D. Throop, AN
Family Nurse Practitioner
Classification: UNCLASSIFIED
Caveats: NONE

Appendix E

MCXC-DH 25 February 2009

MEMORANDUM FOR Department of Research, Womack Army Medical Center, Fort Bragg, NC 28310

SUBJECT: General Impact Statement Regarding Study Protocol: After the Vaccine: Cervical Cancer Screening in Army Women

1. Principal Investigator Name, Title, Department, Phone Number and email address.
Meryia D. Throop, FNP, AN Catholic University of America, School of Nursing, (202) 510-0032/0031
meryia.throop@us.army.mil

2. No assistance is required for the support of this research protocol.

3. Total number of participants to be studied: 200

4. Number of participants per month: 60

5. Length of study: 4 months

6. Decision of Department Chief regarding supporting this research protocol:

- ○ Disapproved, cannot support activity
- ✓ Approved, no comment
- ○ Approved with comment

ROBERT F. MALSBY, III
MAJ, MC
Chief, Department of Deployment Health

Appendix F

VOLUNTEER AGREEMENT AFFIDAVIT

For use of this form, see AR 70-25 or AR 40-38; the proponent agency is OTSG

PRIVACY ACT OF 1974

Authority:	10 USC 3013, 44 USC 3101 and 10 USC 1071-1087
Principal Purpose:	To document voluntary participation in the Clinical Investigation and Research Program. SSN and home address will be used for identification and locating purposes.
Routine Uses:	The SSN and home address will be used for identification and locating purposes. Information derived from the study will be used to document the study; implementation of medical programs, teaching, adjudication of claims, and for the mandatory reporting of medical condition as required by law. Information may be furnished to Federal, State and local agencies.
Disclosure:	The furnishing of your SSN and home address is mandatory and necessary to provide identification and to contact you if future information indicates that your health may be adversely affected. Failure to provide the information may preclude your voluntary participation in this investigational study.

PART A - VOLUNTEER AFFIDAVIT

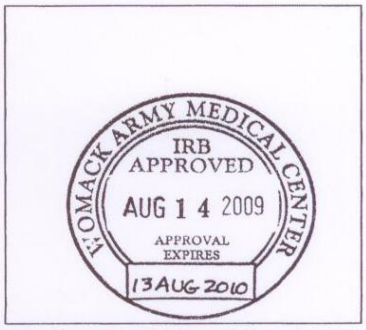
Volunteer Subjects in Approved Department of the Army Research Studies

Volunteers under the provisions of AR 40 38 and AR 70 25 are authorized all necessary medical care for injury or disease which is the proximate result of their participation in such studies.

I, _____ having full capacity to consent and having attained my _____ birthday, do hereby volunteer to participate in the research protocol **After the Vaccine: Cervical Cancer Screening in Army Women** under the direction of Meryia D. Throop, Family Nurse Practitioner, Associate Principle Investigator and Melonie Quander, Registered Nurse, Principle Investigator, conducted at Womack Army Medical Center.

The implications of my voluntary participation; the nature, duration and purpose of the research study; the methods and means by which it is to be conducted; and the inconveniences and hazards that may reasonably be expected have been explained to me by Meryia Throop.

I have been given an opportunity to ask questions concerning this investigational study. Any such questions were answered to my full and complete satisfaction. **Should any further questions arise concerning my rights on study related injury I may contact the Center Judge Advocate at Womack Army Medical Center, (910) 907-8579, or Sponsored Programs at Catholic University of America, (202) 319-5218, or Dissertation Chair, Patricia McMullen, PhD, JD, CRNP, Catholic University of America, (202) 319-5252 .**



I understand that I may at any time during the course of this study revoke my consent and withdraw from the study without further penalty or loss of benefits; however, I may be required (military volunteer) or requested (civilian volunteer) to undergo certain examinations if, in the opinion of the attending physician, such examinations are necessary for my health and well being. My refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled.

PART B - EXPLANATION OF WHAT IS TO BE DONE

INTRODUCTION: You have been invited to participate in a research study conducted at Womack Army Medical Center because you are a woman serving in the United States Army. We hope to learn what influences you to make decisions regarding your healthcare, especially about cervical cancer screening (more commonly know as the "Pap smear") and the Human Papillomavirus (HPV) vaccination. By understanding a military woman's attitudes about healthcare we hope to understand why some soldiers may avoid getting annual cervical cancer screening exams, and in women under the age of 27 years old, the HPV vaccination. We hope to use this information to understand the best ways to help Army women complete cervical screening and for women under the age of the 27 years old, the HPV vaccination. Up to 210 participants may enroll in this study. Participation is entirely voluntary. You may refuse to participate or withdraw from the study at any time without penalty or loss of benefits to which you are otherwise entitled.

PURPOSE: The purpose of this study is to 1) Understand the attitudes that women serving in the Army have about cervical cancer, 2) Understand what influences women serving in the Army to complete cervical cancer screening and HPV vaccination, 3) Which attitudes or influences are the strongest to predict women in the Army completing cervical cancer screening and HPV vaccination, and 4) Compare what women serving in the Army report as their last cervical cancer screening and vaccination, with the date and results in their electronic medical records. Meryia Throop, the Associate Principle Investigator, is a Family Nurse Practitioner conducting this study as part of her doctoral studies in nursing science at the Catholic University of America School of Nursing in Washington, DC. Melonie Quander, the Principle Investigator, is a Registered Nurse and works at Womack Army Medical Center.

PROCEDURES: Today you will be asked to complete the survey, Cervical Cancer Questionnaire in Military Women by Meryia Throop, the Associate Principle Investigator. This survey asks questions about your personal attitudes regarding cervical cancer and HPV, influences for you to complete cervical cancer screening and/or HPV vaccination, and a few questions about your sexual behavior. Attached to the last page of this consent is the Removable Section for Sensitive Data, where you will be asked to provide personal information such as your name, last 4 of your social security number, a phone number where Meryia Throop can reach you (or email if you prefer), date (month and year) of the results of your last pap, and any follow up plan if you have had an abnormal cervical cancer screening exam. If you are less than 29 years old, Meryia Throop will also ask the date (month and year) of you last HPV vaccine.

The Removable Section for Sensitive Data is a single detachable page that is the only link (by a unique number assigned by Meryia Throop, the Associate Principle Investigator) between your personal information (i.e., name and last four of your social security number) and the Cervical Cancer Questionnaire for Military Women. Meryia Throop will be the only person in the study that will know your unique number that can be traced back to you. Based on the information you provide on the Removable Section for Sensitive Data, Meryia Throop and Melonie Quander, the Principle Investigator, will review the date and results of your last pap smear test, and if under 29 years old, your HPV vaccination record. If your results are abnormal and you do not have a follow up plan in place, Meryia Throop and/or Melonie Quander will also identify and contact you and your primary care manager (PCM), to review the abnormal results. Meryia Throop and Melonie Quander will not look at any other section, portion, or part of your medical record. Upon this limited review of your lab and vaccination results Meryia Throop will immediately destroy (by shredding) this detachable sheet with your personal information (such as your name and last four of your social security number).

If your cervical cancer screening results or HPV vaccination are different than what you report by more than two months, then Meryia Throop or Melonie Quander will contact you by phone (or email if you prefer) in the next seven days and review the date and results of your screening exam and HPV vaccination. If you indicate a follow up plan or understood different directions than what you were told by your primary care manager (PCM) as indicated in your record, Meryia Throop and/or Melonie Quander will contact you and assist you with a follow up appointment. Meryia Throop and/or Melonie Quander will also contact your PCM so they can expect you at your next visit. Also, Melonie Quander will place a note in your medical record to remind your PCM about the need for a follow up visit. If you have any questions, concerns, or problems regarding your cervical cancer results or difficulty in making an appointment you may contact Meryia Throop at (202) 510-0032 (meryia.throop@us.army.mil) or Melonie Quander at (910) 987-9771 (melonie.quander@us.army.mil) and they will assist you.

All information regarding your participation in this study will be kept private and your answers will be able to be traced back to your name by Meryia Throop by the assigned unique protocol number. All of the paperwork regarding this study will be secured under lock and key. The questionnaire has 74 questions and should take less than 15 minutes to complete. In the course of the day while you are waiting in the Soldier Support Center, please feel free to fill out this questionnaire or Meryia Throop can escort you to a private area to complete the questionnaire. You may hand the survey back to Meryia Throop when you are finished, or place the survey in the locked black box at the front desk, or mail the survey back to Meryia Throop (who will provide the postage stamp).

POTENTIAL BENEFITS: There may be no direct benefit to you, but the knowledge that is gained from this study will be used to further evaluate women's needs related to cervical cancer screening while serving in the military. It may be used to improve military women's knowledge about and their ability to complete annual cervical cancer screening and HPV vaccination. The potential benefits are that women's health care providers in the military may be better prepared to take care of military women's health needs related to cervical cancer.

RISKS, INCONVENIENCES, AND DISCOMFORTS: You will be asked questions about your attitude towards cervical cancer and a few questions about your sexual behavior. Some women may be uncomfortable or embarrassed when asked about cervical cancer or sexual behavior. It may be an inconvenience to participate in the study.

SAFEGUARDS: You are reminded that you do not have to answer any questions that you do not wish to answer. You may stop filling out the questionnaire at any time or leave some questions blank. Thinking about cervical cancer or sexual behavior may bring up emotional or stressful responses. You will be referred to a counselor at Womack Army Medical Center if you feel the need to further discuss your reactions or feelings.

ALTERNATIVES TO PARTICIPATION: Not participating in this study is the alternative to participating in this study. However, if you feel uncomfortable answering any question, you may leave that question blank.

COMPENSATION: You will not be paid for your participation in this study. However, today you will receive a handout regarding cervical cancer and a pen. You will also receive written confirmation of your last cervical cancer screening date and results, and if less than 29 years old, the date of your last HPV vaccination.

CONFIDENTIALITY OF RECORDS: The case records from this study will be available for review by members of the Institutional Review Board (IRB) at Womack Army Medical Center, by representatives of the

Food and Drug Administration (FDA) and other governmental agencies as part of their normal duties. All records will be kept in a confidential form. Otherwise, only the nurses and physicians conducting this study will have access to the records from this study. Information gained from this study may be used as part of a scientific publication, but you will in no way be personally identified. Complete confidentiality cannot be promised, particularly for military personnel, because information bearing on your health may be required to be reported to appropriate medical or command authorities.

Meryia Throop, the Associate Principle Investigator for this study, will have access to your assigned unique protocol number and the limited results from your electronic medical record. Melonie Quander, the Principle Investigator for this study, will only look at your laboratory results and vaccine history in your electronic medical record. The case records, without any identifiers linked directly to you, from this study will be available for review by members of her dissertation committee, nursing faculty at the Catholic University of America, as part of their normal duties. All records will be kept in a confidential form.

NEW FINDINGS: Significant findings that occur during this study that might affect your decision to participate in the study will be discussed with you. Any significant findings developed from this study will be available to you and may be obtained from your primary care manager (PCM).

REMOVAL STATEMENT: Your participation in this study may be terminated without your consent if conditions occur which might make your continued participation dangerous or detrimental to your health; or if military contingency requires it; or if you become ineligible for military care as authorized by Army regulation.

OTHER INFORMATION: If you should require medical care for injuries or disease which result from participation in this study, the medical care to which you will be entitled is the same as that which you are already entitled as a DoD health care beneficiary. This does not include domiciliary (home care) or nursing home care.

You are encouraged to ask any questions, at any time, that will help you to understand how this study will be performed and/or how it will affect you. You may contact Meryia Throop at (202) 510-0032 or Meryia.throop@us.army.mil.

Also if you have any questions or concerns about this study or your rights as a study subject you may contact the Institutional Review Board, Womack Army Medical Center, Fort Bragg, NC 28310, (910) 907-8955 or the Institutional Review Board (Sponsored Programs), Catholic University of America, Washington, DC 20064, (202) 319-5218.

VOLUNTEER AGREEMENT AFFIDAVIT

IF THERE IS ANY PORTION OF THIS EXPLANATION THAT YOU DO NOT UNDERSTAND, ASK THE INVESTIGATOR BEFORE AGREEING TO PARTICIPATE IN THIS STUDY.

You will be given a signed and dated copy of this consent document for your records.

I do ☐ do not ☐ (check one & initial) consent to the inclusion of this form in my outpatient medical treatment record.

I understand my rights as a research participant, and I voluntarily consent to participate in this study. I understand what the study is about and how and why it is being done. I will be given a signed and dated copy of this consent document for my records.

SIGNATURE OF VOLUNTEER	DATE	PRINTED NAME OF VOLUNTEER
PERMANENT ADDRESS OF VOUNTEER		
PRINTED NAME OF PERSON ADMINISTERING CONSENT (Associate Investigator) Meryia D. Throop		
SIGNATURE OF PERSON ADMINISTERING CONSENT		
DATE		

Appendix G

Authorization for Research Use of Protected Health Information
Womack Army Medical Center (WAMC)
Protocol Title: After the Vaccine: Cervical Cancer Screening in Army Women
Principal Investigator: Meryia D. Throop
WAMC #: _____
Study Site: Soldier Support Center, Ft Bragg, NC

The Federal Health Insurance Portability and Accountability Act (HIPAA) includes a Privacy Rule that gives special safeguards to Protected Health Information (PHI) that is identifiable, in other words, can be directly linked to you (for example, by your name, Social Security Number, birth date, etc.). We are required to advise you how your PHI will be used.

1. What information will be collected?
For this research study, Meryia Throop and Melonie Quander will be collecting information about:

a. The dates and results of your last cervical cancer screening exam ("pap smear")
b. HPV vaccination (if you are less than 27 years old)
c. Primary Health Care Provider (if your report dates/results inconsistent with your electronic record).

2. Who may use my PHI within the Military Healthcare System?
The members of the research team (Meryia Throop and Melonie Quander) will have limited access to your health information in order to review your cervical cancer screening exam date, results, and HPV vaccination only. We will compare your self reported dates and results with your electronic medical record. Additionally, your PHI may be made available to health oversight groups such as the WAMC Department of Research Staff and WAMC Institutional Review Board.

3. What persons outside of the Military Healthcare System who are under the HIPAA requirements will receive my PHI?
No one outside of the Military Healthcare System will receive your PHI.

4. What is the purpose for using or disclosing my Protected Health Information (PHI)?
a. The members of the research team need to use your PHI in order to compare your self reported cervical cancer exam date and results with your electronic medical record.
b. If your self report and plan of care is inconsistent with Army Regulation or the American Society for Colposcopy and Cervical Pathology, Meryia Throop and/or Melonie Quander will contact your Primary Healthcare Manager and assist you in making a follow up appointment.

5. How long will the researchers keep my Protected Health Information?
The research team (Meryia Throop and Melonie Quander) will keep the research data for up to 3 years after the end of the study. However, immediately upon completing the electronic chart review and determining that your self report and electronic record are the same, Meryia Throop will place your unique research number as coded data in the statistical software, and the detachable information sheet (Removable Section for Sensitive Data) will be destroyed by shredding. If it is noted that your self report and electronic record are not the same, then Meryia Throop will keep the Removable Section sheet under lock and key until you are contacted. Upon contacting you, the Removable Section sheet will be destroyed by shredding. The unique research number that links your name to the data will be destroyed by shredding as soon as data collection is complete.

6. Can I review my own research information?
a. You may look at your personal research information at any time. Meryia Throop will send you a reminder letter one to two weeks after you complete the study of the date with the results of your last cervical cancer screening exam and HPV vaccination (if you are under the age of 27 years old).

7. Can I cancel this Authorization?
Yes. If you cancel this Authorization, you will no longer be included in the research study. The information we collected from you can be destroyed at your request.
If you want to cancel your Authorization, please contact the Principal Investigator (Meryia Throop) in writing. [Catholic University of America, School of Nursing, 620 Michigan Ave, NE, Washington, DC 20064]

8. What will happen if I decide not to sign this Authorization?
If you decide not to sign this Authorization, you will not be able to participate in this research study. Refusal to sign this Authorization will not result in any loss of medical benefits to which you are otherwise entitled.

9. Can my Protected Health Information be disclosed to parties not included in this Authorization who are not under the HIPAA requirements?
There is a potential that your research information will be shared with another party not listed in this Authorization in order to meet legal or regulatory requirements. Examples of persons who may access your PHI include representatives of the Clinical Investigation Regulatory Office, the Food and Drug Administration, the Department of Health and Human Services (DHHS) Office for Human Research Protections (OHRP), and the DHHS Office for Civil Rights. This disclosure is unlikely to occur, but in that case, your health information would no longer be protected by the HIPAA Privacy Rule.

10. Who should I contact if I have any complaints?
If you believe your privacy rights have been violated, you may file a written complaint with the Center Judge Advocate, located at Womack Army Medical Center; 2817 Reilly Road, Fort Bragg, NC, 28310, telephone (910) 907-8579.

By signing this document I authorize WAMC personnel to use and disclose my Protected Health Information (PHI) collected about me for research purposes as described above. My signature below acknowledges receipt of a copy of this Authorization:

Printed Name of Research Participant: _____

_____ _____

Signature of Research Participant Date

A copy of this signed Authorization will be provided to you.

Appendix H

Cervical Cancer

Inside Knowledge
Get the Facts About Gynecologic Cancer

There are five main types of cancer that affect a woman's reproductive organs: cervical, ovarian, uterine, vaginal, and vulvar. As a group, they are referred to as gynecologic (GY-neh-kuh-LAH-jik) cancer. (A sixth type of gynecologic cancer is the very rare fallopian tube cancer.)

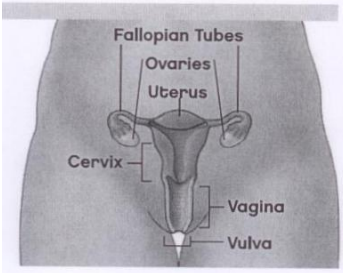
This fact sheet about cervical cancer is part of the Centers for Disease Control and Prevention's (CDC) *National Gynecologic Cancer Awareness Campaign*. The campaign helps women get the facts about gynecologic cancer, providing important "inside knowledge" about their bodies and health.

What is cervical cancer?

Cancer is a disease in which cells in the body grow out of control. Cancer is always named for the part of the body where it starts, even if it spreads to other body parts later.

When cancer starts in the cervix, it is called cervical cancer. The cervix is the lower, narrow end of the uterus. Also known as the womb, the uterus is where a baby grows when a woman is pregnant. The cervix connects the upper part of the uterus to the vagina (the birth canal).

Cervical cancer is the easiest female cancer to prevent, with regular screening tests and follow-up. It also is highly curable when found and treated early.



Who gets cervical cancer?

All women are at risk for cervical cancer. It occurs most often in women over age 30. In 2004,* 11,892 women in the United States were told they had cervical cancer.†

It is important to get tested for cervical cancer because 6 out of 10 cervical cancers occur in women who have never received a Pap test or have not been tested in the past five years.

The human papillomavirus (HPV), a common virus that can be passed from one person to another during sex, is the main cause of cervical cancer. At least half of sexually active people will have HPV at some point in their lives.

Keep in mind, many people will have an HPV infection at some time in their lives, but few women will get cervical cancer.

* The most recent year for which statistics are currently available.

† U.S. Cancer Statistics Working Group. United States Cancer Statistics: 2004 Incidence and Mortality. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2007.

Are there tests that can prevent cervical cancer or find it early?

There are two tests that can help prevent cervical cancer or find it early:

- **The Pap test (or Pap smear) looks for precancers, cell changes on the cervix that might become cervical cancer if they are not treated.**
- **The HPV test looks for the virus that can cause these cell changes.**

The Pap test is recommended for all women. Talk with your doctor, nurse, or other health care professional about whether the HPV test is right for you. Getting a Pap test regularly can find precancerous changes that can be treated, so that cervical cancer is prevented. And a Pap test can find cervical cancer early, when treatment is most effective.

Inside Knowledge is an initiative that supports the Gynecologic Cancer Education and Awareness Act of 2005, or Johanna's Law, which was unanimously passed by the U.S. House and Senate (109th Congress) in December of 2006, and signed into law by President George W. Bush on January 12, 2007.

www.cdc.gov/cancer/knowledge/ 1-800-CDC-INFO

When should I get tested for cervical cancer?

You should start getting regular Pap tests at age 21, or within three years of the first time you have sex—whichever happens first. The Pap test is one of the most reliable and effective cancer screening tests available.

In addition to the Pap test—the main test for cervical cancer—the HPV test may be used for screening women aged 30 years and older, or at any age for those who have unclear Pap test results.

If you are 30 or older, and your screening tests are normal, your chance of getting cervical cancer in the next few years is very low. For that reason, your doctor may tell you that you will not need another screening test for up to three years. But you should still go to the doctor regularly for a check-up that may include a pelvic exam.

It also is important for you to continue getting a Pap test regularly—even if you think you are too old to have a child, or are not having sex anymore. If you are older than 65 and have had normal Pap test results for several years, or if you have had your cervix removed (during an operation called a hysterectomy), your doctor may tell you it is okay to stop getting regular Pap tests.

What raises a woman's chance of getting cervical cancer?

Almost all cervical cancers are caused by HPV. You are more likely to get HPV if you started having sex at an early age, or if you or your partner have had sex with several others. However, any woman who has ever had sex is at risk for HPV.

There are many types of HPV. Usually HPV will go away on its own, but if it does not, it may cause cervical cancer over time. Other things can increase your risk of cervical cancer. They include:

- Not having regular Pap tests.
- Not following up with your doctor if you had a Pap test result that is not normal.
- Having HIV, the virus that causes AIDS, or another condition that makes it hard for your body to fight off health problems.
- Smoking.

How can I prevent it?

- Get the HPV vaccine. It protects against the HPV types that most often cause cervical cancer and is given in a series of three shots. The vaccine is recommended for girls 11 and 12 years of age. The vaccine also can be given to females aged 13 through 26 who did not get any or all of the shots yet. (Note: The vaccine can be given to girls 9 or 10 years of age.)
- See your doctor regularly for a Pap test that can find cervical precancer.
- Follow up with your doctor if your test results are not normal.
- Don't smoke.
- Use condoms during sex.*
- Limit your number of sexual partners.

What are the symptoms?

Early on, cervical cancer usually does not cause signs and symptoms. Advanced cervical cancer may cause bleeding or discharge from the vagina that is not normal for you, such as bleeding after sex. If you have any of these signs, talk to your doctor. They may be caused by something else, but the only way to know is to see your doctor.

What should I do if my doctor says I have cervical cancer?

If your doctor says that you have cervical cancer, ask to be referred to a gynecologic oncologist—a doctor who has been trained to treat cancers like this. This doctor will work with you to create a treatment plan.

Where can I find free or low-cost Pap tests?

If you have a low income, or do not have insurance, you may be able to get a free or low-cost Pap test through the National Breast and Cervical Cancer Early Detection Program. To learn more, call 1-800-CDC-INFO or visit www.cdc.gov/cancer/nbccedp.

Where can I find more information about cervical cancer?

Centers for Disease Control and Prevention: 1-800-CDC-INFO or www.cdc.gov/cancer

National Cancer Institute: 1-800-4-CANCER or www.cancer.gov

* HPV infection can occur in both male and female genital areas that are covered or protected by a latex condom, as well as in areas that are not covered. While the effect of condoms in preventing HPV infection is unknown, condom use has been associated with a lower rate of cervical cancer.

CDC Publication #99-9123, Revised July 2008

CDC

Inside Knowledge
Get the Facts About Gynecologic Cancer

Appendix I

Subject	**RE: Letter of Support for MAJ Throop (UNCLASSIFIED)**
From	"Quander, Melonie G LTC MIL USA MEDCOM WAMC" <melonie.quander@us.army.mil>
Date	Wednesday, February 25, 2009 12:12
To	"Throop, Meryia D MAJ MIL USA USAMEDCOM" <meryia.throop@us.army.mil>

Classification: UNCLASSIFIED
Caveats: NONE

Meryia

I look forward to working with you again.

v/r
LTC Melonie Quander

-----Original Message-----
From: Throop, Meryia D MAJ MIL USA USAMEDCOM
[mailto:meryia.throop@us.army.mil]
Sent: Friday, February 20, 2009 11:15 AM
To: Quander, Melonie G LTC MIL USA MEDCOM WAMC
Subject: Letter of Support for MAJ Throop

Dear MAJ Quander,

Thank you again for fulfilling the position as the executive nurse in my study. As you know I am an Army Nurse and working on my doctorate degree at the Catholic University of America. I plan to conduct a study for my dissertation at the Soldier Support Center (Building 4-2843) from late August 2009 to April 2010. My topic is about the attitudes and behaviors women serving in the Army have about cervical cancer and the Human Papillomavirus vaccine. This study will consist of a small questionnaire and should take less than 20 minutes to complete.

Although participants in the December 2008 pilot study did not indicate any difficulty in making appointments or acute GYN needs, again soldiers that report difficulty in making routine appointments for cervical cancer screening exams ("pap smears") will be directed to the Patient Advocate. For soldiers that report difficulty in contacting the Patient Advocate or with more than routine GYN needs (e.g. CIN I or higher pathology and/or no current plan for follow up) will be directed to contact you for assistance and follow up in their scheduling a specialty appointment with Womack Army Medical Center's GYN clinic.

This study will also include written consent for you and me to review the participant's medical record (CHCSII) for their pap and colposcopy results in the past 5 years and appointed Primary Care Manager only. In the event that their reported exam is in error more than 3 months we will contact the participant (via phone or email as they indicate per the survey) and inform them of the correct date of their last exam. If the participant has concerning pathology per the most current Bethesda guidelines (i.e. requires follow up) and does not indicate a follow up plan in the next 8 weeks in the survey or medical record, we will contact the participant, as well as the participant's Primary Care Manager per their medical record. Finally, a "Nursing Note" indicating contact with the soldier and PCM will be placed in the computerized medical record if participants require contact per these guidelines. This review of medical records will occur once per week of data collection at your preferred time (e.g., Thursday's at 1500-1800).

Once again, thank you for your service in assisting in this study and providing an additional "safety net" for the participants in this study.

I can be contacted at this email or phone (202) 510-0032.

Sincerely,

MAJ Meryia D. Throop, AN
Family Nurse Practitioner
Classification: UNCLASSIFIED
Caveats: NONE

Appendix J

Subject	RE: Mammography Questionnaire (UNCLASSIFIED)
From	"Michels, Thomas C Dr MAMC" <thomas.c.michels@us.army.mil>
Date	Friday, July 25, 2008 17:33
To	"Throop, Meryia D MAJ MIL USA USAMEDCOM" <meryia.throop@us.army.mil>

Classification: UNCLASSIFIED
Caveats: NONE

Hello,
and thanks for your interest. I did a later survey on another topic using the newer modification, the theory of planned behavior; but yes, feel free to borrow, modify, as you see fit this instrument. The idea of using this for cervical cancer crossed my mind recently as well, because of feedback we just got that we are below par in this area, unclear why... TCM

-----Original Message-----
From: Throop, Meryia D MAJ MIL USA USAMEDCOM
[mailto:meryia.throop@us.army.mil]
Sent: Tuesday, July 22, 2008 9:48 AM
To: Michels, Thomas C Dr MAMC
Subject: Mammography Questionnaire

Dear Dr Michels,

I am a PhD student at Catholic University and attempting to get a Triservice Nursing grant to research barriers and facilitators for Army women to complete cervical cancer screening (also my dissertation topic).

I reviewed your 1995 article regarding TRA and mammography in military women and was interested in your opinion and (hopefully) permission to modify the instrument to address cervical cancer in military women.

I can be reached at this email or (202) 510-0032.

Thank you for your time and interest in this matter.

Sincerely,

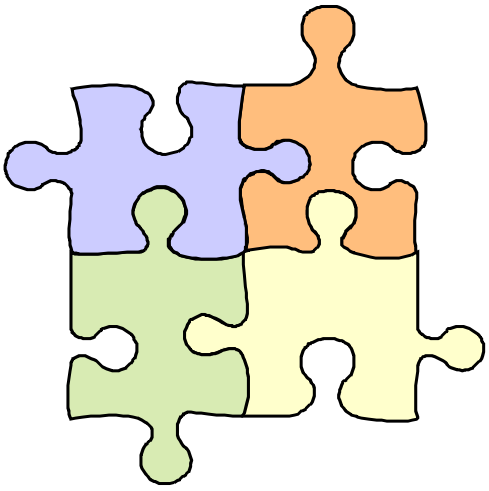
Meryia Throop
MAJ/AN
Classification: UNCLASSIFIED
Caveats: NONE

Appendix K

Cervical Cancer Questionnaire for Military Women

Thank you for taking your time to complete this questionnaire. This questionnaire asks about what attitudes Army women have about cervical cancer and influences for completing a cervical cancer screening exam.

Completing this questionnaire is completely voluntary.



Your individual answers will not be shared with anyone, to include your supervisor or anyone in your chain of command.

Please use your own opinion and do not write your name anywhere in the questionnaire.

Please circle one answer for the following questions

1. What is your marital status?
    a. Single / Never married
    b. Married
    c. Separated
    d. Divorced
    e. Widowed

2. What is the highest grade or year of school you have completed?
    a. 9-11 years (some high school)
    b. 12 years (high school graduate or GED)
    c. 13-15 years (come college or technical school)
    d. 16 (college graduate)
    e. 17 or more (graduate school or more)

3. When was your last pap test?
    a. Never have had a pap test
    b. Within the past year
    c. More than one, but less than two years ago
    d. More than two, but less than three years ago
    e. More than three years ago

4. Where did you get your last pap test?
    a. Military clinic or hospital
    b. Military Battalion Aid Station
    c. Military or civilian Emergency Room
    d. Civilian Clinic
    e. Don't know or can't remember

Please give your opinion of the following statement

1. Circle the number that best describes how likely it is that you will have a pap test in the next year.

Study Number

Extremely Unlikely			Neither Likely or unlikely			Extremely Likely
1	2	3	4	5	6	7

Please give your opinion of each of the following statements (Circle the number closest to how much you agree or disagree)

1. For me, getting a pap test causes pain or discomfort:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

2. For me, getting a pap test is embarrassing:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

3. For me, getting a pap test is inconvenient:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

4. For me, getting a pap test exposes me to other infections:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

5. Getting a pap test involves testing me for cervical cancer even if I do not have problems:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

6. Getting a pap test involves testing me for Human papillomavirus (HPV):

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

7. Getting a pap test always involves testing me for all other sexually transmitted diseases:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

8. Getting a pap test involves testing me to see if I can have a baby:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

9. Getting a pap test would allow finding cervical cancer that my provider cannot see by just looking:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

10. For me, getting a pap test involves thinking about the possibility that I may have cervical cancer:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

11. For me, getting a pap test involves thinking about the possibility that I may have a sexually transmitted disease:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

12. For me, getting a pap test involves thinking about the possibility that I might not be able to have children:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

13. If cervical cancer were found in me, it would lead to surgery resulting in a change in how I look:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

14. If cervical cancer were found in me, it would lead to surgery resulting in me not being able to have children:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

15. If cervical cancer were found in me, it would lead to radiation treatment or chemotherapy:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

Please circle the number that reflects your opinion for each statement

(*even if you have never had a pap test*)

1. For me, the discomfort of a pap test is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

2. For me, the embarrassment of a pap test is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

3. For me, the inconvenience of a pap test is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

4. For me, a male provider doing a pap test is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

5. For me, testing for cervical cancer, even if I do not have symptoms or problems is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

6. For me, testing me for the Human Papillomavirus (HPV) is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

7. For me, testing me for other sexually transmitted diseases or infections is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

8. For me, finding cervical cancer that my provider can't find by looking at me is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

9. For me, thinking about the possibility that I might have cervical cancer is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

10. For me, thinking about the possibility that I might have the Human Papillomavirus (HPV) is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

11. For me, thinking about the possibility that I might have a sexually transmitted disease (STD) is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

12. For me, thinking about not being able to have children is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

13. For me, thinking about surgery that would change how I look is:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

14. For me, thinking about treatment with radiation or chemotherapy would be:

Unacceptable			Neither			Acceptable
1	2	3	4	5	6	7

Please answer each of the following statements as they apply to you *(even if you have never had a pap test)*

When it comes to completing a Cervical Cancer Screening Exam (Pap Smear) every year…

1. Friends or neighbors recommend I get pap test:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

2. My husband/boyfriend/partner recommends I get a pap test:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

3. Other relatives/my family recommend I get a pap test:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

4. My supervisor or chain of command recommend I get a pap test:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

5. My provider recommends I get a pap test:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

6. The media (like newspapers, magazines, TV) recommend I get a pap test:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

7. The internet recommends I get a pap test:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

Please answer each of the following statements as they apply to you

When it comes to my health…

1. Generally speaking, I try to do what my friends or neighbors recommend I should do:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

2. Generally speaking, I try to do what my husband/boyfriend/partner recommends I should do:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

3. Generally speaking, I try to do what my other relatives/family recommends I should do:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

4. Generally speaking, I try to do what my supervisor or chain of command recommends:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

5. Generally speaking, I try to do what my medical provider recommends I should do:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

6. Generally speaking, I try to do what the media recommends I should do:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

7. Generally speaking, I try to do what the internet recommends I should do:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

Please answer the following questions.

1. How old are you? _____
2. Please circle your rank:

E 1-3 E 4-5 E 6-7 E 8+
WO 1-2 WO 3+
O 1-3 O 4-5 O 6+

3. How many years have you served active duty in the military? _____
4. How many total months have you been deployed in the past three years? _____

In support of OEF/OIF _____
Other (please list location and months) _____

5. What is your Military Occupation Specialty (MOS)? _____

6. What do you consider to be your race or ethnicity?
   (May circle more than one)
   a. Asian/Pacific Islander
   b. Black/African American
   c. White/Caucasian
   d. American Indian/Native American/Aleut
   e. Hispanic/Latino
   f. Other (please list) _____

Please circle one answer for the following questions

1. Are you interested in getting the HPV vaccine?

   a. Yes
   b. No
   c. Not sure
   d. Was told by my healthcare provider that I do not need it

2. Have you already started or completed the HPV vaccine?
   a. Yes
   b. No
   c. Not Sure
3. If you received the HPV vaccine, where did you get your last injection?
   a. Military clinic or hospital
   b. Military Battalion Aid Station
   c. Military or civilian Emergency Room
   d. Civilian Clinic
   e. Don't know or can't remember

If you have never had sex, please skip to question 8

1. What age did you have sex for the first time? _____

2. In your entire life time, how many total sexual partners have you had?

   a. Less than 5
   b. Less than 10
   c. More than 10

3. With your primary sexual partner, do you use condoms:

   a. Always (100%)
   b. Usually (76-99%)
   c. Sometimes (51-75%)
   d. Occasionally (26-50%)
   e. Rarely (1-25%)
   f. Never (0%)
   g. No, because I want to get pregnant
   h. No, because I am pregnant

4. In the past year, have you had more than one sexual partner?

   a. Yes
   b. No

5. In the past year, if you had sex with more than one partner did you or do you use condoms:

   a. Always (100%)
   b. Usually (76-99%)
   c. Sometimes (51-75%)
   d. Occasionally (26-50%)
   e. Rarely (1-25%)
   f. Never (0%)
   g. No, because I want to get pregnant
   h. No, because I am pregnant

6. Have you used oral contraceptives ("the pill")?

   a. Less than 5 years
   b. More than 5 years
   c. More than 10 years

7. Have you ever had a sexually transmitted infection (like Chlamydia)?
   a. Yes
   b. No
   c. Not sure

8. Do you currently smoke cigarettes?
   a. Yes
   b. No

Please circle one answer for the following questions

1. I tend to forget to schedule pap test for myself:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

2. I use Army Knowledge Online (AKO) to check to see when next pap test is due:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

3. I would be interested in a test I could use at home for cervical cancer:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

4. I would be interested in test I could use at home for sexually transmitted infections:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

5. My immediate supervisor is:
   a. Male
   b. Female

6. My Commander is
    a. Male
    b. Female

7. In your opinion, please list your experiences in getting a pap test while serving in the military:

_____
_____

*****If you are less than 28 years old, please answer these final questions:**
Please answer each of the following statements as they apply to you***

(even if you have never had a pap test or HPV vaccination)

When it come to starting or completing the Human Papillomavirus (HPV) vaccine-

1. Friends or neighbors recommend I get the vaccine:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

2. My husband/boyfriend/partner recommends I get the vaccine:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

3. Other relatives/my family recommend I get the vaccine:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

4. My supervisor or chain of command recommends I get the vaccine:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

5. My provider recommends I get the vaccine:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

6. The media (like newspapers, magazines, TV) recommends I get the vaccine:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

7. The internet recommends I get the vaccine:

Strongly Disagree			Neither			Strongly Agree
1	2	3	4	5	6	7

8. Circle the number that best describes how likely it is that you will start or complete the HPV vaccine in the next year.

Extremely Unlikely			Neither unlikely or likely			Extremely Likely
1	2	3	4	5	6	7

Once again, thank you for taking your time to complete this questionnaire. This goal of this questionnaire is to better serve Army women and their health care needs. If you have any comments or questions about this survey please use the space below.

Appendix L

Removable Section for Sensitive Data Study Number
_____

1. _____ Name

2. _____ Last 4 of your Social Security Number:

3. _____(month)_____(year) Date of your last pap smear test

4. Results of last Pap (Please mark one box below):
Normal
Abnormal
Not sure
If abnormal Pap results please indicate what is your follow up plan
(may mark more than one):

Medication
Repeat Exam in (circle): 3 months 6 months 12 months
Colposcopy
Not sure

6. **For women less than 27 years old only**: Please circle

Yes No I have started the HPV vaccine _____(month) _____(year)
Yes No I have completed the HPV vaccine
Yes No I am overdue for my next HPV vaccine
Yes No I am not interested in the HPV vaccine
Yes No I was told by my healthcare provider that I do not need the vaccine
_____
If my medical records indicate a different date (greater or less than 2 months)
or different results than above, I want to be contacted at phone # (__)_____
or email _____

If your results are normal and near the date you reported above, I will mail you a letter and shred this paper.

If your results are abnormal and you do not have a follow up plan or you are not sure, I will contact you as you indicate above to review you results and assist you in making an appointment for follow up with your Primary Care Manager (PCM). After I have contacted you, I will mail you a reminder letter and shred this paper.

Appendix M

Letter to Primary Care Health Provider
Dear _____:

On _____, _____ _____ _____
Date Rank Name Last 4 SSN

Participated in the research protocol, "After the Vaccine: Cervical Cancer Screening in Army Women" conducted by MAJ Meryia D. Throop (PI) and LTC Melonie Quander (Womack AMC Site PI) at the Ft Bragg Soldier Support Center. [WAMC Protocol #]

Part of the protocol included a limited electronic review of this soldier's medical record (date and results of last cervical cancer screening exam and date of HPV vaccine).

This limited chart review found that the soldier's self report of their

Follow Up Plan: (self reported as) _____
For the following results_____on _____(date)

Are inconsistent with the current AR 40-501 "Standards of Medical Fitness"/American Society for Colposcopy and Cervical Pathology
2006 Guidelines (available at http://www.asccp.org/pdfs/consensus/algorithms_cyto_07.pdf).

This soldier has been instructed to make a follow up appointment in the next thirty days with you to review her healthcare plan. LTC Quander also placed a nursing note regarding the results and patient instructions in the soldier's electronic medical record.

If you have any questions or concerns, please feel free to contact me at (202) 510-0032 or meryia.throop@us.army.mil or LTC Quander (910) 987-9771 at melonie.quander@us.army.mil.

Thank you for your time and assistance in this matter.

Sincerely,

Meryia D. Throop, FNP
MAJ/AN
Meryia D. Throop
Catholic University of America
School of Nursing
Washington, DC 2006

Appendix N

Glossary of Terms.

Military – an organization made up of personnel who are trained to conduct operations to defend a nation or state.

Department of Defense (DOD)- the organization within the United States government, responsible for planning, funding, and training of defense related personnel that fall under the joint services: Army, Air Force, Navy, Marine Corps.

Service Member- term used in the United States military to describe a man or women who serves in uniform within the joint services.

Army- the ground fighting component of the US military.

Soldier- term used to describe a man or woman who serves in the Army.

Military Occupational Specialty (MOS)- designated code for the name of the occupational (job) skill members of the Army (e.g. 66P- Family Nurse Practitioner, 11B- infantry soldier, 88M- truck driver) .

Air Force- military personnel and equipment organized to conduct air oriented warfare (i.e. not land or sea).

Airman- a term used to describe a man or woman who serves in the US Air Force.

Navy- military personnel who serve in the US naval (sea) forces organized to conduct sea based warfare.

Sailor- a term used to describe a man or woman who serves in the US Navy.

Garrison- location where most service members live and work, which may be located in the United States or overseas (e.g. forts, post, camp, or base).

Deployment – term given to military organizations that are operating away from their home garrison, either for training or in combat zones (e.g. Joint Readiness Training Center, Ft Polk, LA or Operation Iraqi Freedom (OIF), Camp Anaconda, Iraq).

Combat Zone- location where service members are deployed in support of combat operations.

Military Treatment Facility (MTF)- any facility in the DOD which provides health care to service members, their families, and retirees. Examples include fixed facilities located in the United States (Walter Reed Medical Center), clinics, and tents located in combat zones (28th Combat Support Hospital).

Battalion Aid Station (BAS)- echelon II level of health care services provided to soldiers, usually includes one provider and several medics. These elements are located in close proximity to where soldiers work and live when in garrison or deployed.

Primary Care Manager (PCM)- includes (military and civilian) personnel that are licensed to provide primary health care services (e.g. nurse, nurse practitioners, PA's, physicians, midwives, podiatrist, optometrist, and physical therapist.)

Medic- a term used for any basic trained Army soldier with training equivalent to basic emergency medical technicians, usually first line (echelon I) of healthcare and information for soldiers.

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