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FACTORS RELATING TO HPV BEHAVIORS OF FEMALE COLLEGE STUDENTS

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FACTORS RELATING TO HPV BEHAVIORS OF FEMALE COLLEGE STUDENTS

THESIS

A thesis submitted in partial fulfillment of the
requirements for the degree of Masters of Science in the
College of Education
at the University of Kentucky

By

Nicole Rachael Peritore

Lexington, Kentucky

Director: Dr. Melody Noland, Professor

ABSTRACT OF THESIS

FACTORS RELATING TO HPV BEHAVIORS OF FEMALE COLLEGE STUDENTS

This study examined the knowledge, sources of information, reasons for and against Gardasil® uptake, and possible relationships between unhealthy behaviors and vaccination for undergraduate college females at a public university. Utilizing an online survey, 2400 random students were emailed as well as recruited through online classes. The final sample size was 516 females. The study determined how many participants had been vaccinated and their rationale for or against vaccination. The majority of study participants were knowledgeable about HPV and Gardasil®. The primary sources of information about HPV and Gardasil® were doctors and television; however parents and friends were also common sources of information. Predictors for HPV inoculation included race, the belief that the vaccine would protect against HPV, alcohol use, and engagement in anal intercourse. Over 50% of participants had received at least one dose of Gardasil®, and 82% had completed the series. The most common rationale for not getting the vaccine, or not completing the vaccination series, was concern about side effects. The most common rationale for completing the vaccination or intending to complete the series was protection from cervical cancer. In conclusion, there is a continued need provide health education about HPV and HPV vaccination for college females.

KEYWORDS: HPV, HPV Vaccination, Health Behaviors, Predictability of HPV Inoculation, Gardasil®

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3/19/2012

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INTRODUCTION

Statement of the Problem

Cancer can be defined as a disease in which the cells of the body continue to multiply without ceasing. When the cells of the cervix grow without control it is referred to as cervical cancer. Cervical cancer is a possibility for all women; however it is most commonly seen in women 30 years of age or older. Science now shows that the human papmillomavirus (HPV), a sexually transmitted virus, causes many of the cervical cancer instances, as well as vaginal and vulvar cancer. In many developed countries, specifically in the Western countries, cervical cancer can be prevented through screenings and vaccine availability (Centers for Disease Control and Prevention (CDC), 2009), yet developing countries hold the greater proportion of cervical cancer cases, which is over 80% (Schiffman, Castle, Jeronimo, Rodriguez, & Wacholder, 2007).

Worldwide, cervical cancer is the second most common cancer in women. In Latin America, the Caribbean, and Eastern Europe, cervical cancer contributes to more years of life lost (YLL) than maternal conditions, AIDS or Tuberculosis (Schiffman, Castle, Jeronimo, Rodriguez, & Wacholder, 2007). In the United States, it is estimated that there will be over 12,000 new cases of cervical cancer diagnosed in 2011 (American Cancer Society, 2011). There has been an established link between the HPV infection and cervical cancer. The current estimates are that over 20 million Americans are currently infected with HPV and that approximately 6.2 million more people will be infected every year (CDC, 2011).

HPV is the most common type of sexually transmitted infection with which approximately 50% of sexually active persons have been infected, are currently infected,

or will be infected within their lifetime (CDC, 2011). Approximately 80% of sexually active females will have been infected with HPV by the time they reach 50 years of age (Pichichero, 2006). There are over 40 different types of HPV and the infection can affect both male and female. Various parts of the genital area can be infected such as the skin of the penis, the vulva, the lining of the vagina, cervix, or rectum and anus (CDC, 2011).

In the public domain, there are two broad categories into which HPV has clinically been divided: the "low risk" genital warts-causing virus, and the "high risk" cervical cancer-causing virus. The "low risk" HPV is estimated to cause genital warts in approximately 1% of all sexually active individuals. However, the number of cervical cancer cases is growing. The American Cancer Society (ACS) estimates that over 11,000 new cases will be diagnosed a year, with approximately 11,070 new cases positively diagnosed in 2008. (ACS, 2011) The infection is usually passed through either vaginal or anal sex and the infected person may not know that he or she is passing it along. In those who do get the virus, approximately 90% of the cases can be cleared by the body's own immune system; however, it may take up to 2 years (CDC, 2011). During this time the virus can be spread.

Most of the individuals who get infected with HPV do not show physical signs and the infection can be passed even after years of abstinence. However, certain individuals may exhibit symptoms such as small bumps or groups of bumps, usually in the genital area (CDC, 2011). An infected person may develop genital warts that appear within weeks or months of the sexual encounter which transmitted the disease, if they appear at all. For those who have genital warts that do appear, for some individuals the warts will

go away, for others the warts will stay unchanged on their body, and still for others, the warts will increase in size and number (CDC, 2011).

Most of the risk factors for an HPV infection are from the sexual behaviors of individuals. One significant risk factor is a relatively young age (20-24 for females and 25-29 for males) of sexual initiation. One study estimated that 74% of newly infected individuals were between the ages of 15 -24, in 2000 (Pichichero, 2006). The earlier and more often an individual engages in sexual intercourse, the more likely that individual will be infected with HPV. Other risk factors for becoming infected with HPV include condom use (or lack of use), number of sexual partners, sex with a new partner, and marital status (Zimet, Shew, & Kahn, 2008).

Vaccine Development

There are steps that currently can be taken to prevent HPV. Prevention of HPV can be demonstrated through the types of relationships that females have; abstinence and/or longer monogamous relationships would be preferable to shorter, non-committed relationships. Monogamous relationships with individuals who have had few to no sexual partners will diminish the risk of infection transmission. Without an open discussion of sexual history in a relationship, females may not be able to tell if an infection is present or if their partners may be infected due to a prior relationship (CDC, 2011). The use of condoms in sexual encounters can also be a tool used to help prevent HPV infection. Condoms offer a barrier to infection; however, the condom has to be used correctly and regularly. There is also the possibility of infection through contact of genital areas that are not covered by the condom (CDC, 2011).

Lastly, women currently have the option of vaccination against HPV. There are currently two vaccines available: Gardisil® and Cervarix®. The Human Papillomavirus (HPV) Vaccine, Gardasil®, was created by Merck and Co, Inc. (Whitehouse Station, NJ) and approved by the Food and Drug Administration for use in June of 2006. The vaccine is an intramuscular injection intended for use in females ages 9-26, although the recommended age is 11-12 years. The vaccine was created to guard against the HPV types 6, 11, 16, and 18. HPV types 6 and 11 are precursors for genital warts (Merck & Co., 2008) and seen in 90% of genital wart cases (Merck, 2008). HPV types 16 and 18 are precursors for over 70% of cervical cancer cases (Merck, 2008). The vaccine is also known to protect against precancerous lesions caused by HPV types 6, 11, 16 and 18. Those lesions are cervical intraepithelial neoplasia (CIN) grade 2/3 and cervical adenocarcinoma *in situ* (AIS), cervical intraepithelial neoplasia (CIN) grade 1, vulvar intraepithelial neoplasia (VIN) grade 2 and grade 3, and vaginal intraepithelial neoplasia (VaIN) grades 2 and 3 (Merck & Co. Inc., 2008).

The vaccination is administered over a period of 6 months. The vaccination series starts with an initial injection, a second injection at 2 months, and a third and last vaccination, at the 6 month time period. Even though the vaccine is intended to prevent cervical cancer and precancerous lesions, the Gardasil® vaccine is only established for 4 of the 40 types of HPV. An inoculated individual should continue to be screened for cervical cancer via a Papanicolaou Test, also known as a Pap smear, on a yearly basis or as requested by a healthcare provider. The vaccine is not currently approved for use in females under the age of 9, pregnant women, or females over the age of 27. Only recently has the vaccine been approved for use in males (Merck & Co. Inc., 2008).

The vaccine was determined to be most effective prior to the start of sexual activity. Thus, the recommendation for vaccination is females in the 11-12 year range. Merck & Co., Inc examined the effectiveness of the vaccine for females ages 16-26 in regards to the impact that the Gardasil® vaccine had on the overall burden of HPV related cervical, vulvar, and vaginal disease. The study determined that for all women who participated the vaccination reduced the incidence of CIN2/3 by 97.4 %, AIS by 94.8%, VIN 2/3 by 97.0% and genital warts by 96.4 %. There was a reduction in lesions caused by HPV types 6, 11, 16, and 18 (Merck & Co. Inc., 2008). The benefits of Gardasil® for ages 16-26 outweighed any potential risks.

Contributing Factors for Gardasil Uptake

As of February 2011, roughly 33 million doses of Gardasil have been dispersed. The Vaccine Adverse Event Reporting System (VAERS) is a system that is used to record and track any adverse affects that may or may not have resulted from the vaccine. Since its approval, 18,354 reports have been filed with the VEARS (approximately 0.00055% of cases). On the record, 92% of the reported incidents were considered not serious.

The reports included both non-serious and serious side effects among those inoculated. Mild issues have been reported such as pain at the injection site and a redness or swelling. Some individuals have had a mild fever and some a moderate fever. There also have been reports of nausea and vomiting. The most common issue has been dizziness after injection of Gardasil® (AHFS Consumer Medication Information, 2009).

In order to ensure the safety of persons receiving the vaccine, the FDA and CDC now recommend a person receiving the injection stay sitting or lying down for 15 minutes after receiving Gardasil® (CDC, 2010). This preventative measure has reduced

many of the negative side effects previously reported such as dizziness and nausea and vomiting (CDC, 2011).

Purpose of the Study

Although the Gardasil vaccine has been FDA approved since 2006, there are still some misunderstandings concerning HPV, cervical cancer and Gardasil®, the HPV vaccine. When the vaccine was first released to the public in 2006, the main target for inoculation was girls ages 11-12. Current college students would have been the targeted cohort that was recommended for the vaccine. This age may or may not have been exposed to critical information regarding HPV and the benefits of the Gardasil® vaccine.

Knowledge regarding the vaccine may affect whether or not individuals receive the vaccine. Studies show that awareness of HPV is lower among minority women than white women (Licht et al. 2010); however both are still below a 50% knowledge level, 6-18% compared to 39% respectively (Marlow, Wardle, Forster, & Waller, 2009). Giuseppe et al. (2008) determined that females were more knowledgeable about HPV, cervical cancer, and the HPV vaccine when: the female was older, had at least one parent who was in health care, had a family member or friend with cervical cancer, and had discussed HPV with their healthcare provider. This study looks to determine current knowledge levels of females regarding HPV and the HPV vaccine, Gardasil®, among the college population at the University of Kentucky in Lexington, Kentucky.

Current research has not fully explored all of the ways that college females are influenced regarding the HPV vaccine, specifically information from doctors, parents, friends, other relatives, Internet, health class, Gardasil® brochures, television, magazines, campus health services, or other sources.

The source of information for college females about HPV or Gardasil® could lead to the acceptance of the vaccine or the knowledge can have a negative impact and lead to rejection of the vaccine. The health care providers of eligible females could be a critical source of knowledge about the vaccine. In one study 88% of pediatricians would recommend the vaccine to all of their patients that are eligible, 11% stated that they would recommend it for some of their patients, and 1% reported that they would not give it to any of their patients. Some of the hesitancy to recommend the vaccine was reported to be due to the cost of the vaccinations and concerns with safety. A few pediatricians also admitted that they feared it would impact the patients' sexual activity after inoculation (Ishibashi, Koopmans, Alexander, & Ross, 2008).

The health care provider's insight regarding the vaccine can have lasting impact on their patients. If health care providers were recommending the Gardasil® vaccine, there would be a relationship between the number of vaccinated college females and the source of their knowledge being from a health care provider. Studies have found that many health care providers were reluctant to immunize female patients who were in the lower age range for the Gardasil® vaccination. The older the patient in the vaccination age range, the more likely the health care provider would discuss HPV vaccination (Zimet, Shew, & Kahn, 2008). A doctor is not likely to promote a vaccine that he or she does not know well enough to discuss it thoroughly with patients. That type of discussion, or lack thereof, will most likely affect the vaccination rates.

There could be many other sources of information available for college females to learn about HPV and the HPV vaccine other than from their health care providers. One such source of information about HPV, Gardasil®, and the HPV vaccine could be from

media outlets. Media access includes television, news articles, magazines, and Internet; these sources provide a one way exposure to the information about HPV and the Gardasil® vaccine.

Generally, the media gives more attention to adverse reactions that have occurred after inoculation (Olshen et al., 2009). These stories may or may not have evidence to support them. Furthermore, typically these news stories do not address the benefits that can be attained from the vaccination, only the risks (Olshen et al., 2009). This slanted information may affect how many female college students have received the vaccine or have intentions to receive the vaccination. News reports concerning adverse effects of the Gardasil® vaccine have been less than previous years and that could potentially affect the perceptions about the vaccine to college females (Olshen et al., 2009).

The current health behaviors of college females could demonstrate the likelihood of accepting the Gardasil® vaccine. Current research shows that when women are sexually active they tend to be more acceptable of the Gardasil® vaccine and have at least received the first vaccination in the series (Roberts et al., 2010). Another study shows that women who have had 5 or more sexual partners were more willing to receive the vaccine (Jones & Cook, 2008). These studies focus on the relationship between sexual health behaviors and HPV vaccination. This study not only examined the relationship between sexual behavior and receiving Gardasl® uptake, but also sought to determine if there were relationships among HPV vaccination rates and alcohol consumption, drug use, cigarette use, and binge drinking.

The purpose of this study was to further examine characteristics of female college students who have and have not received the Gardasil® vaccine, examine the relationship

between HPV vaccination rates and the Health Belief Model specifically severity and susceptibility, and investigate the relationship between unhealthy behaviors and inoculation. The research literature was missing up-to-date information about college females HPV knowledge levels, their sources of information, and attitudes and beliefs about HPV and Gardasil®. The available research lacks information research into the relationship between inoculation and certain unhealthy behaviors. This study was conducted to fill in the gaps in the research.

The present study specifically explored college females and their knowledge of HPV and the HPV Vaccine, Gardasil®, how many female college students had received the vaccination or intended to receive the vaccination, the reasons for receiving the vaccination or not receiving the vaccination, and the sources of HPV and Gardasil® information with designation of the primary source. This study also explored the perceived susceptibility and severity of HPV and looked for relationships among HPV inoculation and specific unhealthy behaviors: cigarette smoking, marijuana and other illegal drug use, alcohol use, and condom use.

The research questions for this study were:

(1) What is the knowledge of female undergraduate students concerning HPV and the HPV vaccine Gardasil®?

(2) What are the sources of knowledge, including the primary source, about HPV and the HPV vaccine Gardasil® for female undergraduate students?

(3) What percentage of female undergraduate students have received at least one dose of the HPV vaccine Gardasil®?

(4) What are the main reasons for and against Gardasil® inoculation?

(5) What are the perceptions regarding susceptibility and severity of contracting HPV for female undergraduate students?

(6) Do female undergraduate students who received the HPV vaccine engage in more unhealthy behaviors from those who did not receive the vaccination?

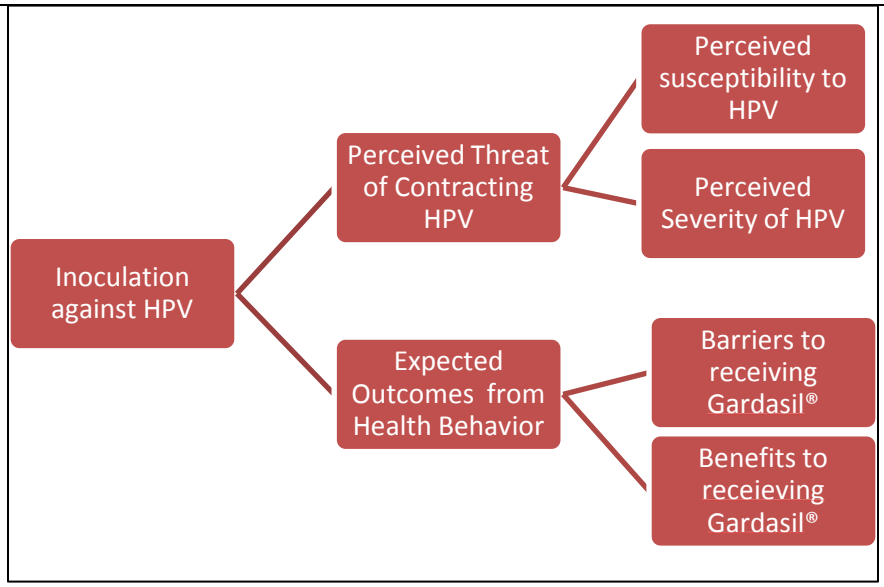
(7) Are there certain variables that can predict whether or not a student is likely to have received the vaccination?

Theoretical Basis for the Study

The Health Belief Model (HBM) was developed in the 1950's in order to understand why so few people participated in programs that were developed to prevent and detect diseases (Rosenstock, 1966). Health motivation is the central focus of this theory and by applying it to the different groups, college aged females and mothers, the theory may give insight to the reasoning behind the decisions these persons make concerning HPV vaccine Gardasil®. There are six main concepts in the HBM: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self – efficacy (National Cancer Institute, 2005). The health belief model is used to assist in predicting the behavior of a cohort in relation to health improvement. Figure 1.1 demonstrates the HBM in relation to HPV inoculation.

Figure 1.1

Health Belief Model Applied to Inoculation Against HPV



Perceived susceptibility is defined as the beliefs that an individual has about the chances he or she will have of getting a disease and/ or infection. This study examines the perceived susceptibility of being infected with HPV. Perceived severity is defined as the belief that if one has the infection or disease it will be severe. For this study the perceived severity is in reference to the severity of being diagnosed with HPV and its possible effects to personal health. Perceived benefits are defined as an individual's beliefs about the effectiveness of any action taken in order to reduce the risk of the disease or its seriousness. This study examines the perceived benefits of being vaccinated with Gardasil®. Lastly, perceived barriers are defined as the believed costs of taking the desired action. This barrier can be a physical, psychological, or emotional cost (National Cancer Institute, 2005). The barriers to getting the Gardasil® vaccine could be the physical discomfort of vaccination, the thought that only people who are

sexually active get the vaccine, price, or other factors. This study examines which factors influence decisions regarding the Gardasil® vaccine.

Perceived susceptibility can contribute to the attitude and participation an individual has with a health-behavior change. Marlow, Waller, and Wardle, (2009) looked at the perceived susceptibility of females in predicting vaccination of HPV. The study looked at both younger and older women and how knowledge affected their perceived risk. For cancers in general, it was determined that people perceived susceptibility when family history dictated that a certain cancer was prevalent. Personal behaviors could also affect perceived susceptibility. The study determined that knowledge of cervical cancer in its association with HPV may have an effect on the attitudes towards the vaccine. The people who were aware of disease at the initial survey generally had family members affected by the disease. Marlow's study also determined that the general public seems unaware that a sexually transmitted infection could cause cancer (Marlow et al. 2009).

The HPV vaccine Gardasil® continues to make headlines and news stories across all sources of media. The lack of knowledge, various sources of information, perceived susceptibility and severity, and other health behaviors can provide much needed information about who is getting the vaccination and who is not and areas that health educators can address in regards to HPV and HPV vaccination.

Hypotheses

1. The majority of female undergraduates will have heard of HPV and the vaccine Gardasil®.
2. Female undergraduate students will demonstrate accurate knowledge regarding HPV and the HPV Vaccine Gardasil®.

3. The most common sources regarding HPV information will be health care providers and television.
4. The majority of female undergraduate students will not have received even one dose of the Gardasil® vaccination.
5. The female undergraduate students will identify the fear of side effects as a major factor for not receiving the vaccination.
6. Undergraduate females who regard the vaccine as a way to protect themselves against cervical cancer will be more likely to have received the vaccine.
7. Undergraduate females who are sexually active will be more likely to have received the vaccination than those who are not currently sexually active.
8. A linear composite of the following will predict Gardasil® vaccination: race, education level, father's education, mother's education, relationship status, sexual orientation, received flu shot, number of sexual partners, HBM statements, smokes cigarettes, drinks alcohol, marijuana use, other illegal drug use, binge drinking, and condom use during vaginal, anal and/or oral intercourse.

Delimitations

The study was delimited to:

1. A random sample of full-time University of Kentucky female students.
2. Data collection occurred between April 2011 and May 2011.

Limitations

The study was limited by:

1. A subjective survey developed to measure vaccine uptake, health behaviors, and demographic variables.

2. Vaccination was self-reported by participants; therefore objective measures, such as doctor records, were not utilized.
3. No control group was utilized.
4. Only two of the four components of the Health Belief Model were utilized: severity and susceptibility.

Summary

This study examined college female's knowledge of HPV and the HPV vaccine Gardasil® and relationships between Gardasil® vaccination and sources of information, rationale for vaccination or lack thereof, perceived susceptibility and severity of HPV, and unhealthy behaviors. This chapter presented background information of the study, the purpose of the study, the theoretical basis for the study, hypotheses, the significance of the study, delimitations, and limitations. Chapter Two will present a review of the literature pertinent to this study. Chapter Three will describe the methods utilized during the study. Chapter Four will present the results of the study and discuss significant findings. Chapter Five will provide a summary of the study, conclusions, and implications for future research.

CHAPTER 2
LITERATURE REVIEW

Introduction

This study had several research objectives. The first objective was to determine the current knowledge concerning HPV and the HPV vaccine Gardasil® by female undergraduate students at the University of Kentucky. Secondly, the study aimed to determine the sources of information, including the primary source of information about HPV and Gardasil®. Thirdly, the study looked to determine how many female college students have received at least one dose of the HPV vaccine, Gardasil®, and to determine the reasons for and against Gardasil® uptake. Next, this study sought to examine the perceived susceptibility and severity of contracting HPV. This study also examined possible relationships between getting inoculated for HPV and selected health behaviors: cigarette smoking, drinking alcohol, smoking marijuana, illicit drug use, and sexual behaviors. Lastly, the study looked to determine if selective variables can predict whether or not a student received the vaccination. This chapter will present a discussion of literature related to the present study.

Cancer

Disturbingly, statistics show that half of all men and approximately 33% of all women living in the United States will develop some form of cancer during their lifespan (American Cancer Society (ACS), 2011). Currently millions of people are either living with cancer or have been previously diagnosed with the disease. Cancer, the common name for over 100 different diseases, starts when cells within the body begin to grow at rapid rates without ceasing. The human body is composed of trillions of cells, that when

acting in a normal fashion, have a duration in the body that works in accordance with the needs of that individual. As a child, cells often are growing and dividing to keep up with a normal growth pattern. For an adult, many cells only divide to repair injured areas of the body or replace cells that are no longer effective (ACS, 2011.)

When cells grow at a speed that is out of the normal replacement or repair rate, cancer has started within the body. Cancer growth differs from normal cell growth in that the cells continue their division and growth without dying off. Over time, these cancer cells can also spread into other tissues, a phenomenon that does not occur with a normal cell (ACS, 2011).

Damaged deoxyribonucleic acid (DNA) is the trigger for normal cells to become cancer cells. DNA is the director of the actions of the cell. When a normal cell has damage to the DNA, that cell will either repair the damage or die; however, in a cell that is considered a cancer cell, the damaged DNA does not stop the cell from dividing. All cells created by the cell with the damaged DNA will also have damaged DNA. The created cancer cells will often form a mass, or tumor, although that is not true for all cancers. The cause for the damage to the DNA is still a subject of much research. There is a possibility that damaged DNA can be inherited, however the majority of damaged DNA comes from an error during normal cell division or due to an environmental cause (ACS, 2011).

There are over 100 different types of cancer and many of them act differently within the body and even in a different way within the body from individual to individual. Cancer cells can grow at varied rates throughout their lifespan. Different types of cancer respond differently to the various treatment options. A person with

cancer would need to discuss with his or her doctor about treatment options for their specific diagnoses (ACS, 2011).

Cervical Cancer

When the cells of the cervix grow without control, it is referred to as cervical cancer (ACS, 2011). The cervix is the lower part of a female's uterus and may be referred to as the uterine cervix. The cervix connects the main part of the uterus to the vagina. The cervix is comprised of an endocervix and an exocervix. The endocervix is located towards the main part of the uterus and is covered in glandular cells. The exocervix, sometimes referred to as the ectocervix, is located towards the vagina and is composed of squamous cells. The area in which these two cell types meet is called the transformation zone. The transformation zone is where most cervical cancers start to develop. Figure 2.1 shows the female reproduction system and the location of the cervix, including the exocervix and the endocervix.

Figure 2.1
Female Reproductive System

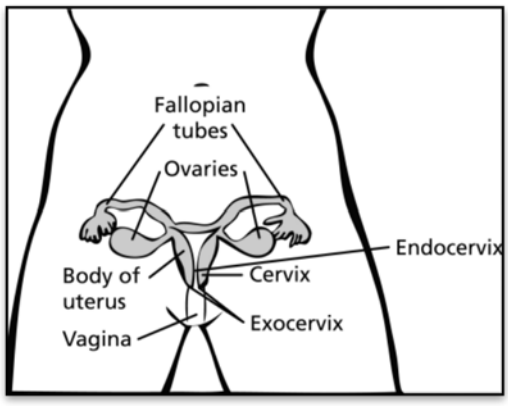


Image from American Cancer Society ©2011

The cells that develop into cervical cancer do so gradually. There are several terms that doctors use to describe the changes: cervical intraepithelial neoplasia (CIN), squamous intraepithelial lesion (SIL), and dysplasia. Any changes within the cells of the cervix can be identified by Pap tests and doctors and patients can take proper steps to prevent further cancer growth (ACS, 2011).

There are two main types of cervical cancers: squamous cell carcinoma and adenocarcinoma. Squamous cell carcinomas are the most common type of cervical cancer, a reported 80-90%, and are from the squamous cells that cover the exocervix. This type of cancer is often found where the exocervix meets the endocervix. The other 20%- 30% of cervical cancers are andenocarcinomas. These cancer cells start developing in the glandular cells of the endocervix. These cancers are becoming more common. There are cases of cervical cancer where there are both squamous cell carcinomas and adenocarcinomas, although these are uncommon occurrences. If both cancer cell types are present, the cervical cancer is called adenosquamous carcinomas or mixed carcinomas (ACS, 2011).

The development of cervical cancer usually happens over several years with small slow changes in pre-cancerous cells; however, there are instances where the development into cancer occurs over a time period less than a year. For women who are in the early stages of cervical cancer or have pre-cancerous cells there are generally no symptoms. Normally, symptoms do not begin until the cervical cancer becomes invasive and there is growth affecting other tissues (ACS, 2011).

The most common symptoms that are associated with cervical cancer are: painful vaginal intercourse, an unusual discharge from the vagina that may occur in between

periods, and/or abnormal vaginal bleeding. Abnormal vaginal bleeding could occur in a usual discharge, after having vaginal intercourse, spotting between periods, having longer or heavier periods, bleeding after the onset of menopause, or excessive bleeding after a pelvic exam. There are other possible explanations for the same symptoms but if an individual has any of these signs, a doctor should be informed (ACS, 2011).

Worldwide, cervical cancer is the second most common cancer in women. In Latin America, the Caribbean, and Eastern Europe, cervical cancer contributes to more years of life lost (YLL) than maternal conditions, AIDS, or Tuberculosis (Schiffman, Castle, Jeronimo, Rodriguez, & Wacholder, 2007). In the United states there are expected to be over 12,000 new cases of cervical cancer diagnosed and over 4200 women will die of cervical cancer in 2011 (ACS, 2011). In many developed countries, specifically in the Western countries, cervical cancer can be prevented through screenings and vaccine availability (Centers for Disease Control and Prevention (CDC), 2009). There has been an established link between the HPV infection and cervical cancer. The current estimates are that over 20 million Americans are currently infected with HPV and that approximately 6.2 million more people will be infected every year (CDC, 2010). It is estimated that by the end of 2011 there will be over 12,710 new cases of cervical cancer and over 4,290 deaths in the United States due to cervical cancer (CDC, 2011).

From 1998 – 2003 there was a large scale study that investigated approximately 83% of the U.S. population and cancer rates. This study estimated that there were 24,900 cases HPV-associated cancers. HPV causes almost all of the cases of cervical cancer and it is known to sometimes be the catalyst for other cancers (De Vuyst, Clifford, Nacimento, Madeleine, & Franceschi, 2009). Due to the fact that this study only covered

about 83% of the population, it is believed that the actual number of HPV related cancers is higher. HPV is thought to be responsible for about 90% of anal cancers, 65% of vaginal cancers, 50% of vulvar cancers, and 35% of penile cancers (De Vuyst et al., 2009). More recent studies have found that about 60% of cancers located at the base of the tongue or tonsils have connections to HPV (Kreimer, Clifford, Boyle, & Franceschi, 2005).

Human Papillomavirus

HPV is the most common type of sexually transmitted infection with which approximately 50% of sexually active persons have been infected, are currently infected, or will be infected within their lifetime (CDC, 2010). Approximately 80% of sexually active females will have been infected with HPV by the time they reach 50 years of age (Pichichero, 2006). There are over 40 different types of HPV and both men and women can get and spread HPV infections. Various parts of the genital area can be infected such as the skin of the penis, the vulva, the lining of the vagina, cervix, or rectum, and anus (CDC, 2007).

There are two clinical categories for HPV: the "low risk" genital warts-causing virus, and the "high risk" cervical cancer-causing virus. Both types of HPV can be passed through either vaginal or anal sex and the infected person may not know that he or she is passing it along. In those who do get the virus, approximately 90% of the cases can be cleared by the body's own immune system; however, that may take the immune system up to 2 years, and during this two year timeframe the virus can be spread (CDC, 2010).

Most of the individuals who get infected with HPV do not show physical signs and an infected individual can pass HPV on to their partners even after years of abstinence. An

infected person may develop genital warts that appear within weeks or months of the sexual encounter which transmitted the disease, if they appear at all. If an infected person does develop genital warts, for some individuals the warts will go away, for others the warts will stay unchanged on their body, and still for others, the warts will increase in size and number over time (CDC, 2007).

In a study conducted in major cities around the United States from January 2003 to December 2005, over 9650 women aged 14 – 65 years were tested for HPV prevalence. It was determined that 23% of tested women had HPV types that were considered high risk for cervical cancer. The prevalence was highest among the 14-19 age group (35%) and second highest was the 20-29 age group (29%). The older the participants the less likely they were to have HPV (Datta, Koutsky, Ratelle, Unger, Shlay, McClain, Weaver et al., 2008). The American College Health Association – National College Health Assessment (ACHA-NCHA II) from the fall 2010 found that 2.1% of college students have been to a doctor's office concerning genital warts or HPV within the past 12 months (ACHA-NCHA II, 2011).

The United States healthcare system supports much of the cost of medical needs due to HPV and HPV related illnesses. In 2004, cervical cancer care totaled between $300 and $400 million. With the rising costs of health care, it may be considered alarming that there is an estimated $3.5 billion spent on follow up Pap smears for women after abnormal results, management and care for women who have precancerous lesions, and those with cervical cancer. The vaccine and Pap smear testing together are more cost effective than a Pap smear alone if a person is not having the screening at the

recommended intervals (Dempsey & Freed, 2008). The HPV vaccine, Gardasil® has shown to prevent cervical cancer and precancerous lesions.

HPV Vaccination

There are currently two vaccinations that are available for the prevention of cervical cancer. The Human Papillomavirus (HPV) Vaccine, Gardasil®, was created by Merck and Co, Inc. (Whitehouse Station, NJ) and approved by the Food and Drug Administration for use in June of 2006. The vaccine is an intramuscular injection intended for use in females ages 9-26, although the recommended age is 11-12 years. The Gardasil ® vaccine is intended to prevent cervical cancer and precancerous lesions (Merck, 2008).

The vaccine is established to combat 4 of the 40 types of HPV; types 6, 11, 16, and 18. HPV types 6 and 11 are precursors for genital warts and seen in 90% of genital wart cases (Merck & Co., 2008). HPV types 16 and 18 are precursors for over 70% of cervical cancer cases (Merck, 2008). The vaccine is also known to protect against precancerous lesions caused by HPV types 6, 11, 16 and 18. Those lesions are cervical intraepithelial neoplasia (CIN) grade 2/3 and cervical adenocarcinoma *in situ* (AIS), cervical intraepithelial neoplasia (CIN) grade 1, vulvar intraepithelial neoplasia (VIN) grades 2 and 3, and vaginal intraepithelial neoplasia (VaIN) grades 2 and 3 (Merck & Co. Inc., 2008).

The vaccination is administered over a period of 6 months with a timetable of starting with the initial injection, a second injection at 2 months, and a third and last injection at the 6 month time period. It is recommended that an inoculated individual continues to be screened for cervical cancer on a regular basis. The vaccine is not currently approved for

use in females under the age of 9 years, pregnant women, or females over the age of 27 years. (Merck & Co. Inc., 2008). The vaccine has more recently been FDA approved for use in males (CDC, 2011) and in late 2011 the Advisory Committee on Immunization Practices (ACIP) recommended that males also be vaccinated against HPV (American Social Health Association, 2011).

The HPV vaccine Gardasil ® was determined to be most effective before the start of sexual activity and the recommendation is for females in the 11-12 year range to get the vaccine. Merck & Co., Inc examined the effectiveness of the vaccine for females ages 16-26 in regards to the impact that the Gardasil® vaccine had on the overall burden of HPV related cervical, vulvar, and vaginal disease. It was determined that for all women in the study the vaccination reduced the incidence of CIN by 97.4 %, AIS by 94.8%, VIN by 97.0% and genital warts by 96.4 %. There was a reduction in lesions caused by HPV types 6, 11, 16, and 18 (Merck & Co. Inc., 2008).

There are risks and side effects that have been observed with the HPV vaccination in some individuals. The reports included both minor and serious side effects among those that have been inoculated. Mild issues that have been reported include pain and /or redness and swelling at the injection site. Some individuals have reported a mild fever after inoculation and there have been a few reports of moderate fever. Other relatively minor complications that have been reported from vaccinated individuals include nausea and vomiting. The most common issue has been dizziness after injection of Gardasil® (AHFS Consumer Medication Information, 2009). Although most of these symptoms are not serious, public reports of such side effects could impact feelings towards the vaccine and ultimately the vaccination rate.

Some individuals have had serious side effects to the vaccine. Approximately 6.2% of all reported side effects were considered to be serious (Slade, Leidel, Vellozzi, Woo, Hua, Sutherland, et al., 2009). Unfortunately, there have been 32 cases of death reported in conjunction with the Gardasil ® vaccination. Of those 32 cases, only 20 had medical records to verify the death, 8 were second hand reports that could not be verified, and 4 were manufacturer reports with no identification. The majority of the deaths were thought to be compounded by other infections or diseases. The timing of the reported death ranged from 2 to 405 days after inoculation (Slade, Leidel, Vellozzi, Woo, Hua, Sutherland, et al., 2009).

Slade et al. (2006) has investigated problems reported after inoculation of the vaccine since its public release (also referred to as post-licensure. The Vaccine Adverse Event Reporting System (VAERS) was examined in 2008 to look for discrepancies between the HPV vaccine Gardasil® during the clinical trials and its release to the public. The report acknowledged that there had been an increase in the number of adverse event reports filed, however the effects could be due to the increase in the total number of people that received the vaccine (Slade, Leidel, Vellozzi, Woo, Hua, Sutherland, et al., 2009). These reported events could have negatively influenced general public perception of the vaccine and its safety**.** The ACIP and CDC still support the vaccine (CDC, 2011).

Despite the support from medical groups such as CDC, the vaccination rates may be considered low. The first research studies that looked into HPV and HPV infections among different age groups found that in the 20-24 year age range, 24% had a HPV infection. In 2008, a study by Dempsey and Zimet further investigated female adolescents and young adults and HPV vaccination rates. They determined that

adolescents and young adults did not have a strong source of information and that the information they did receive was incomplete. The conclusion was that this age group would be more likely to accept the vaccination if they were more familiar with the positive and negative outcomes from vaccination itself. Another study found that 18 year olds were four times more likely to report being vaccinated than the 19-26 year old participants (Licht, Murphy, Hyland, Fix, Hawk, & Mahoney, 2009).

Knowledge of HPV and HPV Vaccination

Lack of knowledge about the disease and vaccination, price of vaccination, and the extended period of time needed to complete the vaccination series all contribute to the low HPV vaccination rates. Further research into developing better tools for knowledge distribution and avenues for increasing acceptance of the vaccine would help to increase the rates of vaccination (Zimet, Shew, & Kahn, 2008). The ACHA-NCHA II fall 2010 survey recorded that 31.8% of the females who participated have received the HPV vaccine (ACHA-NCHA II, 2011).

In 2007, the knowledge ratio between HPV and its relation to cervical cancer was still relatively low. Tiro, Meisser, Kobrin, and Chollette (2007) found that of the 3076 women who responded to the 2005 Health Information National Trends survey, a random digit dial survey, there were gaps in knowledge about HPV. The age of the women in the survey ranged from 18-65 years. Only 40% (n=1,248) of the participants had heard of HPV, and less than 50% of those knew that it was a cause of cervical cancer. The women did recognize that HPV was a STI (64%), and that it is not rare (70%). Very few in the study knew that HPV often resolves on its own (4%). Less than 2% were able to answer all five items in the survey about HPV correctly. The women who were more aware of

HPV were associated with higher education levels and had visited a health care provider within the past year. The wide range of ages that participated in the survey could have an effect on the number of participants who were aware of HPV. The vaccine is only available to persons in the 9 – 26 years age range and those above that age range may not have discussed the vaccine with their health care providers, thus resulting in overall lower knowledge rates.

A study conducted by Ragin at el. (2009) about the knowledge of the general population with regards to the HPV and the HPV vaccine, found a much higher rate of knowledge. In this study, over 93% of the 202 female adults surveyed had heard of the HPV and 87% had heard of the HPV vaccine. However, when asked about the vaccine protection against most cervical cancers and genital warts, only 18% of the participants responded correctly. There is still room for knowledge and education about HPV and the HPV vaccine among the general population.

In 2006, Kentucky added two questions in regards to HPV to a CDC's Behavioral Risk Factor Surveillance System (BRFSS) survey taking place in two Appalachian counties. Over 600 women participated in the phone survey and their ages ranged from 18 to 70+ years. The first question added aimed to assess the participant's awareness of HPV and the second was asked to assess the acceptance of the vaccine for adolescent girls ages 10-15 years of age. The survey found that 57.6% of the respondents had heard of HPV and 70.2% accepted the vaccine for girls (Christian, Christian, & Hopenhayn, 2009).

Although there have been many studies that focused on the general public's knowledge about HPV and the HPV vaccine, there have been fewer studies that have

focused specifically on college aged students. One recent study conducted at a biomedical university assessed knowledge about the HPV vaccine. This study found that the mean percentage correct for the questionnaire was a 73 out of a 100. The participants seemed to understand that the HPV vaccine helps to prevent cervical cancer (97%), however only 41% were able to correctly identify that the vaccine also protects against genital warts (Tsau, Reutzel, Wang, Quinones, Nguyen, Hasan, & Workman, 2010).

There have been studies that examine the ethnic difference in HPV awareness. Due to the fact that many initial studies about HPV involved mostly white women, there was little data to support minority women in their knowledge about HPV. Face to face interviews were utilized to assess the knowledge and acceptability of HPV and the HPV vaccine among non-white women ages 16 years to over 55 years. In the age group of 16-24 years, 22% of women reported that they were aware of HPV, the highest out of all the age groupings (Marlow, Wardle, Forster, & Waller, 2009).

Sources of Information Regarding HPV and Gardasil®

The HPV vaccine continues to make headlines and news stories across all mediums of media. There are several outlets for information regarding the HPV vaccine that are available to the public: television commercials, websites, magazine ads, and radio spots all offer advertisement for the vaccine. However, the amount of information that can be given from these sources is often limited, whether due to time or space (Kelly, Leader, Mittmaier, Hornik, & Cappella, 2009).

An Italian study about the knowledge, attitudes and behavioral intentions of adolescents and young women concerning HPV found that participants of the self-administered survey were more knowledgeable if they talked to a parent who was a

health care professional, a person with a personal story about cervical cancer, or they had been to a health checkup within the past year (Giuseppe, Abbate, Ligori, Albano & Angelillo, 2008).

A study conducted in the Appalachian areas of KY determined that less than 50% of the areas have heard about HPV (44.4%). The majority of the respondents stated that they learned about HPV from a healthcare provider (37.1%) followed by the media (26.6%) (Hopenhayn, Christian, Christian, & Schoenburg, 2007). One Kentucky study indicated that college women who were having vaginal sex, those who reported having an STI, and those who have had an abnormal Pap test were more likely to be accepting of the vaccine. The study suggested that an area that would benefit from HPV vaccine promotion would be in a clinical setting (Crosby, Schoenberg, Hopenhayn, Moore & Melhan, 2007). According to the 2007 Texas BRFSS, 25.4% of 18- 26 year olds in Texas have talked to their doctor about the HPV vaccine (Wood & Cook, 2007).

Doctors are a critical source of information about the vaccination. There were many concerns voiced when the vaccine was first released for public distribution. A survey was conducted asking 375 doctors belonging to the American Academy of Pediatrics about their intentions of recommending the vaccine, if they already were recommending the vaccination, and what were the factors that led them to offer or not offer the HPV vaccine. The majority of doctors reported that they would recommend the vaccination to all of the patients that were eligible (88%). Although pediatricians are not the only healthcare providers that are able to talk about the vaccine with patients, their support could be very influential on vaccination rates (Ishibashi, Koopmans, Curlin, Alexander, & Ross, 2008).

Just prior to and after the release of Gardasil ®, there were various reports from the media about the vaccine. Reports containing incorrect information or reports that were missing key information could influence the public in a negative way. One content analysis study looked at the newspapers, newswires, and television news networks within the 6 months before and after the release of the vaccine. The study found that 99% of the stories mentioned that the vaccine was linked to cervical cancer, 78% reported that HPV was a sexually transmitted infection, and only 20% of the stories reported that women would need to continue with regular screening for cervical cancer after receiving the vaccine. Newspapers were significantly more likely to mention the continued need for cancer screening. The study also showed that many of the stories were missing critical information about the vaccine or cervical cancer (Kelly, Leader, Mittermaier, Hornik, & Cappella, 2009).

Another study that examined the news articles that mentioned HPV from January 2002 – June 2005 confirmed that there were 25 articles that were published from a pool of 285 US newspapers during the time period inspected. The information that was commonly referred to focuses on the information about the experimental status of the vaccine, the explanation of the link between HPV and cervical cancer, and the articles refer to the producers of the vaccine by name. The study found that there were critical components of information that were missing from the news articles which could mislead a person and ultimately misinform a decision made about the vaccine. It is noted that if a reader relies on newspapers as a source of information about the vaccine, then there could be negative influences on the public opinion in regards to the acceptance of the vaccine (Calloway,Jorgensen, Saraiya, & Tsui, 2006).

Buhi, Daley, Fuhrmann, and Smith (2009) found that the use of search engines, such as Google, was the predominant way to locate online sexual health information for most young adults. In college, the Internet is used in a variety of ways for undergraduate students. The Internet is able to provide information on a variety of topics at the type of a word or phrase. Riseout (2001) found that in the 15-24 years old age group, 75% access health information from the Internet.

There are several other sources of information for HPV and Gardasil® that young adults can use to gain access to information (Briones, Nan, Madden & Waks, 2011; Sandfort & Pleasant, 2009).Although there are many studies that ask for the various sources of information, none ask a female college student what she considers to be her primary source of information.

Vaccination Rates

A study conducted at two public universities with a self-administered survey found that 43.6% of participating females (n=406) received at least one dose of the HPV vaccine (Licht, Murphy, Hyland, Fix, Hawk, & Mahoney, 2009). In the fall of 2010 ACHA-NCHA II report that 48% of college females had received HPV vaccinations (ACHA-NCHA II, 2011). In both of the studies, less than 50% of females received the inoculation.

Health Belief Model

The Health Belief Model (HBM) was developed in the 1950's in order to study why very few people participated in health related programs that were developed to prevent and/ or identify diseases even if the programs were at no cost. Health motivation is the essential component of this theory and by applying it to college aged females the HBM

may offer insights to inoculation rates and decisions made by the participants concerning the HPV vaccine Gardasil. There are six main concepts in the HBM: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self – efficacy (National Cancer Institute, 2005). This study focuses on the concepts perceived severity and perceived susceptibility which is a limitation. Perceived severity is defined as the beliefs that an individual has about the chances they have of getting a disease (National Cancer Institute, 2005).

Perceived susceptibility can contribute to an individual's participation in a health-behavior change. Marlow et al. (2009) looked at the perceived susceptibility of females in predicting vaccination of HPV. The study looked at both younger and older women and how knowledge affected their perceived risk. For cancers, in general, it was determined that people perceived susceptibility when family history demonstrated that a certain cancer was prevalent. Personal behaviors could also affect perceived susceptibility. It was determined that knowledge of cervical cancer and its association with HPV may have an effect on the attitudes towards the vaccine. Marlow's study also determined that the general public seems unaware that a sexually transmitted infection could cause cancer (Marlow, Waller, & Wardle, 2009).

Brewer and Fazekas (2007) published an article that reviewed other studies where HPV vaccine acceptability was predicted by the health beliefs of the participants. The studies were conducted from 1995 to 2007. Since the vaccine was not available to the public until 2006, many of the studies were done prior to the release. Brewer and Fazekas found that people were more accepting of the vaccine when they believed that the vaccine was effective, when a physician would recommend it to them, and when they

thought that a HPV infection was a likely occurrence. It was also found that cost was the main barrier, followed by low perceived safety of the vaccine. Brewer and Fazekas (2007) published an article that reviewed other studies where HPV vaccine acceptability was predicted by the health beliefs of the participants.

Marlow et al. (2009) found that severity of HPV could be considered confusing to young adults. HPV is linked to cervical cancer, however it can be cleared by the body and therefore it is not always a threat. This confusion could lead to some young adults feeling that HPV is not very severe and thus, feel that there is no need for vaccination.

Unhealthy Behaviors

This study also looked at the relationships between other health risk behaviors of those who have received or plan to receive the vaccine versus those who have not nor plan to receive the vaccine. Specifically, this study examined cigarette smoking, alcohol use, drug usage, and binge drinking behaviors, as well as sexual behaviors among the participants in relation to HPV vaccine uptake. To the researcher's knowledge there are no current studies that had studied the relations between unhealthy behaviors and HPV vaccination. If there are specific behaviors that persons who accept the vaccine engage in, knowledge of those behaviors could assist in predicting whether or not someone will receive the vaccination.

In college, there are many opportunities to engage in behaviors that are seen as being unhealthy. These behaviors can involve alcohol, tobacco, or drug abuse or an increased sexual risk-taking behavior. American College Health Association National College Health Assessment (ACHA-NCHA II) has a regular survey that examines the behaviors for college students in the 30 days prior to taking the survey.

Most of the risk factors for an HPV infection are from the sexual behaviors of individuals. One significant risk factor is a relatively young age (20-24 for females and 25-29 for males). One study estimated that 74% of newly infected individuals were between the ages of 15 -24, in 2000 (Pichichero, 2006). The earlier and more often an individual engages in sexual intercourse, the more likely that individual will be infected with HPV. Other risks factors for becoming infected include condom use or the lack of use, number of sexual partners, sex with a new partner, and marital status (Zimet, Shew, & Kahn, 2008). In Kentucky, the Hopenhayn et al. (2007) study conducted in Appalachian areas suggested that women who were younger, smokers, and had lower income were more likely to accept the vaccination. This study could affirm those findings.

Cigarette smoking is seen as a unhealthy behavior and the Fall 2010 ACHA-NCHA II found that of the female college students surveyed 6.8% of them have smoked 1 – 9 days in the previous 30 days from the time they took the survey, 2.0% have smoked 10-29 days, and 3.7% have smoked on all 30 days. There was a total of 12.5% of females that smoked at least once in the previous 30 days is 12.5% (ACHA-NCHA II, 2011).

There were 47.9% of the college females that reported using alcohol 1-9 days in the previous thirty, 10.7 % reported using alcohol 10-29 days of the previous 30, and 0.5% reported using alcohol on all 30 days. In totality, all of the females taking the survey, 59.1 % reported having had alcohol at least once in the past 30 days (ACHA-NCHA II, 2011).

Marijuana use during the previous 30 days from the time of the survey was seen in the ACHA-NCHA II survey participants. The ACHA-NCHA II survey found 8.4% of the female survey respondents have smoked 1-9 days, 2.2% reported having smoked 10-

29 days, and 1.1% having smoked all 30 days. With other illicit drug use the ACHA-NCHA II survey found that 6.8% had used drugs 1-9 days out of the last 30, 1.2% had used 10 to 26 days of the last 30, and 0.8% used all 30 days (ACHA-NCHA II, 2011).

Some female college students partake in binge drinking. The ACHA-NCHA II survey asked how many times a person has 5 or more drinks in one sitting within the last two weeks. Female college students participating in the survey reported that 19.4% had participated in binge drinking 1-2 times in the past two weeks, 6.8% reported participating 3-5 times, and 1.3% had participated in binge drinking 6 or more times during the previous two weeks before the survey.

Condom Use in College Students

Condom use is a critical component to the prevention of spreading STI's such as HPV. Although condom use does not guarantee a person will not transmit or receive the HPV infection, it does decrease the likelihood of transmission. According to the data from the 2010 ACHA-NCHA II survey 34.2% of females reported that they have not had a sexual partner over the past 12 months,42.8% reported one sexual partner, 10.4% reported 2, 5.5% reported 3, and 7.2% reported 4 or more sexual partners in the past 12 months (ACHA-NCHA II, 2011).

Male condom use is the most common form of birth control as reported by the survey. Over 61% of college females report using a male condom as their choice of birth control during vaginal sex to prevent pregnancy. When the sexually active students were asked how often a condom or barrier was used for sexual intercourse over the previous 30 days, female replied that 5.8% used a condom during oral intercourse, 51.4% during vaginal intercourse, and 22.3% during anal intercourse (ACHA-NCHA II, 2011).

Lopez and McMahon (2007) looked at the HBM and the use of condoms as a way to prevent the spread of the HPV infection among college aged females. The study utilized a true or false question format to assess the knowledge of HPV first. The study found that 79.5% of the participants felt that their knowledge of HPV was poor and only 58% of the participants knew that there was a vaccine available for the prevention of HPV.

Summary

Cervical cancer is a serious disease that can now be prevented through the use of the vaccination Gardasil®. The vaccine is approved for use by females from 9-26 years of age. Vaccination of college aged females is important for protection against HPV and potentially the development of cervical cancer. Although there have been several studies that look at factors for HPV vaccination independently, this study aimed to look at the factors together to examine predictors for inoculation.

CHAPTER 3

METHODS

Introduction

This study explored college females and their knowledge of HPV and the HPV Vaccine, Gardasil®, how many female college students had received the vaccination or intended to receive the vaccination, the reasons for receiving the vaccination or not receiving the vaccination, and the sources of HPV and Gardasil® information with designation of the primary source. This study also explored the perceived susceptibility and severity of HPV and looked for relationships among HPV inoculation and specific unhealthy behaviors: cigarette smoking, marijuana and other illegal drug use, alcohol use, and condom use.

Sample and Population

This study was conducted at the University of Kentucky located in Lexington, Kentucky. At the time of the study the University had 18,296 full time undergraduate students, of which 9053 were female (University of Kentucky, 2010). This study recruited full-time female participants at the undergraduate college level. Undergraduate college females were chosen as the sole participants in order to capture participants who were most likely to be in the appropriate age range for the HPV vaccine. A full time student is defined as a student who has enrolled in a minimum of 12 credit hours per semester. The classification of student (freshman, sophomore, junior or senior) was determined by the number of earned credit hours reported through the registrar's office. After approval from the Human Subjects Institutional Review Board (IRB) at the University of Kentucky, the registrar provided the researcher with 2400 email addresses –

600 from each class of students. Female students who had closed records were not eligible for possible selection.

Research Design

A cross-sectional design was utilized with random sampling for survey participants. To decide sample size, Cochran's (1977) sample size formula for categorical data was utilized with a set alpha level a priori at .05. This formula is used to calculate the minimum sample size that can be used for survey.

The formula is as follows:

$$n_o = \frac{(t)^2 \times (p)(q)}{(d)^2}$$

$$n_o = \frac{(1.96)^2 \times (.5)(.5)}{(.05)^2} = 384$$

For Cochran's sample size formula above:

t = the value for an alpha level of .025 in each tail = 1.96

(p)(q) = estimate of variance, .5 each = .25 (maximum possible proportion (.5) x 1 – maximum possible proportion (.5) produces the maximum possible sample size

d = acceptable margin of error for proportion being estimated.

According to this method, if the sample size exceeds 5% of the population then an adjusted formula should be used.

$$n_1 = \frac{384}{(1 + \frac{384}{population})}$$

To account for the potential lack of participation the following equation was utilized.

$$n_2 = \frac{adjusted\ minimum\ sample\ size}{anticipated\ return\ rate}$$

There are approximately 9053 female undergraduates at the University of Kentucky. Utilizing the adjusted minimum sample size formula, there should be a minimum of 369 participants. To account for online survey response rate of 15%, the n_2 equation was utilized and the calculation brought the suggested number of recruited participants to 2400.

Upon IRB approval, instructions were given to the Registrar at the University of Kentucky to randomly select females evenly distributed among the four undergraduate classes. A total of 2400 full-time undergraduate female students were chosen for the sample – 600 freshman, 600 sophomores, 600 juniors, and 600 seniors. An email (Appendix A) was constructed and sent to the 2400 female students. The email served as the consent form for the IRB (Appendix A). The email explained briefly about the study and the survey. At the bottom of the email was an anonymous link to access the survey instrument. If an email recipient chose to participate in the survey, she would simply click the link at the bottom of the survey which would take her directly to the online survey.

Data Collection Procedures

Over the course of the study two methods were used in order to reach acceptable participation levels for the study. Below is a description of the two recruitment methods.

Part A

The initial recruitment method for this study centered on randomly chosen participants among the full time, female undergraduate population of the University of Kentucky. The registrar provided the researcher with 2400 possible participants and their email addresses. The list was given to the researcher both by class and one complete list.

Due to email size limitations, the researcher created four groupings: freshman, sophomores, juniors, and seniors to communicate with all of the possible participants. A total of 3 emails were sent out by the researcher to each potential participant. The first initial email was sent on April 6, 2011, followed by a reminder email sent to the group on April 14, 2011, and finally, the last email was sent on April 19th 2011. All participants were asked to complete the survey by April 21st, 2011.

Part B

To increase participation and keep the responses random, 22 professors who were listed in the University Course Catalog as teaching an undergraduate online course in summer sessions I and II were contacted. All professors were contacted via email (Appendix B) requesting that they post the information about the study and the study link on Blackboard to reach the students. The researcher reminded professors that the survey was for female participants only. There was no follow up reminders to the professors as the researcher did not want to burden them. The copy sent through the professors to potential participants gave the deadline of July 28th, 2011. The professors who were contacted taught classes in the summer session at the University of Kentucky for the following departments: English, Biology, Chemistry, Kinesiology and Health Promotion, Geography, Communications, Women's Studies, and Theater. The researcher did not ask for confirmation of posting the information and link.

The incentive to complete the survey was an opportunity to win one of five (5) $25.00 Target Gift cards. At the end of the survey, participants were given an opportunity to enter the drawing. An entry to the drawing required the participant to enter her name and email address. All information provided by participants who opted to enter

the drawing was kept confidential. The website RANDOM.org was used to select the winners of the drawing.

Protection of Human Subjects

The University of Kentucky Institutional Review Board (IRB) approved this research study. This approval was granted before any data collection began. All of the research staff had completed the CITI training required by the Office of Research Integrity. The email sent to all possible participants explained that by clicking on the link to the survey, the individual was consenting to participate in the study. Participants were made aware that information supplied would be kept anonymous and confidential.

Pilot Testing

Before data collection was begun, a pilot data survey was distributed to 15 undergraduate females. The purpose of the pilot data was to test the survey instrument for understanding and ease of use. The pilot testing utilized Qualtrics (Qualtrics Labs, Inc., 2011) to deliver and collect data from the online survey. Twelve students participated in the pilot data collection. The researcher asked for suggestions for improving the content clarity and flow of the survey to be emailed. The survey was adjusted to reflect the emailed suggested changes. The first suggestion was to offer answers to the true or false questions that were asked in the beginning of the survey. These answers were supplied for those who requested them after the survey was closed to enrollment via an email (Appendix F). There was also a recommendation to capitalize key words in questions where there may have been subtle differences in the wording. The researcher took the opportunity to make sure that all key terms that could influence the participant's response were bolded and clear to the reader. All modifications were then

approved through the University's IRB. The link to the final version of the survey was then emailed out to potential participants.

Survey Instrument

This study utilized an online survey (Appendix C) to gather information. The survey was developed at the University of Kentucky and consisted of questions from the researcher and health educators as well as previous studies, presentations, and demographic questions. The survey consisted of a total of 28 questions. The survey instrument, developed using Qualtrics, enabled customization of the questions asked based on answers provided by the participant, thus skipping questions that were not relevant to a particular participant. The survey took participants in the pilot study about 10 minutes to complete.

This survey tool was developed to efficiently and accurately meet the study objectives. Nominal, ordinal, interval, and ratio data were collected through the survey questions. The first four questions of the survey were knowledge-based questions regarding HPV and the HPV vaccine, Gardasil®, and were retrieved from a previous study by Lopez and McMahan (2007), a Gardasil ® brochure (Merck, 2008) and fact sheets from the CDC (2011). The first question simply asked if the participant had heard of HPV. If the participant answered yes or maybe, the second question would ask 6 true or false questions to establish the knowledge level of the participant on HPV. If a participant answered no to the first question, the survey instrument would automatically move her to the third question. The third question asked the participant if she had heard of the human papillomavirus vaccine, Gardasil®. If the participant answered yes or maybe, the survey would move on to 4 true or false questions regarding the vaccine to

determine the knowledge level of the participant about the vaccine. If a participant answered no, that she had not heard of the HPV vaccine then the participant was moved ahead to questions regarding health behaviors, skipping the questions related to the vaccine.

The fifth question in the survey was created to determine the source of information concerning HPV and the HPV vaccine. The question asked participants to mark all of the sources of information from which they received information regarding Gardasil®. Question 6 then moved the marked sources forward and asked the participant to choose the single, most primary source of information from which they received information in regards to the vaccine, Gardasil®.

In order to study the intentions of HPV inoculation, questions 7 – 11 were compiled and modified from Jones and Cook (2008). The Jones and Cook study looked exclusively at the intentions of university students to get the HPV vaccine. The questions were modified to reflect options that were not previously offered and to develop wording that was more appropriate for this study. In order to clarify behaviors regarding the vaccine and intentions of vaccination, question 7 asked if the participant had received at least one dose of the HPV vaccine Gardasil®. If a participant answered that Gardasil® had not been received, the survey moved the participant ahead to question 9, which asked for reasons for not being vaccinated. If a participant marked that she had received at least one dose of the vaccine or was unsure, the survey continued to question 8.

Question 8 further examined the participant's response to the vaccine. The survey asked the participant to choose how many of the vaccine doses she had received and her intentions for the completion of the series of vaccinations if she had not completed the

series already. The first option offered that the participant had received all three of the injections. The second option was that the participant had received at least one of the injections and was planning to continue with the series. The third option was that the participant had received one or two doses but was not planning on getting anymore of the injections. The fourth and fifth options were created for those who may have chosen unsure in question 7. The fourth option offered that no doses had been received but there was intention of getting the vaccine, and the fifth option was that no doses had been received and there was no intention of getting any vaccines.

The survey moved the participant to either question 9, 10, or 11 based on the response given in question 8 in order to most accurately determine the participant's attitude toward the vaccine. A participant would have moved onto question 9 if she answered that she had not had any of the HPV vaccine series in question 7, or if in question 8, she had answered that she had received a dose or two of the vaccine and was not planning on continuing. Question 9 asked the participant to select all of the possible reasons for either not receiving the vaccine or choosing not to continue with the vaccine series.

Question 10 asked the participant to mark all of the reasons why she either completed the vaccination series or intended to complete the series. A participant would have been moved to this question if in question 8 she had selected that she completed the series of injections, or that she had one or two doses and intended to complete the series. Question 11 was placed in the survey for determining the reasons for intending or planning on vaccination. This question was designed for the person who was unsure if she had received the vaccine.

Question 12 was adapted from Lux and Petosa (1994) which looked at severity and susceptibility with HIV among adolescents. In this study, the questions were adapted for HPV. The present study offered six statements in which the participant was asked to decide how she felt about HPV. The participant chose how she felt about each statement ranging from strongly disagree (1) to strongly agree (4). The statements were used to assess the perceived severity and perceived susceptibility of the vaccine.

In order to examine the health behaviors of the participant, question 13 was constructed. Question 13 was taken from the University of Kentucky Health Behavior Survey (Staten, Miller, Noland, & Rayens, 2005). This question asked the participant to select how often she participated in unhealthy behaviors in the past 30 days. The question specifically asked about smoking cigarettes, drinking alcohol, smoking marijuana, other illegal drug use (such as cocaine and methamphetamine), and binge drinking. The participant had a scale of answers to choose from starting at 0 days (1) and ranging up to 20 – 30 days (5). The timeframe of the scales was the same scale used by ACHA-NCHA (2011).

Participants were asked about their sexual behavior and condom use with their partner for the past month in question 14 which was adapted from the 2007 YBRFS (MMWR, 2008). The participants were asked about frequency of condom use during vaginal intercourse, anal intercourse, and oral intercourse over the past month. Question 14 utilized a Likert scale which offered the following options: no intercourse in the last 30 days (1), never used a condom (2), rarely used a condom (3), sometimes used a condom (4), most of the time used a condom (5), always used a condom (5).

The next 10 items on the survey consisted of demographic questions selected to determine specific information about the study's participants. Question 15 asked for the participant's age. The Gardasil® vaccine has an age restriction, 9 – 26 years of age, and those who are outside of the age restriction may have different opinions and influences about Gardasil®. The present study sample only utilized those who were eligible for vaccination. Question 16 asked the participants to select their gender. Although the survey was intended for female participants only, if a male student would have taken the survey, the researcher wanted to be able to identify and eliminate the responses so that it would not have influenced the data. Question 17 asked for participants to select their race. Participants were asked to select their highest level of completed education for question 18. This question was asked because academic class level may have influenced participant level of knowledge, for example, a senior may be more likely to have had a health class or more opportunity to visit with a university doctor while a freshman may not have had those opportunities. The 19th and 20th questions asked the participant about their parent's level of education in order to help the researchers infer the socioeconomic level of the participant.

Question 21 inquired about the participant's relationship status in terms of single or married, and question 22 asked the participant to choose how she would describe her sexual orientation. The participants were also asked if they have received a flu shot as question 23 in the survey. Question 23 was asked to allow the researcher to gather information about another health behavior that requires an injection for positive outcomes.

Question 24 asked the participant if she had ever been diagnosed with HPV. Presumably, if a participant had been diagnosed with HPV, she would have had certain attitudes about the HPV vaccine that could be important for the researcher to record. Question 25 asked the participant to determine how many sexual relationships she had over her lifetime.

Question 26 asked if the participant would like to be entered for the drawing of a $25 Target gift card. If the participant selected yes, the participant was prompted to provide a name and email so that the researcher was able to select and contact the winner. If the participant selected no, she was moved forward to question 28 which asked for the participants' email address if she would like to have received an email with the answers to the true or false questions (Appendix F) at the beginning of the survey.

Data Analysis

The collected survey data were downloaded from the Qualtrics software directly into the Statistical Software Package for Social Sciences (SPSS) version 20.0. There were 601 returned surveys. Each of the respondents was given a unique code by SPSS of letters and numbers. The researcher reassigned IDs to each of the surveys by simply numbering them from 1 – 601. Of the 601, there were 48 surveys that were removed from the data analysis because they were not completed, there were also 33 surveys removed because the responder was out of the vaccination age range. Lastly, 4 more surveys were removed due to inconsistencies within the response. The data analysis sample consisted of 516 surveys.

Due to the survey format, there were answered questions that were transferred into SPSS as unanswered or missing data. The "missing" data was adjusted to represent

non response rather than missing data. For data analysis some of the variables were modified. Question 7 on the survey, which asked if a participant had received at least one injection, gave participants three options: “yes”, “unsure,” and “no.” The seven “unsure” responses were converted to either ‘yes” or “no” based upon subsequent responses. If in later questions the participant responded that they had received the vaccination then their previous answer was corrected to a “yes,” if subsequent answers were unclear or indicated the participant had not received the vaccine then the answer was changed to a “no.”

Descriptive statistics were utilized to describe the characteristics of the participants. These data were presented as percentage of the total and the number of responses for each particular category. The general characteristics contained within in the demographic information included the gender, age, race, level of education, and parental level of education. Descriptive statistics also included relationship status, sexual orientation, diagnosis of HPV, flu vaccination rate, and number of sexual partners.

Descriptive statistics were used to answer the first five objectives of the study, to determine the knowledge level of HPV and Gardasil® among female college students, to determine the sources of knowledge, to determine how many participants had received at least one injection of Gardasil®, to determine the rationale for Gardasil® uptake or not, and to determine what was the perceived susceptibility and severity of HPV among female college students. For each of these variables a percentage of the total and number of participants was calculated.

For further examination of the first objective, the ten knowledge questions were used to create a total knowledge score. A total score was comprised of correctly

identifying the given statements as true or false. Scores were calculated for each individual as the number of questions correct out of the number of questions attempted. If a person left a question blank, it was not counted against her score. The total score was utilized for determining the mean and mode of knowledge about HPV and Gardasil® among the female college students.

Objectives 2 – 5 were utilized to determine factors for inoculation through the use of the vaccination rate as a dependent variable in crosstabulation statistics. The independent variables were sources of knowledge, rationales for uptake or not, perceived susceptibility or severity, unhealthy behaviors, and condom use.

Crosstabulation statistics were also used to answer objective 6, to determine if there was a relationship between unhealthy behaviors and getting inoculated for HPV. In the crosstubulation calculations, the dependent variable was vaccination and the independent variables were: cigarette smoking, drinking alcohol, smoking marijuana, other illegal drug use, binge drinking, and condom behaviors for vaginal, anal, and oral intercourse.

To address the last objective, a logistic regression analysis was used. The last objective was to determine if selective variables could predict whether or not a student received the vaccination. The logistic regression used vaccination as the dependent variable. The independent variables came from the demographics, the HBM statements, unhealthy behaviors, and condom use. The demographic variables included race, education level, father's and mother's education level, relationship status, sexual orientation, flu shot vaccination, and number of sexual partners. The HBM statements included 3 susceptibility statements: the belief that the participant may one day be at risk

for getting HPV, the belief that the vaccination would be a good way to protect against HPV, and that it was possible that the participant may get HPV in the future. The severity statements were: the belief that if the participant got HPV there would be serious negative consequences, the belief that HPV would be extremely harmful and that the participant was not worried about getting genital warts. The unhealthy behaviors that were used as independent variables included: cigarette smoking, alcohol use, marijuana use, other illegal drug use, and binge drinking. The last category of independent variables was condom use which utilized the following categories: vaginal condom use, anal condom use, and oral condom use.

Variables

Logistic Regression Dependent Variable

Vaccination rate was the dependent variable for this study. This variable was measured in question 7 which asked if the participant had received at least one of the three doses of Gardasil®. The participants were categorized as "yes, they had received at least one dose of Gardasil®" or "no, they had not received at least one dose of Gardasil®." Those who had received at least one dose of the vaccine were considered to be vaccinated. The survey question allowed for an "unsure" response. Participants who marked unsure were categorized as "yes" or "no" based on their answers to other questions in the survey instrument.

Logistic Regression Independent Variables

The independent variables were demographics, the HBM statements, unhealthy behaviors, and condom use. The demographic variables included race, education level, father's and mother's education level, relationship status, sexual orientation, flu shot

vaccination, and number of sexual partners. Race was measured by five categories in question 17. Education levels were measured in question 18. The original question had 8 categories ranging from some high school to completed graduate school. The survey was designed for undergraduate females; however, because the names came randomly from the Registrar, the other categories were included to capture participants who were removed from the sample as necessary. For logical regression analysis, the four categories that were used for education levels ranged from freshman year of college to senior year of college.

Both father's and mother's educational level was utilized as independent variables measured by questions 19 and 20. The parental education level offered 5 possible responses ranging from did not complete high school(1) to post bachelor's degree education(5).

Relationship status was measured by question 21 and offered two categories for a participant to choose from: single or married. Sexual orientation was measured in question 22 and offered the following categories: heterosexual, homosexual, bisexual, and other. Question 23 asked participants if they had a flu shot in the current year. Categories for flu vaccination included, yes, maybe, and no.

Participants were also asked if they had been diagnosed with HPV which was measured in question 24. There were three categories to choose from: yes, unsure, and no. The last independent variable in the logical analysis was the number of sexual partners a participant has had in her lifetime. This was measured by question 25, which allowed for choices ranging from 0 partners to 10 or more partners.

The HBM statements included 3 susceptibility statements: the belief that the participant may one day be at risk for getting HPV, the belief that the vaccination would be a good way to protect against HPV, and that it was possible that the participant may get HPV in the future. The severity statements were: the believe that if the participant got HPV there would be serious negative consequences, the belief that HPV would be extremely harmful, and lastly, that the participant was not worried about getting genital warts. These statements were measured in question 12 by a Likert scale. In the original question, the Likert scale offered the following categories: strongly disagree (SD), disagree (D), agree (A), or strongly agree (SA). Categories were then condensed into two categories, SD/D and SA/A for use in logical regression.

The unhealthy behaviors that were used as independent variables included: cigarette smoking, alcohol use, marijuana use, other illegal drug use, and binge drinking. All of the above variables were categories in question 13. The question asked how often the behavior had happened in the previous 30 days using a Likert scale. The previous 30 days were broken down for the participants into 6 options: 0 days, 1-2 days, 3-5 days, 6-9 days, 10-19 days, and 20 – 30 days. This scale was the same scale utilized by the ACHA-NCHA II survey (2011).

The last category of independent variables was condom use utilizing the following independent variables: vaginal condom use, anal condom use, and oral condom use. These variables were measured in question 14 and were set as a Likert scale. The participants were asked about their use of condoms over the past 30 days and included the following options: no intercourse in the last 30 days, never used a condom, rarely used a condom, sometimes used a condom, most of the time used a condom, and always

used a condom. For analysis, the participants who marked that they had not participated in the sexual intercourse over the past 30 days were removed.

CHAPTER 4
RESULTS AND DISCUSSION

Introduction

The present study specifically explored college females and their knowledge of HPV and the HPV Vaccine, Gardasil®, how many female college students had received the vaccination or intended to receive the vaccination, the reasons for receiving the vaccination or not receiving the vaccination, and the sources of HPV and Gardasil® information with designation of the primary source. This study also explored the perceived susceptibility and severity of HPV and looked for relationships among HPV inoculation and specific unhealthy behaviors: cigarette smoking, marijuana and other illegal drug use, alcohol use, and condom use. This chapter presents the results and discussion.

Presentation of Results

The survey was open for data collection from April, 2011 to July, 2011. In the first round of recruitment 2400 emails were sent to selected possible participants. There was a response rate of 21% (N=508). The second recruitment occurred through the contact of 22 professors listed in the University Course Catalog as teaching an online course in at the University of Kentucky in summer sessions I and II. All professors were contacted via email (Appendix B) request.

In total, there were 601 recorded responses to the survey. There were 48 surveys that were left uncompleted and so were eliminated from the surveys analyzed. There were 33 surveys that were completed by females who were outside of the age range for Gardasil ® inoculation (ages 9 – 26 years), and those responses were also eliminated.

Two additional surveys were removed because of responses stating that the participant was male. Two more surveys were considered to be invalid due to contradictions in the critical responses to having received the vaccination. After dropping these participants, the sample included 516 female college students.

Table 4.1 demonstrates the general characteristics of the sample.

Table 4.1
General Characteristics of the Participants

Variable		*n*	Percentage
Age			
(in years)	18	63	12.2
	19	129	25.0
	20	123	23.8
	21	96	18.6
	22	65	12.6
	23	25	4.8
	24	5	1.0
	25	5	1.0
	26	5	1.0
Race			
	African American	28	5.4
	Asian	23	4.5
	Caucasian	443	85.9
	Hispanic/Latino	10	1.9
	Other	12	2.3
Completed Education Level			
	Completed High School	22	4.3
	Freshman Year of College	132	25.6
	Sophomore Year of College	118	22.9
	Junior Year of College	120	23.3
	Senior Year of College	120	23.3
	Some Graduate School / Professional School	4	0.8
Father's Education Level			
	Did not complete HS	22	4.3
	High School	102	19.8
	Some college or post-secondary education	92	17.8
	College Degree	177	34.3
	Post Bachelors	123	23.8
Mother's Education Level			
	Did not complete HS	11	2.1
	High School	81	15.7
	Some college or post secondary education	100	19.4
	College degree	194	37.6
	Post bachelors degree	130	25.2

Table 4.1 (continued)
General Characteristics of the Participants

Variable	*n*	Percentage
Relationship Status		
Single	480	93.0
Married	36	7.0
Sexual Orientation		
Heterosexual	491	95.2
Homosexual	8	1.6
Bisexual	14	2.7
Other	3	0.6
Flu Shot Inoculation		
Yes	123	23.9
Maybe	7	1.4
No	384	74.7
Previous HPV Diagnoses		
Yes	34	6.6
Unsure	8	1.6
No	473	91.8
Number of Sexual Partners		
0	126	24.4
1	125	24.2
2	64	12.4
3	44	8.5
4	34	6.6
5	34	6.6
6	13	2.5
7	15	2.9
8	7	1.4
9	9	1.7
10 or more	45	8.7

Note. *n* = sample size; *P* = percentage.

All of the included participants were females in attendance at the University of Kentucky. The age range was 18 to 26 years. Of the sample, there were 12.25% (n=63) 18 year olds, 25.0% (n=129) 19 year olds, 23.8% (n=123) 20 year olds, 18.6% (n=96) 21

year olds, 12.6% (n=65) 22 year olds and 4.8% (n=25) 23 year olds. There were 15 participants in the 24 – 26 years of age range, with 1.0% (n=5) participants at each age. The majority, 85.9% (n=443) of participants were Caucasian. There were participants from all four levels of college education: 25.6% (n=132) freshman, 22.9% (n=-118) sophomore, 23.3% (n=120) juniors, and 23.3 % (n=120) seniors in the sample. The majority of participants had parents who were college educated, 34.3% (n=177) of their fathers held a college degree and 37.6% (n=194) of their mothers held a college degree. The majority of participants categorized themselves as being single (93.0%, n=480) and 7.0% (n=36) were married. The sample reported themselves as mainly heterosexual (95.2%, n=491). However, the sample included 1.6% (n=8) homosexual sexual orientation and 2.7% (n=14) as bisexual. The majority of the sample (74.7%, n=384) did not get a flu shot in the previous year. Most of the participants reported that they did not have HPV (91.8%, n= 473). There were 34 participants (6.6%) who reported that they did have HPV. In the reported number of sexual partners among the sample, the majority of participants have had either none (24.4%, n=126) or one (1) (24.2%, n=125) sexual partner. There were 8.7% (n=45) of participants who reported ten or more sexual partners.

The participants were asked if they had heard of HPV and 94.2% (n=486) of participants answered that they had heard of HPV, 5.2% (n= 13) of participants selected that they had not heard of HPV, and less than one percent (0.6%, n=3) selected that they were unsure if that had heard of HPV. If participants answered that they had had heard of HPV or were unsure, they were asked to complete 6 true or false questions to ascertain

their knowledge level. Table 4.2 shows the statements and responses regarding HPV knowledge.

Table 4.2
Knowledge of HPV (n = 489)

	True	False
	Percent *(n)*	
HPV is the most common sexually transmitted disease.	62.6 (306)*	37.4 (183)
There are many types of HPV.	62.6 (306)*	36.3 (183)
When someone has HPV, there are always visible signs.	1.8 (9)	98.2 (480)*
HPV may go away on its own.	29.9 (146)*	60.1 (343)
Over 50% of sexually active people have HPV.	65.0 (318)*	35.0 (171)
Even with the use of a condom, HPV can be spread.	86.1 (421)*	13.9 (68)

* Denotes the correct answer

There were six true or false statements used to assess the knowledge of HPV among the sample. The statement "HPV is the most common sexually transmitted disease." was correctly identified as true by 62.6% (n=306) of the sample. The statement "There are many types of HPV" was correctly identified as true by 62.6% (n=306) percent of the sample. The statement "When someone has HPV, there are always visible signs" was correctly identified as false by 98.2% (n=480). When asked if the statement "Over 50% of sexually active people have HPV," 65.0 % (n=318) correctly identified it as true and the statement "Even with the use of a condom, HPV can be spread" was correctly identified as true by 86.1% (n=421) of the sample. However, the fourth statement, "HPV may go away on its own", was answered correctly by less than one-third of the participants. Only 29.9% (n=146) correctly identified the statement as true.

In the sample, 96.5% (n= 498) responded that they had heard of the HPV vaccine, Gardasil ®, 1.2% (n=6) responded that they were unsure if they had heard of the vaccine, and 2.3% (n =12) responded that they had not heard of Gardasil ®the HPV vaccine. If the participant responded that she had not heard of the HPV vaccine, she was not included in the questions regarding the knowledge of the vaccine, source of knowledge of vaccine, and reasons for getting or not getting vaccinated. Therefore, 504 participants were assessed about their knowledge of the HPV vaccine Gardasil ®. Table 4.3 shows the statements and responses from the sample in regards to HPV vaccine knowledge.

Table 4.3
HPV Vaccine Knowledge (n = 504)

	True	False
	Percent *(n)*	
The HPV vaccine consists of three injections.	98.2 (495)*	1.8 (9)
It takes over a year to complete all of the vaccines.	64.3 (324)	35.7(180)*
The cost for the vaccine is over $500.00 for all of the injections.	27.0 (136)	73.0 (368)*
The age range approved for the vaccine is 9 – 26 years.	83.9 (423)*	16.1 (81)

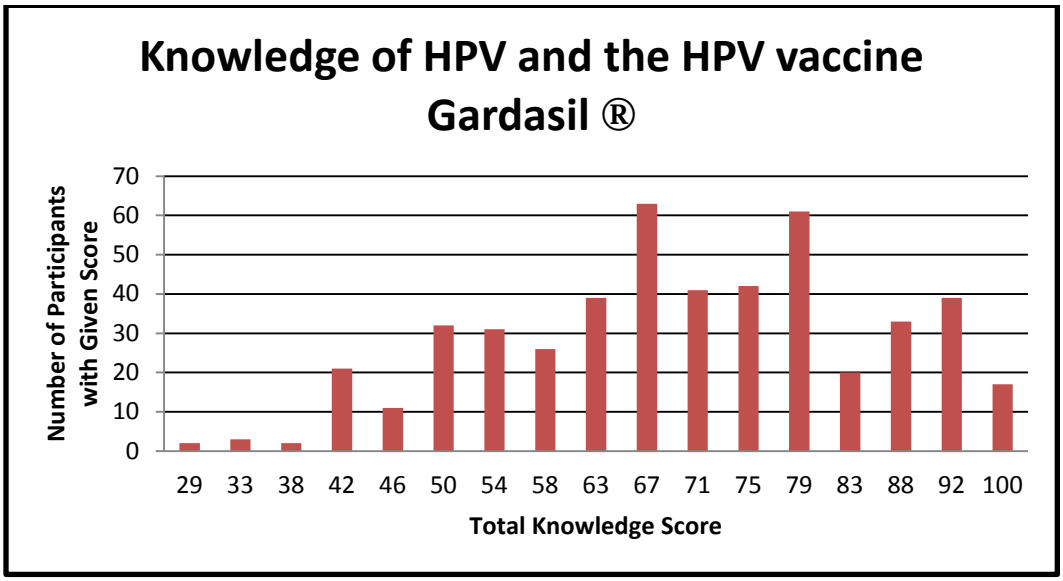
* Denotes the correct answer

There were four true or false statements that were used to assess the participants' knowledge of the HPV vaccine, Gardasil ®. The statement "The HPV vaccine consists of three injections" was correctly identified as true by 98.2% (n=495) participants and the statement "The age range approved for the vaccine is 9 – 26 years" was correctly

identified as true by 83.9% (n=423) of the participants. The two false statements were "It takes over a year to complete all of the vaccines" and "The cost for the vaccine is over $500.00 for all of the injections." Those statements were correctly identified by 35.7% (n=180) and 73.0% (n=368) respectively.

A total score was given to each participant. The total score was an average score comprised of the number of correct answers to the true or false questions divided by the total responses that the particular individual answered. This calculation allowed for a score for respondents who left questions unanswered. Figure 4.1 displays a histogram of the total knowledge scores.

Figure 4.1
Total Knowledge Scores of Participants



The mean total knowledge score was comprised of the 10 knowledge questions asked about both HPV and the HPV vaccine, Gardasil®. The mean score was 70, and the mode was a 67. The range of scores was a low of 29 percent to 100 percent.

All participants who identified that they had not heard of the HPV vaccine Gardasil® were moved forward in the survey skipping questions regarding the knowledge of the vaccine, source of knowledge of vaccine, and reasons for getting or not getting vaccinated. Based on the participant responses for other questions throughout the survey, 5 of the "unsure" responses were converted to "yes" responses and 1 was converted to a "no" response. Thus, 503 participants answered the HPV questions and 13 participants skipped to the questions regarding HPV and perceived susceptibility and perceived severity questions.

Table 4.4 shows the different sources of information for HPV and the HPV vaccine. Participants could choose more than one source of information.

Table 4.4
Sources of Information about HPV and HPV Vaccination [a]

	n	Percentage
I have not heard of the HPV vaccine	1	0.2
Doctor	404	80.2
Parent	268	53.2
Other Relatives	48	9.5
Friends	267	53.0
Internet	115	22.8
In a health class	124	24.6
Gardasil® Brochure	134	26.6
Television	329	65.3
Magazine	121	24.0
UK Health Service	61	12.3
Other	10	2.0

[a] Participants could choose more than one source of information

There are various sources of information regarding the HPV vaccine. Participants were asked to choose all sources of information. The participants reported that the most common source of information was their doctor at 80.2% (n= 404), television (65.3% n= 329), parent (53.2%, n=268), and friends (53.0%, n=267). Many other sources were also

selected: other relatives, 9.5% (n=48), Internet, 22.8% (n=115), in a health class, 24.6 % (n=124), Gardasil® brochure, 26.6% (n=134), magazine, 24.0 % (n=121), and UK health service, 12.3% (n=61).

Once selections were made for the participant sources of information, those choices were used to determine which was considered to be the primary source. Table 4.5 shows the participant selection of the primary source of information.

Table 4.5
Primary Sources of Information about HPV and HPV vaccination [a] (n=504)

	n	Percentage
I have not heard of the HPV vaccine	1	0.2
Doctor	215	42.7
Parent	75	14.9
Other Relatives	5	1.0
Friends	39	7.7
Internet	11	2.2
In a health class	16	3.2
Gardasil® Brochure	9	1.8
Television	120	23.8
Magazine	5	1.0
UK Health Service	8	1.6

[a] Participants could only choose one source of information

When asked of all the possible sources, which would be considered the primary source of information, the most common response was doctor (42.7%, n=215), followed by television (23.8%, n=120) and the third most common primary source was a parent (14.9%, n=75). Other primary sources of information included: friends, 7.7% (n=39),

other relatives, 1.0% (n=5), internet, 2.2% (n=11), in a health class, 3.2 % (n=16), Gardasil® brochure, 1.8% (n=9), magazine, 1.0% (n=5), UK health service, 1.6% (n=8).

The majority of survey participants have received at least one dose of the HPV vaccine as seen in Table 4.6.

Table 4.6
Percentage of Participants Who Have Received at Least One Injection

	n	Percentage
Yes	299	59.4
No	204	40.6

In the sample 59.4% (n=299) received at least one injection of the HPV vaccine Gardasil® and 40.6% (n=204) have not received any of the injections. Not of all of the participants who started the injection series have completed the series. Table 4.7 summarizes the participant completion of the vaccination.

Table 4.7
Completion of HPV Vaccination Series (n=307)

	n	Percentage
Yes, I have completed all 3 injections in the series	254	82.7
Yes, I have completed one or two injections in the series and yes I plan to compete the rest of the series	24	7.8
Yes, I have completed one or two injections in the series and no I DO NOT plan to get anymore in the series	16	5.2
No, I have not received any of the injections but yes, I plan to	9	2.9
No, I have not received any injections in the series and no, I do not plan to	4	1.3

Of the 299 who have had at least one Gardasil® injection, 254 participants have completed all three of the injections in the series, a completion rate of 82.7%. Some of the students who completed the survey had not completed the vaccination series; 7.8%

(n=24) intend to complete the series. Some of the students will not be completing the series of vaccinations (5.2 % n= 16).

Participants in the study who did not start the vaccination series, and those who started the series and stopped, were asked to choose reasons for their decision. The selections made by the participants as reasons for either not starting or stopping the HPV vaccination series are summarized in Table 4.8.

Table 4.8

Rationale for Not Getting Vaccine or Not Completing HPV Vaccination Series [a] *(N=217)*

	n	Percentage
The vaccine is too new	70	32.3
I am too young to get the vaccine	1	0.5
I am not sexually active	72	33.2
My insurance does not cover the cost	14	6.5
I do not have insurance	13	6.0
I oppose the vaccine due to moral or religious reasons	4	1.8
Generally, I am cautious of vaccines	50	23.0
It is too expensive	44	20.3
Vaccines against STI's may encourage sexual behavior	6	2.8
I am worried that people will think that I am sexually active	7	3.2
I have not considered the vaccine	61	28.1
I believe that I do not know enough about the vaccine to get vaccinated	60	27.6
I am worried about side effects	75	34.6
I believe that screening alone is enough protection	5	2.3
I have already been exposed to HPV and therefore do not think that the shot will help me	10	4.6
I have heard negative things about the vaccine	38	17.5
I believe that having to get 3 separate injections Is too complicated	19	8.8
I do not like to get shots	50	14.7

[a] Participants could choose more than one rationale

All participants who either responded that they had not received any of the HPV vaccinations or those who had received one vaccination in the series but were planning

on completing the series, were asked to select all the reasons for their decision (n= 217). The participant's most common rationale for not receiving the vaccination or stopping in the middle of the vaccination series was "I am worried about side effects" (34.6%, n= 75). The next most common answers were "I am not sexually active" (33.2%, n=72), "The vaccine is too new" (32.3%, n= 70), "I have not considered the vaccine" (28.1%, n= 61) and "I do not know enough about the vaccine" (27.6%, n=60). Other rationales selected were "I am too young to get the vaccine" (0.5%, n=1), "My insurance does not cover the cost" (6.5%, N=14), I do not have insurance" (6.0%, n=13), " I oppose the vaccine due to moral or religious reasons" (1.8%, n=4), "Generally, I am cautious of vaccines" (23.0%, n=50), "it is too expensive" (20.3%, n=44), Vaccines against STI's may encourage sexual behavior" (2.8%, n=6), " I am worried that people will think that I am sexually active" (3.2%, n=7), "I believe that screening alone is enough protection" (2.3%, n=5), "I have already been exposed to HPV and therefore do not think that the shot will help me" (4.6%, n=10), " I have heard negative things about the vaccine" (17.5%, n=38), "I believe that having to get 3 separate injections is too complicated" (8.8%, n=19), and lastly, " I do not like to get shots" (14.7%, n=50).

The participants who had completed the vaccination series or intended to complete the series were asked about their rationale for receiving the vaccine. The selections that those participants made are summarized in Table 4.9.

Table 4.9

Rationale for Completing the Vaccine Series or Intending to Complete the HPV Vaccination Series[a] *(n=278)*

	n	*P*
I believe that having the vaccination would be a good way to protect myself from HPV	235	84.5
I believe that having the vaccines would be a good way to protect myself from cervical cancer	251	90.3
I believe that vaccines are important for preventing disease	205	73.7
My doctor told me I should get vaccinated	206	74.1
I am sexually active and I wanted to protect myself	136	48.9
I have heard positive things about the vaccine	125	45.0
I learned about the vaccine from a health class	25	9.0

[a] Participants could choose more than one rationale

If the participant selected that she had received all of the vaccinations in the Gardasil® series or that she had at least received one and intended to receive the others, she was asked to select all of the rationale that lead them to that decision. The most common response was "I believe that having the vaccines would be a good way to protect myself from cervical cancer" (90.3%, n= 251), followed by "I believe that having the vaccination would be a good way to protect myself from HPV" (84.5%, n=235). Other common responses were "My doctor told me I should get vaccinated" (74.1%, n=206), and "I believe that vaccines are important for preventing disease" (73.7%, n=205). The statements "I am sexually active and I wanted to protect myself" (48.9%, n=136) and "I have heard positive things about the vaccine" (45.0%, n=125) were selected by less than half of the subset. The last statement "I learned about the vaccine from a health class" was the least chosen by 9.0% (n=25) of the participants.

The next set of questions focused on assessing the perceived susceptibility and perceived severity of HPV using a Likert scale. Table 4.10 displays the statements and the accompanying percentage of the sample who strongly disagreed, disagreed, agreed or strongly agreed with each statement.

Table 4.10

Belief of Susceptibility and Severity of HPV and HPV Vaccine (n= 516)

	SD/D	SA/A
Susceptibility		
I may one day be at risk of getting HPV	39.5(204)	60.5 (312)
Having the vaccination is a good way to protect myself from HPV	9.7 (50)	90.3(466)
It is possible that I may get HPV in the future	43.0 (222)	57.0(294)
Severity		
I believe that HPV would be would be extremely harmful if I got the infection	26.2(135)	73.8(381)
I believe that if I got HPV I will have serious negative consequences	24.6(127)	75.4(389)
I am not worried about getting genital warts due to HPV	56.7 (293)	43.3(223)

SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree

Participants were asked if they strongly disagreed, disagreed, agreed, or strongly agreed to six (6) statements regarding HPV and the HPV vaccine that can be directly tied to the Health Belief Model, specifically perceived susceptibility and perceived severity.

The strongly disagree and disagree categories were combined as one category and the strongly agree and agree were combined. The majority of the participants strongly agreed or agreed (60.5%, n=312) that they may one day be at risk for getting HPV. Over 90% of participants agreed or strongly agreed (90.3%) that having the vaccination was a good way to protect them from HPV. In the responses, 57% (n=294) believed that it is possible that they may get HPV in the future. Of the severity statements, the majority of the participants strongly agreed or agreed (75.4%, n=389) that if they got HPV it would have serious negative consequences. Most of the participants strongly agreed or agreed (73.8%, n= 381) that HPV would be extremely harmful if they got the infection. There were 56.7% (n=293) that responded that they strongly disagreed or disagreed that they are not worried about getting genital warts due to HPV.

Participants were asked how often they engaged in unhealthy behaviors over the past 30 days. Table 4.11 summarizes the responses.

Table 4.11

Percentage of Participation in Unhealthy Behaviors in the Past Month

	Percentage *(n)*					
	0 Days	1-2 Days	3-5 Days	6-9 Days	10-19 Days	20- 30 Days
Cigarette Smoking (N = 515)	84.1 (433)	5.6 (29)	1.6 (8)	0.8 (4)	2.5 (13)	5.4 (28)
At Least Two Drinks of Alcohol (N=509)	34.0 (173)	22.8 (116)	17.5 (89)	18.1 (92)	7.1 (36)	0.6 (3)
Smoked Marijuana (N=514)	84.2 (433)	6.2 (32)	2.9 (15)	1.8 (9)	1.9 (10)	2.9 (15)
Illegal Drug Use[a] (N = 516)	96.5 (498)	2.7 (14)	0.6 (3)	0.2 (1)	-	-
Binge Drinking[b] (N=515)	60.0 (309)	17.5 (90)	13.2 (68)	7.0 (36)	2.1 (11)	0.2 (1)

[a] Examples include cocaine, methamphetamine, and prescription drugs not prescribed to you

[11b] Defined as having more than 4 drinks in one setting

The majority of participants had not smoked cigarettes in the past 30 days (84.1%, n= 433) and 5.4 % (n=28) had smoked 20 – 30 days in the past month. The participants varied in their drinking habits; 34.0% (n=173) did not have at least two drinks of alcohol in the past month, 22.8% (n=116) had two drink of alcohol on 1 -2 days in the past month. Of the responses, 17.5% (n=90) report that they had participated in binge drinking (at least four (4) drinks in one setting) 1-2 days in the past month, and 13.2% (n=68) had participated in binge drinking in 3-5 days in the past month. The majority of participants had not smoked marijuana (84.2%, n=433) in the past month nor used other illegal drugs

(96.5%, n=498) in the past month, although there was some illegal drug use among the cohort.

Participants were also asked how often they used a condom with their partner during sexual activity in the past 30 days. The responses are summarized and presented in Table 4.12.

Table 4.12

Participant Condom Use in Previous Month

	Percentage *(n)*					
	No intercourse in last 30 days	Never Used a Condom	Rarely Used a Condom	Sometimes Used a Condom	Most of the Time Used a Condom	Always Used a Condom
Vaginal Intercourse (N=516)	48.1 (248)	15.9 (82)	6.4 (33)	5.2 (27)	8.3 (43)	16.1 (83)
Anal Intercourse (N=514)	94.6 (486)	3.9 (20)	0.2 (1)	0.2 (1)	0.6 (3)	0.6 (3)
Oral Intercourse (N=515)	59.6 (307)	37.9 (195)	0.8 (4)	0.8 (4)	0.6 (3)	0.4 (2)

The participants recorded their sexual activity and the use of condoms during the previous month of answering the survey. During those 30 days 48.1% (n=248) reported no vaginal intercourse, 94.6% (n=486) reported no anal intercourse, and 59.6% (n=307) reported no oral intercourse. Of those who were sexually active during the given time frame, 15.9% (n=82) reported never using a condom with their partner and 16.1% (n=83)

reported always using a condom during vaginal intercourse. For anal intercourse, the majority of the sexually active reported that they never used a condom (3.9%, n=20). Lastly, for oral intercourse, the majority who were sexually active never wore a condom (37.9%, n=195).

By removing participants who were not sexually active in the past 30 days from the subset, there is a clearer picture of condom use. Table 4.13 shows the condom behaviors of those participants who reported they were sexually active in the past 30 days.

Table 4.13

Percentage of Condom Use in Previous Month Among Sexually Active Participants

	Percentage (*n*)				
	Never Used a Condom	Rarely Used a Condom	Sometimes Used a Condom	Most of the Time Used a Condom	Always Used a Condom
Vaginal Intercourse (N=268)	30.6 (82)	12.3 (33)	10.1 (27)	16.0 (43)	31.0 (83)
Anal Intercourse (N=28)	71.4 (20)	3.6 (1)	3.6 (1)	10.7 (3)	10.7 (3)
Oral Intercourse (N=208)	93.8 (195)	1.9 (4)	1.9 (4)	1.4 (3)	1.0 (2)

To further examine condom behaviors, Table 4.13 presents the percentage of condom use among sexually active participants in the previous 30 days. The participants were just as likely to always wear a condom with their partner (31.0%, n=83) as they were to never wear a condom with their partner (30.6%, n=82) for vaginal intercourse.

For anal intercourse, the majority of participants who engaged in the behavior reported that they never used a condom (71.4%, n=20). Of the 208 participants who engaged in oral intercourse, 93.8% (n=195) never used a condom.

To further examine participant condom use with their partners, Tables 4.14, 4.15, and 4.16 show the condom use during vaginal, anal, and oral intercourse in relation to the total knowledge score.

Table 4.14
Total Knowledge Score and Condom Use during Vaginal Intercourse

Total Knowledge Score (in percent)	No intercourse in the last 30 days	Never used a condom	Rarely used a condom	Sometimes used a condom	Most of the time used a condom	Always used a condom	Total
29	1	1	0	0	0	0	2
33	2	1	0	0	0	0	3
38	2	0	0	0	0	0	2
42	10	1	1	2	1	6	21
46	4	1	0	0	3	3	11
50	17	4	4	0	2	5	32
54	18	4	0	1	2	6	31
58	19	2	2	1	0	2	26
63	21	7	2	2	3	4	39
67	26	8	6	8	7	8	63
71	16	6	3	2	5	9	41
75	18	6	3	2	5	8	42
79	29	12	2	1	4	13	61
83	10	4	2	1	1	2	20
88	13	7	1	3	2	7	33
92	18	7	4	2	2	6	39
100	9	6	0	0	0	2	17
Total	233	77	30	25	37	81	483

Table 4.15
Total Knowledge Score and Condom Use during Anal Intercourse

Total Knowledge Score (in percent)	No intercourse in the last 30 days	Never used a condom	Rarely used a condom	Most of the time used a condom	Always used a condom	Total
29	1	1	0	0	0	2
33	3	0	0	0	0	3
38	2	0	0	0	0	2
42	21	0	0	0	0	21
46	11	0	0	0	0	11
50	31	1	0	0	0	32
54	31	0	0	0	0	31
58	26	1	0	0	0	25
63	36	3	0	0	0	39
67	59	1	1	1	0	62
71	40	1	0	0	0	41
75	39	2	0	0	1	42
79	58	2	0	0	1	61
83	19	1	0	0	0	20
88	28	4	0	1	0	33
92	37	1	0	0	1	39
100	17	0	0	0	0	17
Total	457	18	1	2	3	481

Table 4.16
Total Knowledge Score and Condom Use during Oral Intercourse

Total Knowledge Score (in percent)	No intercourse in the last 30 days	Never used a condom	Rarely used a condom	Sometimes used a condom	Most of the time used a condom	Always used a condom	Total
29	1	1	0	0	0	0	2
33	2	1	0	0	0	0	3
38	2	0	0	0	0	0	2
42	14	7	0	0	0	0	21
46	6	5	0	0	0	0	11
50	21	11	0	0	0	0	32
54	23	8	0	0	0	0	31
58	18	7	1	0	0	0	26
63	27	12	0	0	0	0	39
67	33	27	0	1	1	0	62
71	20	19	1	0	0	1	41
75	24	14	1	2	1	0	42
79	39	20	1	0	0	1	61
83	11	9	0	0	0	0	20
88	16	17	0	0	0	0	33
92	21	18	0	0	0	0	39
100	9	8	0	0	0	0	17
Total	287	184	4	3	2	2	482

Tables 4.14, 4.15, and 4.16 depict the total knowledge score of the participant and condom use for vaginal, anal, and oral intercourse. Among all three groupings, those who did not have intercourse, or did not use a condom with their partner during intercourse were the lowest of the score on the knowledge of HPV and Gardasil®.

Table 4.17 further examines participant source of information and if they received at least one injection of the HPV vaccine series.

Table 4.17
Inoculation Rates and Sources of Information [a]

Source of Information	Received Injection Percentage (*n*)	
	No	Yes
Doctor (N= 404)[b]	31.6 (128)	68.4 (276)
Parent (N= 268)[b]	27.6 (74)	72.4 (94)
Other relatives (N= 48)	27.1 (13)	72.9 (35)
Friends (N= 266)	38.7 (103)	61.3 (163)
Internet (N= 115)	50.4 (58)	49.6 (57)
In a Health Class(N= 123)	41.4 (51)	58.6 (72)
Gardasil Brochure (N=134)	44.0 (59)	56.0 (75)
Television (N= 328)	44.8 (147)	55.2 (181)
Magazine(N=121)	47.1 (57)	52.9 (64)
UK Health Services (N=61)	57.4 (35)	42.6 (26)

[a] Participants could select more than one source of information

[b] Statistically significant at the p<.000 level

Looking at the participants who had and had not received at least one injection and sources of information together showed that the majority of participants who selected doctor as a source of information (54.9%, n=276) had received at least one injection. This was a significant finding (p<.000) at the 95% confidence level. Parent as a source of

information also is significant at the 95% confidence level (p<.000) with 38.5% (n=194) of participants indicating parent as a source of information.

Table 4.18 shows the percent of participants that had received at least one of the vaccinations and the perceived susceptibility and perceived severity using a crosstab statistical analysis.

Table 4.18

HPV Inoculation and Perceived Susceptibility and Severity of HPV (N=503)

HBM Statement		Percentage Who Have Received At Least 1 injection Percent(*n*)	
		No	Yes
Susceptibility			
I may one day be at risk of getting HPV	SD/D	16.7 (84)	21.9 (110)
	SA/A	23.8 (120)	37.6 (309)
Having the vaccination is a good way to protect myself from HPV.	SD/D	5.21 (29)	2.61 (18)
	SA/A	34.7 (175)	55.9 (159)*
It is possible that I may get HPV in the future.	SD/D	18.1 (91)	24.1 (212)
	SA/A	22.5 (113)	35.4 (178)
Severity			
I believe that if I got HPV I will have serious negative consequences.	SD/D	9.71 (53)	13.7 (69)
	SA/A	30.1 (151)	45.7 (230)
I believe that HPV would be extremely harmful if I got the infection.	SD/D	9.91 (53)	15.6 (79)
	SA/A	30.0 (151)	43.7 (220)
I am not worried about getting genital warts due to HPV.	SD/D	21.3 (107)	35.0 (176)
	SA/A	19.3 (97)	24.5 (123)

* Statistically significant at the 95% confidence level (p<.000)

Table 4.18 shows the relationship between HBM model statements about the susceptibility and severity of HPV. The belief that having the vaccination is a good way to protect again HPV and having the vaccination was statistically significant. Table 4.19 shows HPV inoculation and unhealthy behaviors.

Table 4.19
HPV Inoculation and Unhealthy Behaviors

Unhealthy Behavior		Received HPV Injection Percentage (*n*) No	Yes	Total Number of Responses
Cigarette Smoking				
	0 days	33.7 (169)	50.6 (254)	423
	1-2 days	2.2 (11)	3.4 (17)	28
	3-5 days	0.6 (3)	1.0 (5)	8
	6-9 days	0.2 (6)	0.6 (7)	4
	10-19 days	1.2 (6)	1.4 (12)	13
	20-30 days	2.8 (14)	2.4 (12)	26
Total		n=204	n=298	502
Alcohol Use[a]				
	0 days	46.6 (77)	53.4 (88)	165
	1-2 days	38.9 (44)	61.1 (69)	113
	3-5 days	32.9 (29)	67.1 (59)*	88
	6-9 days	40.2 (37)	59.8 (55)	92
	10 – 19 days	30.5 (11)	69.5 (25)	36
	20 – 30 days	100.0 (2)	0 (0)	2
Total		n = 200	n = 296	496
Marijuana Use				
	0 days	43.1(182)	56.9 (240)	422
	1-2 days	29.0 (9)	71.0 (22)	31
	3-5 days	26.6 (4)	73.4 (11)	15
	6-9 days	33.3 (3)	66.7 (6)	9
	10 – 19 days	40.0 (4)	60.0 (6)	10
	20 – 30 days	14.2 (2)	85.2 (12)	14
Total		204	297	501

Table 4.19 (continued)
HPV Inoculation and Unhealthy Behaviors

Unhealthy Behavior		Received HPV Injection Percentage (*n*) No	Yes	Total Number of Responses
Illegal Drug Use[b]				
	0 days	41.0(199)	59.0 (287)	486
	1-2 days	23.1 (3)	76.9 (10)	13
	3-5 days	66.7 (2)	33.3 (1)	3
	6-9 days	0.0 (0)	100.0 (1)	1
	10 – 19 days	-	-	-
	20 – 30 days	-	-	-
Total		204	299	503
Binge Drinking[c]				
	0 days	43.7(131)	56.3 (169)	300
	1-2 days	39.0 (34)	61.0 (53)	87
	3-5 days	32.3 (22)	67.7 (46)	68
	6-9 days	30.5 (11)	69.5 (25)	36
	10 – 19 days	45.5 (5)	55.5 (6)	11
	20 – 30 days	-	-	-
Total		203	299	502

[a] Alcohol use is defined as two drinks in one setting
[b] Examples of illegal drugs use include but are not limited to cocaine, methamphetamine, and prescription drugs not prescribed to you
[c] Binge drinking is defined as four or more drinks in one setting
* Statistically significant at the 95% confidence level (p<.000)

As shown in Table 4.19, the majority of the participants were not smokers (n=423), and there were more smokers who received at least one of the HPV vaccinations. There were 53 participants who smoked a cigarette at least once in the past 30 days who had received at least one dose of the vaccination. Participants who drank alcohol 1-2 days or 3-5 days in the previous 30 were more likely to have had at least one injection (61.1%, n= 69) and (67.1%, n=59) respectively. The majority of the participants

did not smoke marijuana in the previous 30 days at the time of the survey. There were 31 participants who smoked marijuana 1-2 days in the previous 30 days. Of those, 71% (n=22) had received at least one injection. When asked about the illegal drug use, 486 of the 503 who responded had not used illegal drugs in the previous 30 days. Of those who used illegal drugs, there were more that had received at least one dose of the HPV vaccine (n=12) than those who did not (n=5). The majority of survey participants who engaged in binge drinking in the previous 30 days had at least one injection of Gardasil®.

Table 4.20 shows the HPV inoculation rates in relation to condom use for vaginal, anal, and oral intercourse.

Table 4.20
HPV Inoculation and Sexual Activity with Condom Use

		Received HPV Injection Percent (*n*)		Total Responses
		No	Yes	
Vaginal Intercourse				
	No intercourse in the last 30 days	43.8 (106)	56.2 (136)	242
	Never used a condom	41.3 (33)	58.7 (47)	80
	Rarely used a condom	40.6 (33)	59.4 (19)	32
	Sometimes used a condom	38.5 (10)	61.5 (16)	26
	Most of the time used a condom	40.5 (17)	59.5 (25)	42
	Always used a condom	30.9 (25)	69.1 (56)	81
Total		204	299	503
Anal Intercourse				
	No intercourse in the last 30 days	40.2 (192)	59.8 (285)	477
	Never used a condom	38.9 (7)	61.1 (11)	18
	Rarely used a condom	0.0 (0)	100.0 (1)	1
	Sometimes used a condom	-	-	-
	Most of the time used a condom	50.0 (1)	50.0 (1)	2
	Always used a condom	66.7 (2)	33.3 (1)	3
Total		202	292	501

Table 4.20 (continued)
HPV Inoculation and Sexual Activity with Condom Use

		Received HPV Injection Percent (*n*)		Total Responses
		No	Yes	
Oral Intercourse				
	No intercourse in the last 30 days	43.7 (131)	156.3 (69)	300
	Never used a condom	35.4 (68)	64.6 (124)	192
	Rarely used a condom	50.0 (2)	50.0 (2)	4
	Sometimes used a condom	66.7 (2)	33.3 (1)	3
	Most of the time used a condom	50.0 (1)	50.0 (1)	2
	Always used a condom	0.0 (0)	100.0 (1)	1
Total		204	298	502

There were 242 participants who reported that they did not have vaginal intercourse in the 30 days before the survey. Of those, over half (56.2%, n=136) reported they had received at least one dose of the vaccine, Gardasil®. Of the 80 participants who reported that during vaginal intercourse she and her partner never used a condom, 58.7% (n=47) had received at least one dose of the vaccine, and of the 81 who reported that she and her partner always used a condom during vaginal intercourse, 69.1% (n=56) had received at least one dose of the vaccine. There were 477 participants who reported they did not have anal intercourse in the previous 30 days before the survey. Of those who did report anal intercourse, 18 reported a condom was never used and there were 11 participants (61.1%) of the 18 who had received at least one dose of the vaccine. Only

three of the participants reported that they always used a condom during anal intercourse, and one of those had received at least one injection of Gardasil®.

There were 202 participants who reported oral intercourse in the 30 days prior to the survey. Only one of the 202 reported that she always used a condom with her partner and that one individual also had received at least one injection of Gardasil®. There were 162 participants who reported never using a condom during oral intercourse and 64.6% (n=124) had received at least one dose of the HPV vaccine.

When looking to determine if there were factors that predicted whether or not an individual was likely to be vaccinated, a logistical regression model was used. Table 4.21 demonstrates the predictability of HPV inoculation.

Table 4.21

Predictability of HPV Inoculation

Factors		B	S.E.	df	Sig.	Exp(B) (Odds ratio)
	Race	.760	.197	1	.000*	2.138
	Education Level	.131	.251	1	.601	1.140
	Father's Education	.077	.284	1	.785	1.080
	Mother's Education	.027	.291	1	.926	1.027
	Relationship Status	.411	1.123	1	.715	1.508
	Sexual Orientation	.957	.482	1	.047	2.605
	Received Flu Shot	-.395	.318	1	.215	.674
	Number of Sexual Partners	-.239	.142	1	.091	.787
HBM Statements						
	One Day May Get HPV	-.521	.519	1	.316	.594
	Believe Vaccination Protects	-.885	.369	1	.016*	.413
	Serious Consequences	-.906	.452	1	.045	.404
	Extremely Harmful	.659	.516	1	.202	1.932
	May Get HPV in the Future	-.735	.573	1	.200	.480
	Not Worried About Warts	-.625	.323	1	.053	.535
Unhealthy Behaviors						
	Smokes Cigarettes	.337	.207	1	.103	1.401
	Drinks Alcohol	-2.060	.810	1	.011*	.127
	Marijuana	.203	.317	1	.523	1.225
	Other Illegal Drug Use	.198	.925	1	.830	1.219
	Binge Drinking	1.633	.837	1	.051	5.120
Condom Use	Condom Vaginal	-.244	.206	1	.237	.784
	Condom Anal	.654	.257	1	.011*	1.924
	Condom Oral	.415	.372	1	.265	1.514

* Statistically significant at the 95% confidence level (p<.000)

When looking to determine the factors that predicted whether or not an individual was likely to be vaccinated, the logistical regression shows that significant predictors of HPV inoculation included white race ($p<.000$), the belief that the vaccination protects against HPV ($p<.016$), alcohol use ($p<.011$) and participated in anal intercourse ($p<.011$).

Discussion of Results

This study had 516 female undergraduate participants in the sample, all of whom were enrolled as students at the University of Kentucky. The majority of the participants considered themselves Caucasian. There was an even distribution among the education levels of the participants. The majority of students were not married and considered themselves to be heterosexual. The majority of the students had none or one sexual partner during their lifetime. However, there were 45 participants (8.7%) who reported having 10 or more sexual partners in their lifetime.

There were a total of 486 participants (94.2%) who reported they had heard of HPV. In a 2007 study of women ages 18-65, only 40% had heard of HPV and less than 50% who had heard of HPV knew it was the cause of cervical cancer (Tiro, Meisser, Kobrin & Chollette, 2007). Ragin at el. (2009) demonstrated that 93% of intrapersonal health survey participants had heard of HPV. The present study had a higher percentage of participants who had heard of HPV when compared to the Ragin at el (2009) and Tiro et al (2007) studies. However, the current study gathered the sample from email requests (online) and the people who participated were likely to have had some interest in the topic and/or had most likely heard of HPV or Gardasil®.

As demonstrated in Table 4.2, when asked true or false questions about HPV, there was one statement that less than 30% of the participants were able to correctly

identify. The statement that "HPV may go away on its own" was correctly identified as true by 29.9% (n=146) of participants. The Tiro et al. (2007) study included a similar statement in which only 4% were able to correctly identify that HPV may go away on its own. The current study shows that there continues to be confusion about HPV and the body's ability to fight the virus for many of the participants.

Of the 516 participants in the survey, 495 (95.9%) knew that the HPV vaccine Gardasil® consisted of three injections. As Table 4.3 demonstrates, most of the participants had a general idea of how expensive the injection series are, and the approved age range for the injections. The present study did show a knowledge gap about the time frame for the vaccination series, which is consistent with other studies (Tsau, Reutzel, Wang, Quinones, Nguyen, Hasan, & Workman, 2010; Zimet, Shew, & Kahn, 2008). The time frame stands as 0 months for the 1st injection, 2 months for the 2nd injection, and 6 months for the 3rd and final injection. Only 35.7% of the participants who had previously heard of the HPV vaccine Gardasil® correctly identified the statement that "it takes over a year to complete the series" as a false statement (Merck, 2006). This could indicate that there needs to be further discussions about the timeline for the injections for this age group.

Figure 4.1 is a histogram of the total knowledge score given to participants. Even though participants were likely interested in Gardasil® or HPV, less than 20 participants were able to correctly identify all 10 questions correctly as true or false. The questions were based upon information that would be critical in making a decision on whether or not to receive a vaccination. If females in the age range of 18-26

do not have adequate knowledge, it may be hard for them to make an informed decision on whether or not to be vaccinated.

Participants were asked to identify all of the sources of information that they had received about the HPV vaccine Gardasil® (see Table 4.4). Doctors were the most common source of information (80.2%, n=404), followed by television (65.3%, n=329), parent (53.2%, n=268), and friends (53.0%, n= 267). In the Sandfort et al. (2010) study, family doctors were identified as most common source at 67.1%, followed by OB/GYN at 45.3% and Internet at 43.4%. The study found that friends were identified by only 25.9% of the participants and family was identified by 23.0% of participants. Buhi, Daley, Fuhrmann, and Smith (2009) found that the use of search engines such as Google was the predominant way to locate online sexual health information. The present study found similar results concerning doctors being the most common information source. The Internet was the 3rd most common in the Sandfort study (2010), but only was identified by 22.8% in the current study and ranked 7th among the 12 sources of information.

In this study, participants were further asked to identify their primary source of information about HPV and the HPV vaccine. Table 4.5 shows the majority of participants chose the doctor as their primary source of information. The second most common source selected was television with 23.8% of the total. The researcher did not find other published literature indicating primary sources of information, however there were studies that suggested further education is needed through clinical settings (Crosby et al., 2007).

Another study utilizing the 2007 Texas BRFSS found 25.4% of 18- 26 year olds had talked to their doctor about the HPV vaccine (Wood & Cook, 2007). The present study found that doctors and television were identified as the most common primary information sources. Due to their recognition as being a primary source of information, doctors should continue talking to patients who are eligible to receive inoculation and have open discussions about the benefits of Gardasil®. Television has not always been a positive source of information and often has omitted information when the focus was on HPV or the HPV vaccine (Kelly, Leader, Mittermaier, Hornik, & Cappella, 2009). Health educators and health care practitioners can help students and patients interpret the information that is given out by the media.

Table 4.14 shows the use of chi square to determine if a particular source were related to inoculation rates. The doctor and parents were two of the most common sources of information. If a participant chose either a doctor or parent as a source of information, that individual was more likely to have received at least one dose of the vaccination. Television was another highly selected variable as a source of information; however television was not significantly related to participant inoculation. Parental education about HPV and Gardasil® is as they are a significant influence and may need to provide their child with information about the vaccine. Doctors and health care practitioners should also continue to talk to patients in the age range for inoculation. The doctor could also be a valuable source of information for the parents of children and teens. Since television as a source of information did not have a significant relationship with vaccination, there could be further research into interpersonal communication versus information from media sources.

In this study, 59.4% (n=299) of participants had received at least one injection of Gardasil®. Of the 299, 254 (82.7%) participants had completed all three vaccinations necessary to complete the HPV vaccination series (Table 4.7). According to the American College Health Assessment survey, 31.8% of college females had received the HPV vaccine (ACHA-NCHA II, 2009). In the present study there was a reported increase in the rate of vaccination when compared to the ACHA-NCHA II survey. The increase in vaccination rate could be due to participant's interest in the survey and topic. The methods of recruitment were sending out emails to individual students requesting that they complete an online survey and professors' posting a link on their online class Blackboard®, and it is likely that only those who had an interest in the topic took the survey.

Table 4.8 shows the rationale for those who have not had any of the injections or had started but decided not to completion the vaccination series. The most common reason for either not starting or not finishing the series was the worry about side effects (34.6%, n= 75). The next two most common reasons for not getting the vaccines were that the participant was not sexually active (33.2%, n=72) and that the vaccine was too new (32.2%, n=70). These were also acknowledged as reasons for not getting the vaccine as published by Zimet, Shew, and Kahn (2008). Another common reason for not receiving the vaccine included a continued lack of information about HPV and Gardasil®. Although there is a sexual behavior component to discussions of HPV and Gardasil® which may make it difficult to start the discussion, there is a need for parents, doctors, and healthcare practitioners to provide accurate information to children, teens, and young adults.

Table 4.9 summarizes the rationale for completing the vaccination series or intending to complete it. Of those who have completed the vaccination series or intended to, the main reason selected by the participants was the belief that having the vaccine is a good way for them to be protected from cervical cancer (90.3%, n=251). Over 90% (n=466) of the participants strongly agreed or agreed with the statement "the vaccination is a good way to protect myself from HPV." Brewer and Fazekas (2007) found that people were more accepting of the vaccine when they believed that the vaccine was effective, and when they thought that a HPV infection was a likely occurrence. Table 4.15 demonstrates the inoculation rates (received at least one injection) and the HBM statements. The statement "the vaccination is a good way to protect myself from HPV" was statistically significant ($p<.000$) related to having received at least one dose of the vaccine. None of the severity statements were significant. There should be further education about the short and long term effects of HPV, although frank discussions may be harder to have because of the sexual nature of transmission.

To determine if participants who were engaged in unhealthy behaviors were more likely to get the vaccine, the participants were asked about selected health behaviors over the previous 30 days from the time of the survey. Although the majority of the students did not smoke cigarettes or marijuana, nor did the majority binge drink or participate in taking other illegal drugs, there were some participants who did participate in each of the unhealthy behaviors as seen in Table 4.11. This survey found that for college females, 66.0% reported having had alcohol at least once in the past 30 days, 15.18%.had used smoking tobacco in the previous 30 days, 15.7% had used marijuana during the past 30 days, and 3.5% of the female survey respondents reported other illicit drug use. The

ACHA-NCHA II survey (Fall 2010) found that for college females, 62.4% reported alcohol use at least once in the past 30 days, 15.2% had used smoking tobacco in the previous 30 days, 9.0% had used marijuana during the past 30 days, and 9.5% had used other illicit drugs in the previous 30 days. The unhealthy behaviors that were happening among college females here on the University of Kentucky campus are consistent with the ACHA-NCHA II survey results for alcohol and cigarette smoking but the students in the present study had lower rates of marijuana and other illegal drug use.

Table 4.19 shows that the many of the participants were not sexually active. Among those who were, always using a condom was seen most frequently with those engaging in vaginal intercourse. One study found that when college aged females believed that they could prevent HPV with the use of condoms; they reported that they were more likely to actually utilize a condom in their sexual activity (Lopez & McMahon, 2007). After looking at possible relationships between sexual behavior and HPV inoculation as shown in Table 4.20, the participants in this study who were participating in anal intercourse were less likely to be using condoms with their partner but more likely to be vaccinated for HPV. All sexually active persons are at risk for spreading and receiving HPV infections, especially if no condoms are used.

When looking to determine the factors that predicted whether or not an individual was likely to be vaccinated, Table 4.21 summarizes the logistical regression. Significant predictors of HPV inoculation included white race ($p<.000$), the belief that the vaccination protects against HPV ($p<.016$), alcohol use ($p<.011$) and participated in anal intercourse ($p<.011$). Studies show that caucasian individuals are more likely to know more about the vaccine and are more likely to be vaccinated (Marlow, Wardle, Forster, &

Waller, 2009). Since caucasians are more likely to know about the vaccine perhaps the materials used for education about the vaccine need to be examined to determine if they are culturally appropriate. The belief that Gardasil® was a good way to be protected from HPV was a statistically significant predictor that an individual was vaccinated. This finding is supported by studies conducted by Marlow et al. (2009) and Brewer and Fazekas (2007). Utilizing the HBM may help doctors understand why their patients have or have not received the vaccination and can assist doctors or health educators in having discussions about the susceptibility and severity of HPV with college students.

The present study found that those college students who drank alcohol were more likely to have been vaccinated for HPV. To the researcher's knowledge, there have not been studies that have looked at the relationship between alcohol use and HPV vaccination. Further research is needed in this area.

HPV can cause cervical cancer as well as anal cancer (CDC, 2010). Lopez and McMahon (2007) found that when college aged females believed that they could prevent HPV with the use of condoms; they reported they were more likely to actually utilize condoms with their partners in their sexual activity. The present study showed that individuals who engaged in anal intercourse, specifically without a condom, were more likely to be vaccinated against HPV. Education for those who are participating in anal intercourse regarding the importance of condom use and possibility of transmitting HPV through anal intercourse is important. Even though there was not a significant relationship between condom use for vaginal and oral intercourse and inoculation, further education about HPV and the use of condoms for prevention of HPV transmission for all sexually active individuals is important for sexual health.

Limitations

There were limitations to this study. First, this survey was a convenience survey developed to measure vaccine uptake, health behaviors, and demographic variables. All measures in the survey were self-reported. Objective measures such as doctor's records were not utilized. Health behaviors that are self-reported may sometimes be biased due to social desirability. Therefore, possible biased responses were a limitation. Due to the online format of the survey, participants knew of the subject matter before agreeing to participate in the survey. This may have led to a greater response from those who were knowledgeable and had received HPV vaccinations. Therefore, having an online format was a limitation. This study did not utilize a control group, therefore it was possible that the students interested in HPV and Gardasil® were the persons that completed the survey. The lack of control group was a limitation when generalizing the results. When analyzing the results for the knowledge questions, the researcher did not count missing data as wrong answers. This was a limitation because there cannot be a determination as to whether the individual did not know the answer or just skipped the question. Lastly, although the study references the HBM, the study focused on two of the four components, severity and susceptibility. Without the full use of the HBM components, there were limitations on the conclusions that could be drawn regarding the model and the behavior choices of the participants.

Summary

This study had several objectives. The first objective was to determine the current knowledge concerning HPV and the HPV vaccine Gardasil® of female undergraduate students at the University of Kentucky. The participants in the present study were

knowledgeable in some areas about HPV and the HPV vaccine, Gardasil® however there were information gaps. Secondly, the study aimed to determine the sources of information, including the primary source of information about HPV and Gardasil®. The main sources of information about HPV and the vaccine were doctors, television, parents and friends. The primary sources were doctors and television. Third, the study looked to determine how many female college students had received at least one dose of the HPV vaccine, Gardasil® and to determine the reasons for and against Gardasil ® uptake. Results indicated that 59.4% of participants had received at least one of the doses of Gardasil®, and over 82% of those had completed the series. The most common rationale for not getting the vaccine, or not completing the vaccination series after starting, was concern about side effects. The most common rationale for completing the vaccination or intending to complete the series of vaccination is protection from cervical cancer.

Next, this study sought to examine the perceived susceptibility and severity of contracting HPV and the relationship with HPV inoculation. This study determined that the belief that the vaccination is a good way to protect against HPV was a predictor of vaccination. This study also examined possible relationships between getting inoculated for HPV and selected health behaviors: cigarette smoking, drinking alcohol, smoking marijuana, illicit drug use, and sexual behaviors. Those who engaged in alcohol use and anal intercourse were more likely to have received an HPV vaccination. Lastly, the study looked to determine if selective variables could predict whether or not a student received the vaccination. Predictors for HPV inoculation included race ($p<.000$), the belief that

the vaccine would be protective against HPV ($p<.016$), alcohol use ($p<.011$) and engagement in anal intercourse ($p<.011$).

CHAPTER 5

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

The present study specifically explored college females and their knowledge of HPV and the HPV Vaccine, Gardasil®, how many female college students had received the vaccination or intended to receive the vaccination, the reasons for receiving the vaccination or not receiving the vaccination, and the sources of HPV and Gardasil® information with designation of the primary source. This study also explored the perceived susceptibility and severity of HPV and looked for relationships among HPV inoculation and specific unhealthy behaviors: cigarette smoking, marijuana and other illegal drug use, alcohol use, and condom use. This chapter presents the conclusions and implications.

Conclusions

1. Of the female college students who participated in the present study, 94.2% reported that they had heard of HPV, and 96.5% reported that they had heard of the HPV vaccine Gardasil®. The first hypothesis stated that 75% of the female college students will have heard of HPV and Gardasil®, and the present study found that hypothesis to be correct.
2. The average participant scored 7 out of 10 (70%) on the knowledge questions about HPV and Gardasil®. The second hypothesis stated that 50% of the female college students will know accurate information about both HPV and Gardasil®, thus this study found this hypothesis to be correct. Almost all of the participants

knew that HPV did not always have visible signs (98.2%, n=480) and that Gardasil® required three injections (98.2%, n=495). The most common wrong answers of the knowledge questions came from not knowing that HPV is often successfully removed by the body's immune system (29.9%, n=146) and that the recommended time frame for the three Gardasil® injections is 6 months (35.7%, n=180).

3. The present study determined that the most common sources of information were doctors (80.2%, n=404), television (65.3%, n=329), parents (53.2%, n=268) and friends (53.0%, n=267). The primary sources of information determined by participants were doctors (42.7%, n=215) and television (23.8%, n=120). This conclusion supports the hypothesis that healthcare providers and television would be the most influential sources.

4. In this study, 59.4% of participants reported that they had received at least one dose of Gardasil®. Of those, 82.7 % reported that they completed the vaccination series. The hypothesis that fewer than half of the female undergraduate students would have had the HPV vaccine, Gardasil®, was rejected since this study found that there were more vaccinations than anticipated.

5. The present study found that the most common response for not receiving the vaccination was the fear of side effects (34.6%, n= 75). The hypothesis that the fear of side effects would be the most common rationale for the majority of the survey participants was accepted. Although only 36%, the fear of side effects was the most common rationale for not receiving the vaccination.

6. The current study found that female college student participants who participated in unhealthy behaviors within the previous 30 days were more likely to be vaccinated. Unhealthy behaviors included alcohol use, marijuana use, use of other illegal drugs, and participation in binge drinking. This supported the hypothesis that there would be a positive relationship between unhealthy behaviors and vaccination for HPV.

Implications

To the researcher's knowledge, this study was the first study to look at this combination of variables and their relationships with HPV vaccination among college female students only. Although there have been some studies that looked into knowledge and/or attitudes regarding HPV, this study combined knowledge, attitudes, source of information, unhealthy behaviors, condom use, and the HBM in relation to getting the vaccination for HPV. Further research is recommended to support the findings from this study. Recommendations for future research would include a survey that utilizes another method other than an online survey, inviting college males to participate in the study, or researching populations outside of the university setting.

Overall, the study implies that there is a continued need for education about HPV and the HPV vaccine. As race was found as a significant predictor of Gardasil® vaccination, it is recommended that there is continued discussion about HPV among various races. Implications of this data indicate that perhaps there is a need for development of culturally appropriate educational material about HPV and Gardasil®. This could be because white women tend to go to the doctor more regularly than other races and thus are exposed to more information about these topics. This area needs to be explored further.

This study found that the primary sources of information regarding HPV and Gardasil® came from doctors and television. Interestingly, television was the second most selected primary source of information but television was not significantly related to having received a HPV vaccination. Health educators could be available to assist students interpret and evaluate information being broadly distributed through television or other news sources. The researcher found no previous research regarding the primary source of information for college aged females. However, these avenues could be critical for continued education about HPV and the vaccine. Further investigation into the differences between sources of information and media messages and their effect on vaccination could be warranted.

Although parents were not found to be significant primary sources of information when examining the inoculation rates against sources of information, parents had significant positive relationship with HPV vaccination. Health educators could work with parents to make sure that appropriate and accurate information is being shared with their children. Due to the sexual behavior component to discussions of HPV and Gardasil® parents may have a difficult time starting the discussion and there could be supplementary information made available to assist parents. Doctors should also continue to educate both parents and patients about HPV and Gardasil®.

The most common reason for either not starting or not finishing the 3 doses of Gardasil® was the worry about side effects, the participant reported not being sexually active, and that the vaccine was too new. The vaccine has been approved by the FDA, and supported by ACIP and the CDC. Gardasil® has been available for over 5 years now and there still is concern about the vaccine's safety. This could be due to lack of

knowledge and/or understanding about HPV and Gardasil®. Health educators should talk about the risks of vaccination, but make sure that they emphasize the benefits as well. Television and other sources of information may not present all of the facts or even provide misinformation.

The Health Belief Model (HBM) could allow further insight into why or why not college students are being vaccinated. Typically, the perceived susceptibility and perceived severity directly impacts an individual's willingness to perform a given health behavior. According to the HBM, if an individual thinks that she is at risk (susceptibility) or that there would be dire consequences (severity) for HPV, she would be more likely to receive the HPV vaccination. There was a significant finding in this study in that participants who agreed or strongly agreed with the statement that Gardasil® would protect them from HPV were more likely to have received at least one dose of Gardasil®. However, this study did not examine all of the HBM constructs. Further research should consider the other two constructs, benefits and barriers to inoculation.

The present study examined the relationship between unhealthy behaviors and inoculation for HPV. Specifically, this study examined cigarette smoking, alcohol use and binge drinking, smoking marijuana and other illegal drug use among the sample and if there was a relationship with receiving Gardasil®. Health educators often discuss these, as well as other, unhealthy behaviors with college students. There is an opportunity to raise further awareness about HPV and the HPV vaccination among those who engage in unhealthy behaviors. For health educators, and other trusted individuals who have influence on college females, discussion about the dangers of unhealthy

behaviors and how those behaviors could put them at risk of being infected with HPV or transmitting HPV or other STI's should continue to take place.

Lastly, condom behavior is a critical component to controlling the spread of STI's such as HPV among sexually active individuals. The lower sample size for this particular behavior could have an effect on the regression so further studies with a larger sample size may have different results. Anal intercourse may be a sensitive topic when discussing sexual behaviors; however this study shows that it should not be ignored in sexual health education and its relationship to HPV vaccination.

Appendix A

Email Request for Participation

Dear University of Kentucky Student:

The following is a survey that is being conducted as part of a master's thesis project at the University of Kentucky in the Department of Kinesiology and Health Promotion concerning factors that may or may not effect getting the HPV vaccine. You have been randomly selected to take part in this survey. This research is being conducted by Nicole Peritore, master's degree student, under the direction of Dr. Melody Noland, Professor at the University of Kentucky.

Although you will not get personal benefit from taking part in this research study, your responses may help us understand more about the HPV vaccine and you may find the survey interesting.

We hope to receive completed questionnaires from about 2400 people, so your answers are important to us. Of course, you have a choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time.
The survey/questionnaire will take about 10 minutes to complete.

Upon completion of the survey, you will have the opportunity to be entered into a drawing for one of five (5) $25.00 gift cards to Target. The last question on the survey will allow you to enter your email address if you would like to be included in the drawing. The web program will allow the researcher to gather this information separately from the data from the survey so your name will not be associated with the answers in any way. All names contributed to the list will be entered into a drawing that will take place after the data collection is complete. The names will be kept confidential at all times. The winners will be notified via email and the gift cards will be mailed to them.

Although we have tried to minimize this, some questions are personal in nature and you may choose not to answer them. At any time you can choose to close your computers browser and leave the survey.

Your response to the survey is anonymous which means no names will appear or be used on research documents, or be used in presentations or publications. The research team will not know any information you provided came from you, nor even whether you participated in the study.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

Thank you in advance for your assistance with this important project.

To ensure your responses/opinions will be included, please continue to the survey through the following link by April 19th
https://uky.qualtrics.com/SE/?SID=SV_1QRFP0zWBMS10dm

Sincerely,
Nicole Peritore
Department of Kinesiology, University of Kentucky
PHONE: 859-257-5826
E-MAIL: Nicole.Peritore@uky.edu\

Appendix B

Faculty Assistance with Recruitment Request

Dear Professor,

My name is Nicole Peritore and I am currently looking for participants in a master thesis survey. The survey is being conducted at the University of Kentucky in the Department of Kinesiology and Health Promotion concerning factors that may or may not effect getting the HPV vaccine. This research is being conducted under the direction of Dr. Melody Noland, Professor at the University of Kentucky.

I have contacted you because you are currently listed in the summer course catalogue as teaching an online course. I am requesting your assistance by posting a link to the survey on your course website.

The survey is for female students only and will take about 10 minutes to complete.

Upon completion of the survey, the student will have the opportunity to be entered into a drawing for one of five (5) $25.00 gift cards to Target. The last question on the survey will allow the student to enter an email address if they would like to be included in the drawing. The web survey will allow the researcher to gather this information separately from the data from the survey so any names will not be associated with the answers in any way. All names contributed to the list will be entered into a drawing that will take place after the data collection is complete. The names will be kept confidential at all times. The winners will be notified via email and the gift cards will be mailed to them.

I would be grateful for your help and would happy to answer any questions that you may have. If you would be willing assist, please post the text below for your students.

Thank you for your time,
Nicole Peritore
This is for FEMALE students only
Dear University of Kentucky Student:

The following is a survey that is being conducted as part of a master's thesis project at the University of Kentucky in the Department of Kinesiology and Health Promotion concerning factors that may or may not effect getting the HPV vaccine. You have been randomly selected to take part in this survey. This research is being conducted by Nicole Peritore, master's degree student, under the direction of Dr. Melody Noland, Professor at the University of Kentucky.

Although you will not get personal benefit from taking part in this research study, your responses may help us understand more about the HPV vaccine and you may find the survey interesting.

We hope to receive completed questionnaires from about 2400 people, so your answers are important to us. Of course, you have a choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time.

The survey/questionnaire will take about 10 minutes to complete.

Upon completion of the survey, you will have the opportunity to be entered into a drawing for one of five (5) $25.00 gift cards to Target. The last question on the survey will allow you to enter your email address if you would like to be included in the drawing. The web program will allow the researcher to gather this information separately from the data from the survey so your name will not be associated with the answers in any way. All names contributed to the list will be entered into a drawing that will take place after the data collection is complete. The names will be kept confidential at all times. The winners will be notified via email and the gift cards will be mailed to them.

Although we have tried to minimize this, some questions are personal in nature and you may choose not to answer them. At any time you can choose to close your computers browser and leave the survey.

Your response to the survey is anonymous which means no names will appear or be used on research documents, or be used in presentations or publications. The research team will not know any information you provided came from you, nor even whether you participated in the study.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

Thank you in advance for your assistance with this important project.

To ensure your responses/opinions will be included, please continue to the survey through the following link:
https://uky.qualtrics.com/SE/?SID=SV_1QRFP0zWBMS10dm

Sincerely,
Nicole Peritore
Department of Kinesiology, University of Kentucky
PHONE: 859-257-5826
E-MAIL: Nicole.Peritore@uky.edu

Appendix C

Survey

1. Have you heard of HPV? (HPV stands for Human Papillomavirus)
   - o Yes
   - o Maybe
   - o No

2. For each of the following statements regarding HPV, please mark whether you believe the statement is true or false.

	True	False
HPV is the most common sexually transmitted infection.		
There are many types of HPV.		
When someone has HPV, there are always visible signs.		
HPV may go away on its own.		
Over 50% of sexually active people have HPV.		
Even with the use of condoms, HPV can be spread.		

3. Have you ever heard of the human papilliomavirus vaccine? (This is also sometimes referred to as the vaccine against cervical cancer or by its name Gardasil®).
   - o Yes
   - o Maybe
   - o No

4. For each of the following statement, please decide and mark each statement as true or false.

	True	False
The HPV vaccine consists of three injections.		
It takes over a year to complete all of the vaccines.		
The cost for the vaccine is over $500.00 for all of the injections.		
The age range approved for the vaccine is 9-26 years.		

5. If you have heard of the HPV vaccine, WHERE did you come across the information (**Please check all that apply).**
   - o I have not heard of the HPV vaccine before today.
   - o Doctor
   - o Parent
   - o Other relatives
   - o Friends
   - o Internet
   - o In a health class
   - o Gardasil® Brochure
   - o TV
   - o Magazine
   - o UK Health Service
   - o Other

6. Which would you say has been you primary source of information on the HPV vaccine? (Please mark only one.)
    - o I have not heard of the HPV vaccine before today.
    - o Doctor
    - o Parent
    - o Other relatives
    - o Friends
    - o Internet
    - o In a health class
    - o Gardasil® Brochure
    - o TV
    - o Magazine
    - o UK Health Service
    - o Other

7. Have you received at least one dose of the HPV vaccine?
    - o Yes
    - o No
    - o Unsure

8. Have you completed all of the injections in the series?
    - o Yes, I have completed all 3 injections in the series.
    - o Yes, I have completed one or two of the injections in the series and yes I plan to complete the rest of the series.
    - o Yes, I have completed one or two injections in the series and no I DO NOT plan to get anymore in the series.
    - o No, I have not received any of the injections but, yes, I plan to.
    - o No, I have not received any of the injections in the series and no I do not plan to.

9. Since you have not started the vaccine series and do not intend to OR have started the series and do not intend to complete the series, check all the reasons that have contributed to your decision:
    - o The vaccine is too new
    - o I am too young to get the vaccine
    - o I am not sexually active
    - o My insurance does not cover the cost
    - o I do not have insurance
    - o I oppose the vaccine due to moral or religious reasons
    - o Generally, I am cautious of vaccines
    - o It is too expensive
    - o Vaccination against STI's may encourage sexually behavior
    - o I am worried that people will think that I am sexually active if I get the vaccine
    - o I have not ever considered getting the vaccine
    - o I believe as though I d o not know enough about the vaccine to get vaccinated
    - o I worry about the side effects
    - o I believe that screen alone is enough
    - o I have already been exposed to HPV and therefore do not think that the vaccine will help me
    - o I have heard negative things about the vaccine
    - o I believe that having to get 3 separate injections is too complicated
    - o My doctor advised me against it
    - o I do not like to get shots
    - o Other

10. Since you have received all of the vaccinations, for HPV, or intend to, please check all the reasons that contributed to your decision.
    - o I believe that having the vaccination would be a good way to protect myself from HPV
    - o I believe that having the vaccination would be a good way to protect myself from cervical cancer
    - o I believe that vaccines are important for preventing disease
    - o My doctor told me that I should get vaccinated
    - o I am sexually active and wanted to protect myself
    - o I have heard positive things about the vaccine
    - o I learned about the vaccine from a health class

11. If you intend to get the vaccine, please check all the reason that contributed to your decision.
    - o I believe that by getting the vaccine I will be protecting myself from HPV
    - o I believe that by getting the vaccine, I will be protecting myself from cervical cancer
    - o I believe that vaccines are important for preventing disease
    - o My doctor told me that I should get vaccinated
    - o I am sexually active and want to protect myself
    - o I have heard positive things about the vaccine
    - o I learned about the vaccine from a health class
    - o I do not intend to get the vaccine

12. The next set of questions will ask if you strongly disagree, disagree, agree, or strongly agree. Please choose the one that reflects how you feel about each statement.

	Strongly Disagree	Disagree	Agree	Strongly Agree
I may one day be at risk for getting HPV.				
Having the vaccination is a good way to protect myself from HPV.				
I believe that I got HPV I will have serious negative consequences.				
I believe that HPV would be extremely harmful if I got the infection.				
It is possible that I may get HPV in the future.				
I am not worried about getting genital warts due to HPV.				

13. The next set of questions will ask how often you do certain health behaviors in the past 30 days.

	0 days	1-2 days	3-5 days	6-9 days	10-19 days	20-30 days
On how many days have you smoked a cigarette?						
On how many days have you had at least two drinks of alcohol?						
On how many days have you smoked marijuana?						
On how many days have you use illegal drugs? (Examples include cocaine, methamphetamine, and prescription drugs not prescribed to you)						
On how many days have you engaged in binge drinking? (defined as more than 4 drinking in one sitting)						

14. The following questions ask about your sexual behaviors.

	No intercourse in the last 30 days	Never used a condom	Rarely used a condom	Sometimes used a condom	Most of the time used a condom	Always used a condom
During the last 30 days, how often did you and your partner use a condom during vaginal intercourse?						
During the last 30 days, how often did you and your partner use a condom during anal intercourse?						
During the last 30 days, how often did you and your partner use a condom during oral intercourse?						

Now we are going to ask some questions about you.

15. How old are you?

16. What is your sex?

- o Male
- o Female

17. How would you describe you race?

- o White – Not Hispanic
- o Black – Not Hispanic
- o Hispanic or Latino
- o Asian or pacific Islander
- o Other (please list)

18. Which best describes the level of education that you have completed?

- o Some high school
- o Completed high school
- o Freshman year of college
- o Sophomore year of college
- o Junior year of college
- o Senior year of college
- o Some graduate school/ professional school
- o Completed graduate school/ professional school

19. Which best describes your father's level of education?

- o Did not complete high school
- o High school
- o Some college or post-secondary education
- o College degree
- o Post bachelor's degree

20. Which best describes your mother's level of education?

- o Did not complete high school
- o High school
- o Some college or post-secondary education
- o College degree
- o Post bachelor's degree

21. How would you describe your relationship status?

- o Single
- o Married

22. Which best describes you?

- o Heterosexual
- o Homosexual
- o Bisexual
- o Other (please list)

23. Did you get a flu shot this year?

- o Yes
- o Maybe
- o No

24. Have you ever been diagnosed with HPV?

- o Yes
- o Unsure
- o No

25. In your lifetime, how many partners have you had a sexual relationship with?

- o 0
- o 1
- o 2
- o 3
- o 4
- o 5
- o 6
- o 7
- o 8
- o 9
- o 10 or more

26. Would you like to be entered into a drawing for a $25.00 Target Gift Card?

27. Please enter your name and email address below:

28. If you would like an email with the correct answers to the true or false questions previously seen on the survey, please type in your email in the space below. This email will only be used once to send you the answers to the questions and will not be linked to you data. If you would not like to receive an email, please leave the space blank and click on the arrows below to complete the survey.

Appendix D

Reminder Email

This is a reminder, if you have already completed the survey, please delete

Dear University of Kentucky Student:

The following is a survey that is being conducted as part of a master's thesis project at the University of Kentucky in the Department of Kinesiology and Health Promotion concerning factors that may or may not effect getting the HPV vaccine. You have been randomly selected to take part in this survey. This research is being conducted by Nicole Peritore, master's degree student, under the direction of Dr. Melody Noland, Professor at the University of Kentucky.

Although you will not get personal benefit from taking part in this research study, your responses may help us understand more about the HPV vaccine and you may find the survey interesting.

We hope to receive completed questionnaires from about 2400 people, so your answers are important to us. Of course, you have a choice about whether or not to complete the survey/questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time.

The survey/questionnaire will take about 10 minutes to complete.

Upon completion of the survey, you will have the opportunity to be entered into a drawing for one of five (5) $25.00 gift cards to Target. The last question on the survey will allow you to enter your email address if you would like to be included in the drawing. The web program will allow the researcher to gather this information separately from the data from the survey so your name will not be associated with the answers in any way. All names contributed to the list will be entered into a drawing that will take place after the data collection is complete. The names will be kept confidential at all times. The winners will be notified via email and the gift cards will be mailed to them.

Although we have tried to minimize this, some questions are personal in nature and you may choose not to answer them. At any time you can choose to close your computers browser and leave the survey.

Your response to the survey is anonymous which means no names will appear or be used on research documents, or be used in presentations or publications. The research team will not know any information you provided came from you, nor even whether you participated in the study.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

Thank you in advance for your assistance with this important project.
To ensure your responses/opinions will be included, please continue to the survey through the following link by April 19th https://uky.qualtrics.com/SE/?SID=SV_1QRFP0zWBMS10dm

Sincerely,
Nicole Peritore
Department of Kinesiology, University of Kentucky
PHONE: 859-257-5826
E-MAIL: Nicole.Peritore@uky.edu

Appendix E

Drawing Winners Email Notification

September 12, 2011

Dear:

In the past few months you have completed a survey examining factors relation to HPV vaccination of female college students. By the completion of the survey and adding your email address to the opting in to the drawing, your email address was entered into the drawing for a $25.00 Target gift card. Congratulations, your name was selected as one of the winners!

In order to receive your gift card, please contact Nicole Peritore at 859-433-0187 or email me at Nicole.peritore@uky.edu.

Your time is greatly appreciated for taking the time to complete the survey.

Sincerely,

Nicole Peritore

Department of Kinesiology, University of Kentucky

PHONE: 859-257-5826

E-MAIL: Nicole.Peritore@uky.edu

Appendix F

Email for True or False Answers

Dear Participant,

You are receiving this email because you had completed a survey regarding HPV and the HPV vaccine Gardasil®. According to you last response on the survey, you requested to know the answers to the true or false Questions on the survey. Below you will find the answers for those questions.

Thank you again for your participation and if you have further questions please contact me at Nicole.Peritore@uky.edu

Sincerely,

Nicole Peritore

HPV Facts

	True	False
HPV is the most common sexually transmitted infection.	This statement is true. HPV is currently the most common STI.	
There are many types of HPV.	This statement is true; there are over 100 different types of HPV.	
When someone has HPV, there are always visible signs.		This statement is false; there are not always signs that an individual had HPV.

HPV may go away on its own.	This statement is true. For many individuals the body's immune system is able to fight off HPV without further consequences.	
Over 50% of sexually active people have HPV.	This statement is true – Over 50% of sexually active people have HPV.	
Even with the use of condoms, HPV can be spread.	This statement is true – even though condom are important for protection against HPV, the infection can be spread with the use of a condom from other parts of exposed genitals.	

HPV Vaccination (Gardasil®) Facts

	True	False
The HPV vaccine consists of three injections.	This statement is true – the Gardasil® vaccine requires 3 doses.	
It takes over a year to complete all of the vaccines.		This Statement is false. The recommended timeframe for all 3 vaccinations is with 6 months: the initial injections, followed by number 2, two months later, and the final injection at 6 months.
The cost for the vaccine is over $500.00 for all of the injections.		This statement is false. The vaccine costs approximately 360.00 dollars for all three, or approximately 120.00 per injection.

The age range approved for the vaccine is 9-26 years.	This statement is true – the current approved age range for the vaccination is 9 -26 years.	

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Publications

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