

ASSESSING KNOWLEDGE AND BEHAVIOR REGARDING INFLUENZA
VACCINES

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Science in
the Graduate School of The Ohio State University

By

Melissa A. Brown

Graduate Program in Allied Medical Professions

The Ohio State University

2010

Master's Examination Committee:

Dr. Kay N. Wolf, Advisor

Dr. Jill Clutter

Dr. Georgianna Sergakis

Copyright by
Melissa A. Brown
2010

Abstract

Influenza kills over 35,000 people and hospitalizes another 200,000 annually. Influenza vaccines help protect people from being infected with the influenza virus. Often people do not have accurate facts about how the influenza vaccine prevents a person from getting the flu, which can hinder their ability to make an educated decision about receiving or not receiving the vaccine. More information about the relationship between knowledge about the influenza vaccine and the decision people make in regards to whether or not they get the vaccine is needed.

The purpose of this study was to determine attitudes and beliefs of the community toward the influenza vaccine. The questionnaire that was developed for this study was completed by 122 volunteer participants in a suburb of Columbus, Ohio. Each participant answered fifteen questions based on the four dimensions of the *Health Belief Model*, which are perceived barriers, perceived benefits, perceived susceptibility and perceived severity along with a “cues to action” subcategory. Several descriptive variables were also obtained.

The majority of the participants were female with 63.1% of the population sampled. Only 20 of the participants had a chronic condition and 22 people worked in the healthcare field. The number of participants that received the vaccine during the 2009-2010 influenza season was 66 people or 54%. During the 2008-2009 influenza season 57 or 49% of participants received the vaccine.

Some differences between attitudes and beliefs based on the descriptive variables were found when evaluated against the five categories from this model using an ANOVA or t-test. Females were more likely to believe that the flu can be severe. Individuals with a chronic medical condition were more likely to believe that they were susceptible to getting the flu and there were few barriers to getting the vaccine. Healthcare workers felt that there were many benefits and few barriers to receiving the vaccine. Individuals that received the vaccine during the past two flu seasons were more likely to believe that there are many benefits and few barriers to getting the vaccine. A regression analysis was performed to help predict vaccine compliance for the 2009-2010 influenza season based on the four *Health Belief Model* categories. This analysis found that perceived barriers were the only component of this model that was able to predict vaccination compliance ($r^2 = 0.257$). No significant correlation was found between the other three components of this model.

This study concluded that about half of the participants received the vaccine. Based on the answers received for each category, perceived barriers was the only positive predictor of vaccination compliance. There are differences between beliefs about the vaccine based on descriptive variables. These findings suggest that there are still misconceptions about the influenza vaccine. These results can help educators create programs targeted at certain populations to increase knowledge within an identified weak category for the targeted population. This may positively affect their beliefs and attitudes towards receiving the vaccine, which could increase vaccination compliance within the targeted group.

Dedication

This document is dedicated to my family.

Acknowledgments

I would like to acknowledge and thank my advisor, Dr. Wolf and committee members, Dr. Clutter and Dr. Sergakis, for their support, dedication and insight throughout the thesis process.

Vita

May 3, 1985Born-Morral, Ohio

2008.....B.S.N. Nursing, The Ohio State University

Fields of Study

Major Field: Allied Medical Professions

Table of Contents

Abstract	ii
Dedication	iv
Acknowledgments	v
Vita	vi
Fields of Study	vi
Table of Contents	vii
List of Tables	viii
List of Figures	x
CHAPTER 1	1
CHAPTER 2	7
CHAPTER 3	23
CHAPTER 4	29
CHAPTER 5	44
BIBLIOGRAPHY	58
Appendix: Influenza Questionnaire	62

List of Tables

Table 1 <i>Health Belief Model</i> Categories and Questions	25
Table 2 Descriptive Characteristics of Participants (N = 122)	30
Table 3 Mean Scores for Each Question Regarding Individual Beliefs about Influenza .	32
Table 4 Mean Subscale Scores for Each Health Belief Model Category	34
Table 5 Mean Scores for Gender and the Corresponding Categories.....	35
Table 6 Mean Scores for Participants with Chronic Conditions and the Corresponding Categories	36
Table 7 Mean Scores for Participants that are Healthcare Workers and the Corresponding Categories	37
Table 8 Mean Scores for Participants that either Received or did not Receive the Influenza Vaccine for the 2008-2009 Season and their Corresponding Categories	38
Table 9 Mean Scores for Participants that either Received or did not Receive the Influenza Vaccine for the 2008-2009 Season and their Corresponding Categories	39
Table 10 Cross-Tabulation for Participants who Received the Vaccine and were Infected with Influenza in the 2009-2010 Season.....	40
Table 11 Cross-Tabulation for Participants who Received the Vaccine and were Infected with Influenza in the 2008-2009 Season.....	41
Table 12 Results of One-Way ANOVA and Comparison of Means for Age Groups and Their Corresponding Categories	42

Table 13 <i>Health Belief Model</i> Categories and Questions	48
Table 14 Mean Scores and Significant p values (< 0.05) for each Descriptive Variable and Their Corresponding Categories	53

List of Figures

Figure 1 <i>Health Belief Model</i>	19
---	----

CHAPTER 1 INTRODUCTION

Background

Influenza, or the flu, is a contagious viral infection. It generally affects the nose and throat. Typical signs and symptoms of influenza include a sudden high fever, headache, fatigue, cough and general muscle pain. In the United States, seasonal influenza kills more than 36,000 people and hospitalizes another 200,000 every year (Chang, Burke, & Glass, 2009). Flu outbreaks occur yearly and these outbreaks normally peak between November and March in the United States. Research has shown that approximately 5-20% of Americans are infected every flu season, but most people improve within a week (Thompson et al., 2003). For some elderly individuals, infants, children, and those with certain chronic diseases, influenza can be life-threatening.

Influenza is classified into three different categories, which are type A, B, or C. Type A is the most prevalent type and causes nearly all serious epidemics. In fact, the recent 2009 outbreak of H1N1 or “swine flu” is a new type A influenza virus. This strain is probably due to a sudden change in the virus structure. Type A influenza strains account for most epidemics and infect humans and various animals including pigs, ducks and chickens. Type B usually causes milder epidemics. Type C influenza has never been associated with an epidemic (Chang, Burke, & Glass, 2009).

There are two seasonal influenza vaccines available on an annual basis. A new vaccine is created annually because influenza viruses continuously change and people need to be protected against the new strains that are expected to be the most prevalent strains in the coming year. One of the available seasonal influenza vaccines is an injection that is made of inactive, or dead, viruses and can be given to anyone over six months old via an intramuscular (IM) injection. The most common side effect from this vaccine is mild soreness and redness at the injection site. People between the ages of five and fifty can decide to receive the other available formulation instead, which is a live attenuated nasal vaccine. Antiviral drugs are also available for treatment of high risk individuals that show signs and symptoms consistent with seasonal influenza.

It is important to note that there are several misconceptions about seasonal influenza. People often get the common cold and the flu confused. This can happen because the signs and symptoms of influenza and the common cold are very similar and often overlap. Also, people often mistakenly use these two terms interchangeably. Some people choose not to be vaccinated against the flu because they believe that the vaccination can cause one to become ill with influenza instead of preventing it. Other individuals believe that seasonal influenza is not a serious and deadly disease. Due to this belief they feel that it is unnecessary to receive an annual vaccine.

Even health care workers are sometimes reluctant to get the vaccine. The Centers for Disease Control and Prevention (CDC) recommends that all health care workers get an annual influenza immunization to protect themselves and their patients from acquiring

this illness. Yet, research has shown that only 40% of healthcare workers in the United States get immunized every year (Douville, Myers, Jackson & Lantos, 2010).

The *Health Belief Model*, developed by Rosenstock in 1966, can be helpful in describing why one chooses to receive an influenza vaccination (Rosenstock & Kirscht, 1974). The *Health Belief Model* states that people make health related decisions and take action if they believe they are susceptible to the condition, if the condition would result in serious harm, and if some action can decrease the severity or likelihood of getting the disease. A person is more likely to make a change in behavior if they perceive that they are susceptible to the condition. In addition, perceived benefits and/or barriers to taking a certain action can influence their decision to take or not take a particular action (Glanz, Rimer & Lewis, 2002).

Knowledge regarding the benefit and harm of receiving an influenza vaccine will influence one's choice to either receive or forgo getting a flu shot. Health literacy is a concept that influences an individual's understanding of getting immunized against influenza. People that are highly health literate usually are in better overall health and are more likely to get immunized against the flu compared to individuals with low health literacy (Howard, Sentell, & Gazmararian, 2006).

Statement of the Problem

Individuals need to be correctly informed about a topic before they can make a good decision. In the United States we have a low percentage of people who get the influenza vaccine every year. Many people have misconceptions about the seasonal

influenza vaccine. If people do not have accurate facts about what seasonal influenza and its accompanying vaccine is, they will not be able to make an educated decision about receiving or not receiving the vaccine to help prevent being infected with the flu.

The review of literature made it clear that there is still much to be known about the relationship between knowledge about the seasonal influenza vaccine and the decision people make in regards to whether or not they get the flu vaccine. Better understanding of this relationship would help to determine, develop, implement and evaluate valuable educational interventions that could facilitate change in the way people view influenza vaccines.

Significance of the Problem

Seasonal influenza is a complex problem that can lead to serious complications and even death, especially among high risk populations. Many people believe that the flu is a relatively harmless illness that will quickly go away with time and simple home remedies. The perception that influenza is not a serious infection has been the way most people have viewed the flu for all of their lives. Few people realize the harm that it can cause. In addition, there are many misconceptions about the safety of the influenza vaccine. Many people do not believe that seasonal influenza is harmful, although with the recent H1N1 influenza outbreak in the spring of 2009, more attention was brought to the severe consequences influenza can have on an individual.

Purpose of the Study

The purpose of this study was to determine attitudes and beliefs of the community toward the influenza vaccine. According to the *Health Belief Model*, changes in behavior are achieved through changes in knowledge and beliefs.

Research Questions

The specific research questions were:

- 1) What are the attitudes and beliefs of the community towards the influenza vaccine?
- 2) Are there differences between attitudes and beliefs based on gender, age, presence or absence of chronic medical conditions, whether or not the participant is working in the healthcare system and whether or not the participant was recently sick with the flu?
- 3) Can you predict vaccination compliance based on the four components of the *Health Belief Model* which are perceived barriers, perceived benefits, perceived susceptibility and perceived severity?

Definition of Terms

Influenza: A highly contagious infection of the respiratory system that is caused by a virus and is transmitted by airborne droplets. It can cause mild to severe illness and can even lead to death (Mosby, 2002).

Seasonal Influenza Vaccine(s): Seasonal influenza vaccines come in two forms.

A) The most common type is a suspension of killed microorganisms that is administered via an intramuscular injection that helps stimulate active immunity against the annual flu strains (Mosby, 2002).

B) The other type of vaccine is a live, weakened nasal spray that also helps stimulate active immunity against the annual flu strains (Jackson et al., 1999).

Belief: A state of mind in which trust or confidence is placed in some person or thing.

Attitude: An emotion or feeling toward a fact or state.

Health Literacy: The ability to understand health information and to use that information to make good decisions about medical care.

CHAPTER 2 REVIEW OF LITERATURE

Ensuring that the general population receives an annual seasonal influenza vaccine continues to be an issue that various healthcare professionals struggle. On average, 36,000 people die from flu related causes annually and another 200,000 people are hospitalized (Chang, Burke, & Glass, 2009). Despite these staggering figures, many people decide they do not want to receive the seasonal influenza vaccine, which has been proven to be the best line of defense against contracting the flu (Bridges, Fukuda, Uyeki, Cox, & Singleton, 2002). Public health officials have spent a considerable amount of time and money informing the public about the benefits of receiving an annual flu vaccine. Vaccinations are credited with preventing more illnesses and deaths over the past century than any other medical development (Field, 2009). Yet, many people still choose not to get immunized. Understanding why there is a disparity between the available research that strongly supports the need for yearly immunizations against influenza and the low percentage of people that actually receive the vaccine will be the focus of this paper. The following review of literature provides information about influenza and seasonal influenza vaccines. The prevalence, causes, risks, diagnosis, signs/symptoms, prevention/treatment, myths and behavior related to influenza vaccines are included in this review.

Influenza – Prevalence

The flu is very common throughout the United States. Yearly outbreaks of the flu generally occur during late fall through early spring. There are usually two epidemiological waves of seasonal influenza during this time period. The first wave typically affects school children and their household contacts. The second wave usually is comprised of elderly individuals, especially those that live in a nursing home or are housebound (Beers, 2006).

According to the World Health Organization (WHO), children are effective transmitters of the flu and children between the ages of five and nine usually have the highest rate of this illness (World Health Organization, 2005). In industrialized countries influenza vaccines appear to offer 70-90% protection against clinical illness in healthy adults, as long as there is a good match between the vaccine antigens and the circulating viruses(s). Among the elderly, vaccines may reduce hospitalization by 25-39%. Influenza occurs all over the world with an annual global incidence estimated at 5-10% of adults. This rate is higher in children, although most hospitalizations and deaths occur in high risk and elderly populations (WHO, 2005).

In early 2010, the CDC published estimated seasonal influenza vaccination rates among several age groups within the United States for the 2009-2010 influenza season. For infants six months of age or younger, the median vaccination rate was 40.6%. The median vaccination rate for children 6 months – 17 years old was 41.2%. Persons between the ages of 18 and 49 had a median coverage rate of 28.8%. Adults aged 50-64

years old had a rate of 45.5% and individuals aged 65 or older had a median immunization rate of 69.3%. These results clearly show that people are often reluctant to receive the flu vaccine, even those that are in a high risk age group (Centers for Disease Control and Prevention [CDC], 2010).

Influenza - Causes

Influenza is caused by contagious influenza viruses and is transmitted through the air by coughing or sneezing, which creates aerosols containing the virus that can enter the respiratory tract through an individual's nose or mouth. These viruses can also be transmitted by person-to-person contact or indirect contact with a contaminated object. These viruses are classified into types A, B, and C based on the origin of their core proteins (WHO, 2005). Influenza A viruses are the main cause of large epidemics that can result in high morbidity and mortality. Influenza B strains can cause mild epidemics and influenza C viruses have never been associated with an epidemic (Chang, Burke, & Glass, 2009). There are two types of mutations that occur in these viruses: antigenic drift and antigenic shift. Antigenic drift is one type of mutation that occurs continuously and results in frequent but minor changes in the structure of the influenza virus. Antigenic drift allows the virus to avoid immune recognition, causing repeated influenza outbreaks (WHO, 2005). Antigenic shift is a major change in the virus, which is caused by a re-assortment of genetic material from different A subtypes. Antigenic shifts cause pandemic strains (WHO, 2005).

Influenza – Risks

Various groups are at an increased risk of contracting the seasonal flu and developing complications from it. Therefore, a seasonal influenza vaccine is highly recommended for these individuals. High risk groups include anyone with cardiopulmonary disorders, diabetes or other metabolic disorders, renal failure and people who are immunocompromised. People over the age of sixty-five or who live in a skilled nursing facility are also at an increased risk. In addition, pregnant women, children six to twenty-four months old, children on long-term aspirin therapy and any family members, household contacts or healthcare workers who interact with these high risk patients should get the annual vaccine (Beers, 2006).

Influenza - Diagnosis

Diagnosis is usually based on clinical signs and symptoms and depends on local epidemiological patterns. Definitive diagnosis requires cell culture of an aspirate sample or a nasopharyngeal swab. The results of this test generally takes several days to obtain; it is more useful in establishing the presence of influenza in the community and detecting antigenic changes (Beers, 2006).

Influenza - Signs and Symptoms

Typical signs and symptoms of the flu in adults include a sudden onset of chills, fever, fatigue, headache, cough and generalized aches and pains. These aches and pains

can sometimes be severe, especially in a person's back and legs. A headache caused by the flu is often accompanied by sensitivity to light. People with seasonal influenza also have respiratory symptoms. These symptoms typically go through two stages. The first stage is characterized by signs and symptoms that include a scratchy sore throat, substernal burning and a nonproductive cough. Later, these symptoms progress to a persistent cough that is raspy and productive (Beers, 2006). It should be noted that children often have these same signs and symptoms. Sometimes children may also experience nausea and vomiting, or abdominal pain. After two to three days, acute symptoms rapidly subside, although a fever may last for up to five days. Weakness, coughing, sweating and fatigue may persist for up to ten days. Most patients make a full recovery within one to two weeks (Beers, 2006).

Sometimes people with a mild form of the flu can have signs and symptoms that closely resemble the common cold. Some typical signs and symptoms someone with a mild form of the flu may have include a sore throat, runny nose and mild conjunctivitis. A person with influenza is susceptible to getting pneumonia, particularly if he or she is in a high-risk group (Lipman, 2010). Pneumonia is an acute inflammation of the lungs that is caused by bacteria and viruses (Mosby, 2002). Testing for pneumonia is indicated when an individual has a worsening cough, purulent or bloody sputum, dyspnea, and rales. Rales are small clicking or rattling lung sounds that can be heard on auscultation. Patients with these lower respiratory tract signs and symptoms on lung examination should have a chest x-ray to detect pneumonia. This would appear as diffuse interstitial infiltrates on x-ray (Beers, 2006).

Influenza – Prevention and Treatment

Getting a yearly seasonal influenza vaccine is the best way to prevent getting the flu. Prevention is recommended for everyone, but it is especially important for high risk populations and healthcare workers to get the vaccine. The seasonal influenza vaccine is available in two forms and both are safe for most individuals to obtain on a yearly basis. The flu vaccine is modified annually to include the most prevalent strains of the flu. Usually the vaccine contains two strains of influenza A and one strain of influenza B. Getting the vaccine on an annual basis is important because this helps someone's body maintain antibody titers and it allows vaccine modification to compensate for antigenic drift. It is best to get the vaccine in the early fall so that antibody titers will be high during the peak months of the flu season (Beers, 2006). A yearly vaccine protects an individual for less than a year. This happens because protective antibodies diminish six to twelve months after vaccination and the virus is always mutating (Grabenstein, 2002).

It is important to note the reason why two influenza vaccines were recommended during the 2009-2010 influenza season. This happened because this pandemic occurred in the spring of 2009, after the seasonal influenza vaccine for 2009-2010 was created. Therefore, the seasonal vaccine did not contain this novel type A H1N1 strain. Shortly after the H1N1 pandemic began, a separate H1N1 vaccine was created. This is why two vaccines were available during the 2009-2010 influenza season. The seasonal influenza vaccine that will be distributed in the upcoming 2010-2011 influenza season will contain this type A H1N1 virus, along with two other strains of the influenza virus. Therefore,

people will only need to receive the seasonal influenza vaccine to be protected from the H1N1 virus (WHO, 2010).

Inactivated influenza vaccines are given by IM injection. This is the most common way for people to be immunized against influenza. Children between six months to thirty-five months old receive a 0.25 mL dose. These children receive a primary and booster shot one month apart, unless the child has been vaccinated previously. The primary and booster vaccines are both 0.25 mL for this age group. Kids between the ages of three and eight years old receive a 0.5 mL shot and possibly an additional 0.5mL booster shot if it is the first time the child is getting the vaccine. Adults and children over the age of five receive a single 0.5 mL dose (Grabenstein, 2002). Mild soreness and redness at the injection site is the most commonly reported side effect with this vaccine.

There is also a live attenuated vaccine that is available in the United States for healthy adults and children from the ages of five to fifty years old. This vaccine should not be given to high risk groups because it does contain a small dose of the live influenza virus. This nasal vaccine cannot be given to pregnant women or people with immune deficiencies. This type of the vaccine is given intranasally at a dose of 0.25 mL in each nostril for a total of 0.5 mL (Beers, 2006). Children between five and eight years of age who have not received the nasal vaccine before should receive a second dose six weeks after they received the first dose. Common side effects with the nasal vaccine include a runny nose and nasal congestion (Jackson et al., 1999).

Antiviral drugs are a class of medications that are available to people that fall into a high risk category and have a positive or suspected case of the flu. These medications

are given to those who are at the highest risk of acquiring influenza related complications. These drugs decrease the ability of flu viruses to reproduce. According to the CDC, people with a chronic illness and who are hospitalized due to a suspected or confirmed case of influenza are one high risk group that should receive an antiviral medication (Bresee, 2009).

Treatment with an antiviral is generally recommended for five days after the patient presents with signs and symptoms indicative of an influenza diagnosis. Hospitalized patients with severe infections may require a longer course of treatment. Typically chemoprophylaxis, or prevention of the flu through the use of an antiviral, is only used for high risk individuals who have been in contact with someone that has the flu. Chemoprophylaxis with an antiviral is usually indicated for up to ten days after the last known exposure to the virus. Practitioners should be conservative when deciding to prescribe an antiviral because resistance to the medication can occur (Bresee, 2009).

It is important for community members to know that the incubation period for influenza ranges from one to four days, with an average of forty-eight hours (Beers, 2006). This is important to know because people are contagious before they even realize that they are sick. This is why good hand hygiene practices, covering one's cough or sneeze with a tissue and staying home from school or work when ill, are effective ways to help ensure that other people do not get the influenza virus as well. This is necessary because the flu is very contagious. Treatment for most patients with the seasonal flu is typically aimed at treating the individual's specific symptom(s); rest, hydration and antipyretic medications are used as needed.

Influenza Vaccination - Myths

Numerous misconceptions about seasonal influenza vaccination still exist. One reason people decide not to get the vaccine is because they feel that the risks associated with the vaccine outweigh the benefits. Many people still believe that it is possible to get the flu from the vaccine. The reason many people believe this is because in rare instances, the nasal vaccine can cause a sore throat, runny nose, headache, or fatigue (Jackson et al., 1999). In addition, receiving a vaccine automatically makes a person more aware of possible signs and symptoms of the flu. Immunity against influenza does not occur for up to two weeks after a vaccine administration so it is possible for someone to become infected with the flu during this time period (Fiore, et. al., 2009). This is why some people mistakenly believe the vaccine gave them the flu during this time period, when in reality protection from the flu is not effective yet.

Sometimes, the three strains of influenza that are included in the vaccine are not the same strains of influenza that are circulating in a particular community. Because of this, people are more susceptible to becoming ill with the flu. This is what happened in the 2009 H1N1 pandemic. This pandemic was caused by an antigenic shift in this novel type A virus. It caused widespread fear among people in the United States and throughout the world (Gallaher, 2009).

People who oppose influenza vaccinations generally fall into two groups. The first group consists of individuals who misunderstand the facts about influenza and its vaccine. More informative educational programs should help improve compliance among this group. The second group understands the facts about the flu, but believes that

decisions regarding any immunizations should be up to the individual (Douville et al., 2010).

Douville and her colleagues conducted a study that looked at over 500 health care workers and their opinions about a mandatory, annual influenza vaccination policy. They also looked at the health care workers' opinions about the safety, effectiveness and knowledge regarding influenza vaccines. This study found that 70% of health care professionals thought that an annual influenza vaccination should be mandatory for all employees that do not have a medical contraindication. Almost all of the employees that believed in mandatory immunizations had already been immunized against the flu, which is an expected outcome. This study also found that knowledge about the CDC's recommendations for routine vaccination against the flu in high risk groups was adequate among all healthcare workers (Douville, et. al., 2010).

Myths regarding immunization against influenza still exist among healthcare professionals; some underestimate the dangers this illness can present to their patients while others may overestimate the risks associated with getting the vaccine (Douville, et. al., 2010). However, these misconceptions among healthcare professionals seem to be getting better because the CDC recently reported that almost 62% of healthcare workers reported having received the influenza vaccine in the 2009-2010 influenza season. This is substantially higher compared to surveys conducted in previous years. This may be due to an increase in recommended or required immunizations for healthcare employees working at certain healthcare facilities (CDC, 2010).

Another misconception is that the influenza vaccine costs too much money. In fact, some people believe that getting the influenza vaccine may actually be a waste of money. However, this is not the case because flu vaccines cost a person without health insurance an estimated \$16.87 per year (MLN Matters, 2008). An individual with health insurance may pay nothing out of pocket, or may only pay around \$10.00 (MLN Matters, 2008). Additionally, healthcare workers can usually receive an influenza vaccine for free because they are part of a high risk group and they usually interact with other high risk individuals on a regular basis.

One study has shown that there can be economic benefits when someone gets the seasonal influenza vaccine. This study found that the direct and indirect cost savings to someone that has received the vaccine in comparison to someone that does not get the vaccine is over \$46.00. Those who received the vaccine reported 25% fewer episodes of upper respiratory illness compared with those who received the placebo vaccine. In addition, they reported 43% fewer days of sick leave from work and 44% fewer doctors' office visits for upper respiratory illnesses (Nichol, et al., 1995).

Influenza has also been shown to greatly increase absenteeism from work and school during flu epidemics. Absenteeism and the resulting loss in productivity can cost the United States an estimated \$12 billion per year (Williams, Hickson, Kane, Kendal, Spika, & Hinman 1988). One study found that over 172,000 hospitalizations can be contributed to influenza during a moderate epidemic which would cost over \$600 million in 1984 dollars, clearly this estimate would be much higher in 2010 dollars (Baker, 1986).

Behavior related to influenza vaccines

Health Belief Model

The *Health Belief Model* is a useful theory to use when discussing the human behavioral change process when considering influenza vaccinations. This model helps explain preventative, treatment, and compliance measures one may take in regard to a potential or actual health threat. This model is a value-expectancy based model. It helps explain why some people decide to get the seasonal vaccine and why others decide to risk getting the flu by not receiving the vaccine. If they perceive that the value of receiving the vaccine is greater than the risk associated with getting the vaccine, they are more likely to get immunized against the flu. (Glanz, Rimer & Lewis, 2002).

The *Health Belief Model* states that changes in beliefs and knowledge are required to achieve a particular change in behavior. There are four key concepts that make up the *Health Belief Model*. The four concepts are perceived susceptibility, perceived severity, perceived barriers and perceived benefits. These four components of the *Health Belief Model* are based on an individual's perceptions related to a certain issue. Perceived susceptibility is an individual's assessment of his or her risk of getting the condition. Perceived severity can be described as a person's evaluation of the seriousness of the condition, as well as its potential consequences. Perceived barriers are an individual's assessment of the negative consequences that may result from adopting a particular behavior. In contrast, perceived benefits are a person's evaluation of the positive consequences that could result from adopting the behavior. An additional part of the *Health Belief Model* is cues to action. Cues to action are external influences that promote

the desired behavior (Rosenstock, 1974). A depiction of the *Health Belief Model* can be found below.

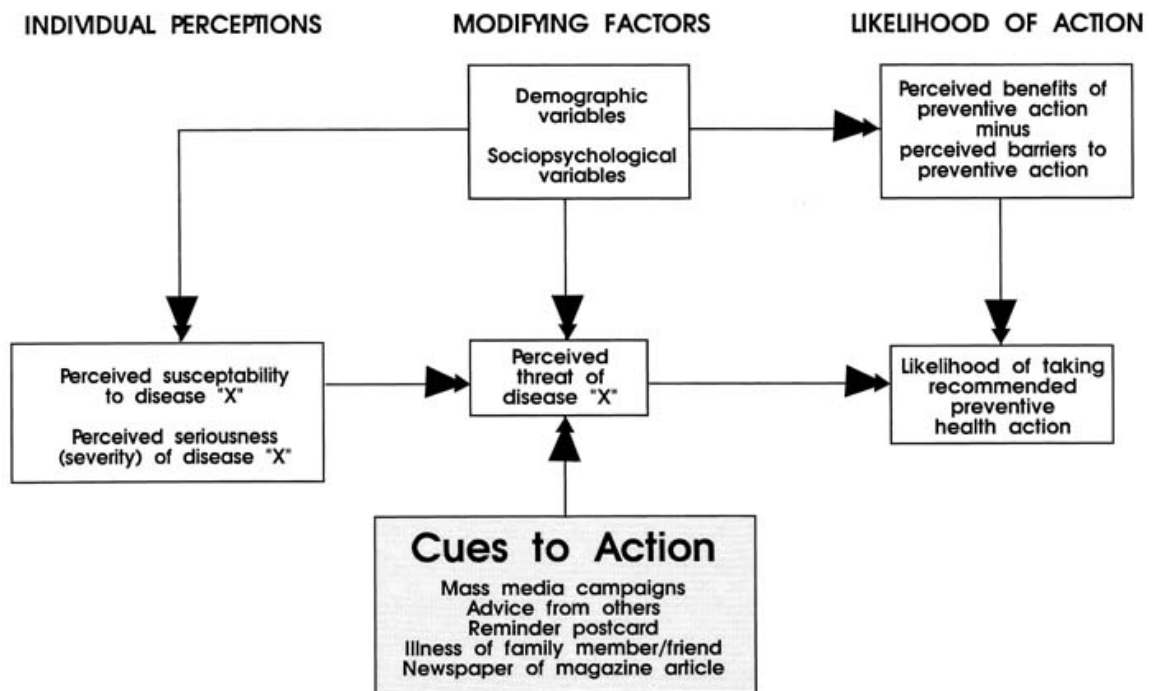


Figure 1 Note: From “Planned or Managed Change and Selected Theories” Health Belief Model 2 www.nursing-informatics.com/N4111/LA2.html. Copyright June Kaminsky.

The first and second concept of perceived susceptibility and severity can be combined to form a perceived threat. If an individual is in a high risk group for contracting seasonal influenza and is more likely to become seriously ill or even hospitalized from the flu, he or she is more likely to get immunized. Perceived benefits increase the likelihood that someone will take a certain health action. In this case, if an

individual believes that getting an influenza vaccine will decrease the likelihood that he or she gets the flu, that person is likely to get the shot. On the other hand, if there are perceived barriers to implementing a health change, the change will likely not occur. This is why educating people about the benefits of receiving an influenza vaccine and dispelling myths about the vaccine is so critical. In addition, cues to action such as ad campaigns and pamphlets that display the facts about seasonal influenza will generally help activate an individual's desire to take action (Glanz, Rimer & Lewis, 2002).

Nexoe, Kragstrup and Sogaard developed a questionnaire in 1996 that was partly based on the *Health Belief Model*. This study described important factors that helped elderly people decide whether or not they wanted to receive the influenza vaccine. The researchers mailed out a 46 item questionnaire to more than 2,000 people over the age of sixty five. This questionnaire included 16 questions based on the four dimensions of the *Health Belief Model*. The first six questions covered perceived barriers to receiving the flu vaccine, while the next question was about perceived benefits to getting the vaccine. The next three questions were about the perceived susceptibility of catching the flu while the last six questions were about the perceived severity of the flu. This study found that perceived benefits and perceived severity of the flu were shown to be positively correlated with the person being in favor of influenza vaccination. Perceived barriers to the vaccine were correlated with the person being against getting the influenza vaccine.

Health Literacy

Health literacy is an important concept to understand because it can help explain health disparities among different populations. Health literacy is defined as a number of skills, including reading, numerical and verbal comprehension skills that are required to be able to obtain, process and understand basic health information so that an individual can make appropriate health decisions (Schwartzberg, VanGeest, & Wang, 2004).

Individuals with low health literacy generally have a hard time navigating the health care system because they are often nervous or scared to tell health practitioners that they do not understand what they were just told.

People with low health literacy skills are more likely to not have a high school degree compared to individuals with adequate health literacy. These individuals also generally have significantly worse health outcomes in comparison to those with adequate health literacy skills (Howard, Sentell, & Gazmararian, 2006). Often people with low health literacy skills do not understand the benefits of receiving an influenza vaccine, or any form of preventative care. This is one reason why a better understanding of health information is linked to an increased use of protective care (Parente, Salkever, & DaVanzo, 2005). Programs to improve health literacy have the potential to increase preventive medicine, which includes receiving an annual influenza vaccine.

One study, conducted in 2002 by Scott, Gazmararian, Williams and Baker, found that people with poor health literacy skills were more likely to report that they had never received the influenza vaccine. These researchers surveyed a cross-sectional group of Medicare enrollees to determine whether elderly individuals with low health literacy

were less likely to report receiving an influenza vaccine or other common preventative procedures. The study revealed that inadequate health literacy is strongly correlated with a lower use of preventative health services.

In conclusion, numerous studies have acknowledged the complex nature of seasonal influenza and the serious complications that can sometimes result from this viral infection. Yet, many people do not believe that the flu is a harmful illness. It is well documented that getting an influenza vaccine is the best way for a person to prevent becoming sick with the flu. However, many people decide not to get the vaccine because there are many misconceptions about the influenza vaccine.

According to the *Health Belief Model*, changes in behavior are achieved through changes in knowledge and beliefs. Individuals need to be knowledgeable about influenza and its accompanying vaccine in order to make an educated decision about whether or not they want to receive the vaccine. This study focused on what the current attitudes and beliefs towards influenza vaccines are within a community and whether or not vaccination compliance can be predicted based on the four dimensions of the *Health Belief Model*. A better understanding of people's beliefs and attitudes regarding the influenza vaccine will help healthcare officials create programs targeted at increasing influenza vaccination rates within the community.

CHAPTER 3 METHODOLOGY

This chapter will describe the procedures used in this study. The following areas are presented: research design, population and sample, instrumentation, data collection, data analysis and limitations.

Research Design

A descriptive, comparative research design was used in this study. A questionnaire was utilized to measure beliefs about seasonal influenza vaccines with a group of volunteer participants in a community environment. Each participant answered a series of questions based on the four dimensions of the *Health Belief Model* using an evaluation scale that ranged from 1 (strongly disagree) to 5 (strongly agree). In addition, the study included whether or not the participant received the seasonal influenza vaccine during the past two flu seasons. The study determined how having one or more chronic medical conditions or working in the healthcare field related to a participant's evaluation scale response scores. Two demographic variables (gender and age) were also obtained in the study.

Population and Sample

The target population for this study was people residing in and around Columbus, Ohio. A convenience sample of 122 adult volunteers aged eighteen and over participated in the study. Participants were recruited on June 5, 2010 at a local youth soccer tournament in a suburb of Columbus, Ohio. Before the researcher gave the volunteer the survey, the participant was told that participation was voluntary and that responses would be completely confidential, while reported in aggregate format only. The researcher then gave the participants the questionnaire that they completed and returned to the researcher.

Instrumentation

The questionnaire that was developed for this study was based on a previous survey that Nexoe, Kragstrup and Sogaard developed in 1996. An expert panel reviewed the questionnaire that was developed for this study, recommended changes were discussed and the questionnaire was finalized. The questionnaire that was used in this research study was based on the four dimensions of the *Health Belief Model*, which are perceived barriers, perceived benefits, perceived susceptibility and perceived severity.

The survey that was used in this study contained 15 questions that the participants answered using an evaluation scale that ranged from 1 (strongly disagree) to 5 (strongly agree). The first 14 questions in this questionnaire are broken down into the four dimensions of the *Health Belief Model*. The first seven questions address perceived barriers related to receiving the influenza vaccine. The next three questions measured the perceived benefits of getting the flu vaccine. The next two questions measured perceived

susceptibility of influenza. Perceived severity was measured with two questions. The last question addresses a separate component of the *Health Belief Model*. This component is called cues to action and it addresses strategies to activate one's "readiness." This question addresses an individual's cue to action given the increased education about seasonal influenza after the 2009 H1N1 outbreak. The table below lists the fifteen questions broken into their corresponding component of the *Health Belief Model*.

Perceived Barriers	1. I do not want to get the flu shot 2. The flu shot will make me sick 3. Getting the flu shot takes too much time 4. Getting the flu shot takes too much effort 5. The flu shot is not available at a convenient time 6. The flu shot is not available at a convenient location 7. Flu shots cost too much
Perceived Benefits	8. The flu shot is safe for me 9. Taking the flu shot will prevent the flu 10. I do not want to spread the flu to my family, friends &/or co-workers
Perceived Susceptibility	11. I have an increased risk of getting the flu 12. I get sick more often than others my age
Perceived Severity	13. Complications from the flu could be serious 14. Getting the flu may lead to other serious health problems
Cues to Action	15. The recent H1N1 influenza outbreak media coverage influenced my decision to receive or not receive the flu shot

Table 1 *Health Belief Model* Categories and Related Survey Questions Used to Measure the Categories

This questionnaire also included four yes or no questions. The first two questions determined whether or not the participant received the seasonal influenza vaccine during the past two flu seasons, and if they did receive the vaccine, whether or not they had the flu. In addition, the study determined how having one or more chronic medical conditions or working in the healthcare field related to a participants evaluation scale response scores. Two demographic variables, which are gender and age were also obtained in the study. The questionnaire may be found in the Appendix.

Data Collection

The data were collected on June 5, 2010 at Spindler Fields in Hilliard, Ohio at a Buckeye Premier Youth Soccer League tournament. Data were collected from volunteers aged eighteen or older, who agreed to be a participant of the study when asked by the researcher. The researcher introduced herself, stated that she was a graduate student at The Ohio State University, and was at Spindler Fields to find volunteers for a study about people's attitudes and beliefs towards flu vaccines. The researcher explained that all answers would be kept confidential and if the participant wanted to participate, he or she would complete a short questionnaire that could be finished in 5 minutes or less. As subjects were completing the questionnaire, the researcher was available to answer questions and clarify instructions, as needed.

Data Analysis

Data obtained from the questionnaires were entered into a computer at The Ohio State University for statistical analysis. The Predictive Analytics SoftWare (PASW) Statistics version 18.0 program was utilized when analyzing the data.

The data were analyzed to determine differences among the respondents relating to the individual variables of gender, age, the presence or absence of chronic medical conditions, and whether or not the participant is a healthcare worker.

The first fifteen questions received an individual mean score and then categorized into one of the four *Health Belief Model* categories except for the last question which was its own cues to action category. A t-test was performed to determine differences between beliefs based on gender, the presence or absence of chronic medical conditions, whether or not the participant works in the healthcare field and whether or not the participant received the influenza vaccine during the past two influenza seasons. In addition, if the participant did receive the vaccine, whether or not they have had the flu in the past two influenza seasons was assessed using a cross tabulation measurement. A one way ANOVA was also used to determine differences in the five *Health Belief Model* categories described above, based on the participants age. A regression analysis was performed to determine if the four components of the *Health Belief Model* can predict vaccination compliance. All of this data was calculated to look for trends among all of these variables.

Limitations

This study was limited by the subjective nature of all of the questions, excluding the demographic questions. The subjective questions on the survey could be affected by participant bias, education level or health literacy, which could skew the results. In addition, the use of a small convenience sample may limit generalization of the results to a larger population.

CHAPTER 4 RESULTS

The results of this study are presented below in two general sections. The first section will describe the individual characteristics of each participant. The second section will analyze the three research questions using both descriptive and statistical techniques.

Subjects

The sample was comprised of spectators attending a youth soccer event in central Ohio. A total of 122 individuals volunteered to participate in the study by completing the Flu Shot Questionnaire. The frequencies and corresponding percentages for each descriptive variable are presented in Table 2. The participant's ages ranged from 18 to 88 years old and the mean age of the participants was 45 years old. Over 40 percent (N = 49) of the subjects were between 40 to 49 years old. The majority of the respondents were female (63.1%). There were only 20 people (16.5%) in the study who had chronic medical conditions. Therefore, the majority of participants did not have a chronic medical condition. Additionally, this study found that most of the participants did not work in the healthcare field. In fact, only 22 people (18.0%) identified themselves as a healthcare worker. The number of participants that received the vaccine during the 2009-2010

season was 66 people or 54%. During the 2008-2009 influenza season 57 or 49% of participants received the vaccine.

Demographic Variable		Frequency	Percent
Age Groups	18-29	15	12.3
	30-39	24	19.7
	40-49	49	40.2
	50-59	22	18.0
	60-88	12	9.8
	Total	122	100
Gender	Male	45	36.9
	Female	77	63.1
	Total	122	100
Chronic Medical Condition	Yes	20	16.4
	No	101	82.8
	Missing	1	0.8
	Total	122	100
Healthcare Worker	Yes	22	18.0
	No	100	82.0
	Total	122	100

Table 2 Descriptive Characteristics of Participants (N = 122)

Analysis of Research Questions

Research Question 1: What are the attitudes and beliefs of the community towards the influenza vaccine?

This question was measured by evaluating the mean score for the first fifteen questions that were included on the questionnaire. These questions were answered using

an evaluation scale response score that ranged from 1 (strongly disagree) to 5 (strongly agree). In addition, the standard deviation from the first fifteen questions was obtained to determine how much variation there was from the mean score for each of these questions. The results for each question can be found in Table 3.

Categories	Questions	N	Mean	Std. Deviation
Barriers	1. I do not want to get the flu shot	122	2.42	1.442
Barriers	2. The flu shot will make me sick	122	2.02	1.004
Barriers	3. Getting the flu shot takes too much time	122	1.66	0.811
Barriers	4. Getting the flu shot takes too much effort	122	1.66	0.851
Barriers	5. The flu shot is not available at a convenient time	122	1.83	0.924
Barriers	6. The flu shot is not available at a convenient location	122	1.75	0.956
Barriers	7. Flu shots cost too much	121	1.79	0.856
Benefits	8. The flu shot is safe for me	122	3.69	1.179
Benefits	9. Taking the flu shot will prevent the flu	121	3.50	1.026
Benefits	10. I do not want to spread the flu to my family, friends &/or co-workers	122	4.54	0.873
Susceptibility	11. I have an increased risk of getting the flu	122	2.63	1.248
Susceptibility	12. I get sick more often than others my age	122	1.84	0.982
Severity	13. Complications from the flu could be serious	122	3.80	1.142
Severity	14. Getting the flu may lead to other serious health problems	122	3.63	1.022
Cues to Action	15. The recent H1N1 influenza outbreak media coverage influenced my decision to receive or not receive the flu shot	122	2.60	1.103

Table 3 Mean Scores for Each Question Regarding Individual Beliefs about Influenza (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

The four separate categories of the *Health Belief Model*, along with the cues to action category were analyzed as five separate aggregates. The mean scores for each subscale are presented in Table 4. The participants for this study reported a mean score

for the barriers subscale of 1.87 (SD = 0.66), this correlates to questions 1-7. These results suggest that most people either strongly disagreed (1) or disagreed (2) with these questions. This is an important result because it suggests that most people believe that barriers to getting the influenza vaccine are not strong enough to prevent them from getting the vaccine. The alpha reliability coefficient was 0.794 for the barriers subscale. This indicates that a high internal consistency level for the barriers subscale was obtained.

The participants reported a mean score of 3.90 (SD = 0.71) for the benefits subscale. This means that most people responded to the three benefit questions, which were questions 8-10, with a neutral (3) or agree (4) response. This result suggests that most of the participants believe that getting the influenza vaccine can be beneficial. The alpha reliability coefficient for the benefits subscale was 0.462, which does not indicate a very high internal consistency level.

A mean score of 2.23 (SD = 0.89) was reported for the susceptibility subscale by the participants. This result shows that most participants disagreed (2) with the two susceptibility questions, which were questions 11-12. This indicates that most people do not believe that they are more susceptible to getting influenza when compared to their peers.

The participants in this study reported a mean score of 3.71 (SD = 0.97) for the severity subscale. This result shows that most subjects in this study were neutral (3) or agreed (4) with questions 13-14. This result indicates that many people do believe that influenza can sometimes be serious.

The mean score for the cues to action subscale was found to be 2.60 (SD = 1.10). This result suggests that most people disagreed (2) or were neutral (3) when they were asked this last question. Most people felt that the media's coverage of the H1N1 pandemic did not have a big influence on their decision to receive or not receive the vaccine.

Categories	N	Minimum	Maximum	Mean	Std. Deviation
Barriers	122	1.00	3.57	1.87	0.664
Benefits	122	1.00	5.00	3.90	0.715
Susceptibility	122	1.00	5.00	2.23	0.893
Severity	122	1.00	5.00	3.71	0.974
Cues to Action	122	1.00	5.00	2.60	1.103

Table 4 Mean Subscale Scores for Each *Health Belief Model* Category
(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

Research Question 2: Are there differences between attitudes and beliefs based on gender, age, presence or absence of chronic medical conditions, whether or not the participant is working in the healthcare system and whether or not the participant was recently sick with the flu?

This question was evaluated by performing a t-test to determine differences between participant's beliefs based on their gender, the presence or absence of chronic medical conditions, whether or not the subject is a healthcare worker and whether or not the participant received the influenza vaccine during the past two influenza seasons. In

addition, if the participant did receive the vaccine, whether or not they had the flu in the past two influenza seasons was assessed by using a cross tabulation. A one way ANOVA test was used to determine differences within the five *Health Belief Model* categories based on the participant's age.

The results of the independent samples t-test showed that there was no statistical difference for barriers, benefits, susceptibility or cues to action when these categories were compared to the participant's gender. The severity category was shown to be statistically significant ($p = 0.025$) when it was compared to an individual's gender. Females were more likely to respond that they believe influenza can lead to serious consequences. Table 5 provides a more detailed description of how these categories interact with an individual's gender.

Categories	Gender	N	Mean	Std. Deviation
Barriers	Male	45	1.98	0.645
	Female	77	1.81	0.671
Benefits	Male	45	3.97	0.629
	Female	77	3.87	0.763
Susceptibility	Male	45	2.22	0.780
	Female	77	2.24	0.958
Severity*	Male	45	3.45	1.038
	Female	77	3.86	0.909
Cues to Action	Male	45	2.38	0.984
	Female	77	2.73	1.154

Table 5 Mean Scores for Gender and the Corresponding *Health Belief Model* Categories (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

* $p < 0.05$

The categories of barriers ($p = 0.032$) and susceptibility ($p = 0.008$) were found to be statistically significant when they were compared to whether or not an individual has a chronic medical condition. This was evaluated by using an independent samples t-test. This suggests that individuals with a chronic medical condition are more likely to believe that the barriers related to receiving the vaccine are not a significant factor in receiving the vaccine when compared to other participants. In addition, individuals with a chronic medical condition were more likely to believe that they are more susceptible to becoming infected with influenza in comparison to their counterparts. The other categories within the *Health Belief Model* showed no statistical difference within this group. These results can be found in Table 6.

Categories	Response	N	Mean	Std. Deviation
Barriers*	Yes	20	1.59	0.599
	No	101	1.93	0.662
Benefits	Yes	20	3.71	0.846
	No	101	3.93	0.681
Susceptibility*	Yes	20	2.72	1.006
	No	101	2.14	0.838
Severity	Yes	20	4.02	0.678
	No	101	3.66	1.012
Cues to Action	Yes	20	2.70	1.174
	No	101	2.57	1.099

Table 6 Mean Scores for Participants with Chronic Conditions and the Corresponding *Health Belief Model* Categories
(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

* $p < 0.05$

The results of the independent samples t-test showed that there was statistical significance for both barriers ($p = 0.006$) and benefits ($p = 0.002$) when these categories were evaluated by whether or not the participant was a healthcare worker. The susceptibility, severity, and cues to action categories were not statistically significant when assessed against whether or not the participant was a healthcare worker. These results suggest that people that work within the healthcare field are more likely to believe that there are few barriers to receiving an influenza vaccine and many benefits to receiving the vaccine. These results are shown in greater detail in Table 7.

Categories	Response	N	Mean	Std. Deviation
Barriers*	Yes	22	1.52	0.495
	No	100	1.95	0.674
Benefits*	Yes	22	4.33	0.534
	No	100	3.81	0.719
Susceptibility	Yes	22	2.43	1.227
	No	100	2.19	0.803
Severity	Yes	22	3.95	1.204
	No	100	3.66	0.915
Cues to Action	Yes	22	2.59	1.260
	No	100	2.60	1.073

Table 7 Mean Scores for Participants that are Healthcare Workers and the Corresponding *Health Belief Model* Categories

(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

* $p < 0.05$

There was a statistical difference based on the categories of benefits ($p = 0.000$) barriers ($p = 0.000$), susceptibility ($p = 0.020$) and cues to action ($p = 0.048$) for the question of whether or not the participant received the influenza vaccine in the 2008-2009 influenza season. This was calculated by using an independent samples t-test and Table 8 illustrates these findings. These findings suggest that participants who received the vaccine were more likely to think that there are few barriers to receiving the influenza vaccine and several benefits to receiving the vaccine. In addition, these participants were more likely to believe that they are more susceptible to getting the flu and cues to action were able to influence their decision to receive the vaccine when compared to their counterparts who did not get the vaccine.

Categories	Response	N	Mean	Std. Deviation
Barriers*	Yes	57	1.47	0.426
	No	62	2.23	0.648
Benefits*	Yes	57	4.22	0.513
	No	62	3.64	0.765
Susceptibility*	Yes	57	2.42	0.953
	No	62	2.04	0.811
Severity	Yes	57	3.73	1.056
	No	62	3.70	0.898
Cues to Action*	Yes	57	2.81	1.187
	No	62	2.40	1.016

Table 8 Mean Scores for Participants that either Received or did not Receive the Influenza Vaccine for the 2008-2009 Season and their Corresponding *Health Belief Model* Categories

(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

* $p < 0.05$

The results of the independent samples t-test illustrated that there was statistical significance for barriers ($p = 0.000$), benefits ($p = 0.000$) and cues to action ($p = 0.044$). These results are described in greater detail in Table 9. These findings are significant because once again they indicate that the participants who received the influenza vaccine in the 2009-2010 influenza season were more likely to believe that there are not many barriers to receiving the vaccine and a person can actually benefit from getting the vaccine. A cue to action, such as a friend talking about the vaccine or an ad campaign highlighting the benefits of receiving the flu vaccine can influence a person's beliefs about the vaccine.

Categories	Response	N	Mean	Std. Deviation
Barriers*	Yes	66	1.56	0.490
	No	55	2.24	0.668
Benefits*	Yes	66	4.13	0.694
	No	55	3.66	0.647
Susceptibility	Yes	66	2.37	0.936
	No	55	2.06	0.822
Severity	Yes	66	3.74	1.008
	No	55	3.70	0.921
Cues to Action*	Yes	66	2.79	1.170
	No	55	2.38	0.991

Table 9 Mean Scores for Participants that either Received or did not Receive the Influenza Vaccine for the 2009-2010 Season and their Corresponding *Health Belief Model* Categories

(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

* $p < 0.05$

Table 10 addresses an issue that is specifically directed towards the participants who got the vaccine in the 2009-2010 season. These participants were also asked whether or not they got the influenza virus after receiving the vaccine. There were fifty-eight participants who received this vaccine during the 2009-2010 influenza season and six of these participants (10.3%) believe they got the flu during this time period. A cross-tabulation measure was performed to obtain these results.

Received Vaccine in 2009-2010		Influenza 2009-2010	
Flu symptoms	Yes	No	Total
Count	6	52	58
% within vaccine 2009-2010	10.3%	89.7%	100%

Table 10 Cross-Tabulation for Participants who Received the Vaccine and were Infected with Influenza in the 2009-2010 Season

Participants who received the vaccine in the 2008-2009 influenza season were also asked whether or not they got the virus after receiving the vaccine. Forty-nine people received the vaccine during this time period and out of this group, eight people (16.3%) responded yes, they believe that they got sick with the influenza virus. This statistic was measured by cross-tabulation and the results can be found in Table 11.

Received Vaccine in 2008-2009		Influenza 2008-2009	
Flu Symptoms	Yes	No	Total
Count	8	41	49
% within vaccine 2008-2009	16.3%	83.7%	100%

Table 11 Cross-Tabulation for Participants who Received the Vaccine and were Infected with Influenza in the 2008-2009 Season

Data regarding the demographic variable of age was broken down into five subscales: group 1, 18-29 years of age (N = 15); group 2, 30-39 years of age (N = 24); group 3, 40-49 years of age (N = 49); group 4, 50-59 years of age (N = 22); and group 5, 60-88 years of age (N = 12). Using a one-way ANOVA, these groups were compared in relation to the five categories of barriers, benefits, susceptibility, severity and cues to action. No statistically significant differences were found among these age groups. Table 12 which is presented below, describes these results in greater detail.

Age Subscale		N	Mean	Std. Deviation	F	Sig.
Barriers	18-29	15	1.97	0.637	1.24	0.296
	30-39	24	1.89	0.588		
	40-49	49	1.91	0.712		
	50-59	22	1.90	0.717		
	60-88	12	1.47	0.473		
	Total	122	1.87	0.664		
Benefits	18-29	15	4.02	0.526	0.56	0.687
	30-39	24	3.86	0.785		
	40-49	49	3.82	0.779		
	50-59	22	3.96	0.616		
	60-88	12	4.11	0.715		
	Total	122	3.90	0.715		
Susceptibility	18-29	15	2.16	1.09	0.142	0.966
	30-39	24	2.14	0.890		
	40-49	49	2.26	0.872		
	50-59	22	2.31	0.779		
	60-88	12	2.20	1.032		
	Total	122	2.23	0.893		
Severity	18-29	15	3.53	0.854	0.225	0.924
	30-39	24	3.68	0.777		
	40-49	49	3.76	0.979		
	50-59	22	3.79	1.151		
	60-88	12	3.62	1.208		
	Total	122	3.71	0.974		
Cues to Action	18-29	15	2.27	0.961	1.964	0.105
	30-39	24	2.46	0.833		
	40-49	49	2.47	1.192		
	50-59	22	3.05	1.214		
	60-88	12	3.00	0.953		
	Total	122	2.60	1.103		

Table 12 Results of One-Way ANOVA and Comparison of Mean Scores for Age Groups and Their Corresponding *Health Belief Model* Categories
(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

Research Question 3: Can you predict vaccination compliance based on the four components of the *Health Belief Model* which are perceived barriers, perceived benefits, perceived susceptibility and perceived severity?

A stepwise regression analysis was performed to evaluate this research question. The coefficient of determination (r^2) was used to help predict vaccine compliance for the 2009-2010 influenza season based on these four components. Perceived barriers were the only component of the *Health Belief Model* that was able to predict vaccination compliance. The r^2 for perceived barriers was 0.257, which is a weak but significant finding. No significant correlation was found between the other three components of this model. This analysis means that if a participant received the influenza vaccine during the 2009-2010 influenza season, he or she was more likely to believe that there are few barriers to receiving the vaccine.

CHAPTER 5
Assessing Knowledge and Behavior Regarding Influenza Vaccines

Melissa Brown, BSN, RN, Kay N. Wolf, PhD, RD, LD, Jill Clutter, PhD, CHES,
Georgianna Sergakis, PhD, RRT

Abstract

Background: Influenza vaccines help protect people from being infected with the influenza virus. Often people do not have accurate facts about how the influenza vaccine prevents a person from getting the flu, which can hinder their ability to make an educated decision about receiving or not receiving the vaccine. More information about the relationship between knowledge about the influenza vaccine and the decision people make in regards to whether or not they get the vaccine is needed.

Purpose: The purpose of this study was to determine attitudes and beliefs of the community toward the influenza vaccine.

Methods: The questionnaire that was developed for this study was completed by 122 volunteer participants in a suburb of Columbus, Ohio. Each participant answered fifteen questions based on the four dimensions of the *Health Belief Model*, which are perceived barriers, perceived benefits, perceived susceptibility and perceived severity along with a “cues to action” subcategory.

Results: The majority of the participants were female with 63.1% of the population sampled. Only 20 of the participants had a chronic condition and 22 people worked in the

healthcare field. The number of participants that received the vaccine during the 2009-2010 influenza season was 66 people or 54%. During the 2008-2009 influenza season 57 or 49% of participants received the vaccine. Some differences between attitudes and beliefs based on descriptive variables were found when evaluated against the five categories from this model using an ANOVA or t-test.

Females were more likely to believe that the flu can be severe. Individuals with a chronic medical condition were more likely to believe that they were susceptible to getting the flu and there were few barriers to getting the vaccine. Healthcare workers felt that there were many benefits and few barriers to receiving the vaccine. Individuals that received the vaccine during the past two flu seasons were more likely to believe that there are many benefits and few barriers to getting the vaccine. A regression analysis was performed to help predict vaccine compliance for the 2009-2010 influenza season based on the four *Health Belief Model* categories. This analysis found that perceived barriers were the only component of this model that was able to predict vaccination compliance ($r^2 = 0.257$). No significant correlation was found between the other three components of this model.

Conclusion: This study concluded that about half of the participants received the vaccine. Based on the answers received for each category, perceived barriers was the only positive predictor of vaccination compliance. There are differences between beliefs about the vaccine based on descriptive variables. These findings suggest that there are still misconceptions about the influenza vaccine. These results can help educators create programs targeted at certain populations to increase knowledge within an identified weak

category for the targeted population. This may positively affect their beliefs and attitudes towards receiving the vaccine, which could increase vaccination compliance within the targeted group.

Background

Influenza is a complex viral infection that affects a large percentage of Americans on an annual basis. Influenza kills over 36,000 people and hospitalizes another 200,000 every year within the United States (Chang, Burke, & Glass, 2009). Despite these figures, many people decide to not receive the influenza vaccine, even though it has been proven to be the best line of defense against contracting the influenza virus (Bridges, Fukuda, Uyeki, Cox, & Singleton, 2002). Many people have misconceptions about influenza vaccines because accurate information about the vaccine can be hard to understand. An individual's beliefs about the influenza vaccine affect whether or not they decide to receive this vaccine. There is still much to be known about the relationship between knowledge about the influenza vaccine and the decision people make in regards to whether or not they receive this vaccine.

The *Health Belief Model* is a theory that was developed to help explain the human behavioral change process. This model is based on the premise that people will make health related decisions, such as getting an influenza vaccine, based on four key concepts. These concepts include perceived barriers, perceived benefits, perceived susceptibility and perceived severity (Rosenstock, 1974).

Purpose

The purpose of this study was to determine the attitudes and beliefs of the community toward the influenza vaccine. Other research questions that were addressed in this study included determining differences in influenza beliefs based on gender, age, presence or absence of chronic medical conditions, healthcare worker status and presence or absence of influenza after receiving an influenza vaccine. In addition, predicting vaccination compliance based on the four dimensions of the *Health Belief Model* was examined.

Methods

This study was designed to measure beliefs about influenza vaccines. The questionnaire that was developed for this study was based on a previous survey that Nexoe, Kragstrup and Sogaard used in 1996 while conducting a similar study. An expert panel reviewed the questionnaire that was developed for this study, recommended changes were discussed and the questionnaire was finalized. In the spring of 2010, 122 adult spectators at a youth soccer event in a suburb of Columbus, Ohio volunteered to complete this questionnaire about the influenza vaccine. This questionnaire contained 15 questions based on the four dimensions of the *Health Belief Model*, along with a separate component of this model called cues to action. These questions were answered using an evaluation response scale that ranged from 1 (strongly disagree) to 5 (strongly agree). In

addition, several descriptive variables were obtained. The questions included in this questionnaire are listed in the table below.

Perceived Barriers	1. I do not want to get the flu shot 2. The flu shot will make me sick 3. Getting the flu shot takes too much time 4. Getting the flu shot takes too much effort 5. The flu shot is not available at a convenient time 6. The flu shot is not available at a convenient location 7. Flu shots cost too much
Perceived Benefits	8. The flu shot is safe for me 9. Taking the flu shot will prevent the flu 10. I do not want to spread the flu to my family, friends &/or co-workers
Perceived Susceptibility	11. I have an increased risk of getting the flu 12. I get sick more often than others my age
Perceived Severity	13. Complications from the flu could be serious 14. Getting the flu may lead to other serious health problems
Cues to Action	15. The recent H1N1 influenza outbreak media coverage influenced my decision to receive or not receive the flu shot

Table 13 *Health Belief Model* Categories and Questions

Data Analysis

The data were analyzed to determine differences among the descriptive variables of gender, age, the presence or absence of chronic medical conditions, and whether or not

the participant was a healthcare worker. The first fifteen questions were placed into one of the five categories and they were assigned an individual mean score.

A t-test was performed to measure differences between beliefs based on all of the descriptive variables, except for age, which was analyzed by using a one way ANOVA test. Participants who responded positively to receiving the influenza vaccine in the 2008-2009 or 2009-2010 influenza seasons were analyzed further by performing a cross-tabulation test. A regression analysis was also performed to determine if it is possible to predict vaccination compliance based on the four components of the *Health Belief Model*.

Results

The results obtained from the 122 volunteers that participated in this study are important because the information gathered will help increase knowledge about what methods can positively change an individual's beliefs about influenza vaccines. The average age of the respondents was 45 years old. The majority of respondents were female (63.1%). A small percentage (16.4%) of the respondents reported having a chronic medical condition and only 18% identified themselves as being a healthcare worker. The number of participants that received the vaccine during the 2009-2010 season was 66 people or 54%. During the 2008-2009 influenza season 57 or 49% of participants received the vaccine. This finding indicates that about half of the participants received the vaccine during both of the influenza seasons that were assessed. In addition, more people received the vaccine during the 2009-2010 influenza season which is a

significant increase that hopefully indicates that people are beginning to have a more positive attitude towards getting the vaccine.

The attitudes and beliefs of the participants towards the influenza vaccine were analyzed based on the mean score for the five categories included in the questionnaire. The mean score for perceived barriers was 1.87 which suggests that most participants believed that barriers to getting the vaccine were not strong enough to prevent them from receiving the vaccine. The participants reported a mean score of 3.90 for perceived benefits which suggests that many of the individuals surveyed believed that getting the influenza vaccine could be beneficial. The perceived susceptibility mean was 2.23 which indicates that most people believed that they are not more susceptible to getting the flu when compared to the general population. The mean score for perceived severity was 3.71, suggesting that most people believe that the flu can be serious; the cues to action mean was 2.60, indicating that most people were fairly neutral in regards to this question.

Independent sample t-tests resulted in statistically significant results for several different demographic variables. Perceived severity was shown to be statistically significant ($p = 0.025$) when it was evaluated against a participant's gender. Females were more likely to feel that influenza can lead to severe consequences.

Individuals with a chronic medical condition were more likely to feel that there are few barriers to receiving an influenza vaccine ($p = 0.032$) and these individuals believed that they are more susceptible ($p = 0.008$) to becoming infected with the influenza virus. This is an expected result because people with chronic medical conditions are generally more susceptible to acquiring any illness, including the flu.

Healthcare workers were more likely to feel that there were few barriers ($p = 0.006$) to receiving the vaccine and many benefits ($p = 0.002$) to getting vaccinated when compared to the sample population as a whole. These results are not surprising because most healthcare workers can receive the vaccine at the facility in which they work for free or at a reduced cost. In addition, people that work in the healthcare field are generally better educated about influenza and its accompanying vaccine.

Individuals that received the influenza vaccine during the 2008-2009 influenza season had statistically significant responses for barriers ($p = 0.000$), benefits ($p = 0.000$), susceptibility ($p = 0.020$) and cues to action ($p = 0.048$) when compared to participants who did not receive the vaccine. Participants that received the vaccine in the 2009-2010 season had statistically significant results for barriers ($p = 0.000$), benefits ($p = 0.000$) and cues to action ($p = 0.044$) when compared to participants that did not receive the influenza vaccine. The fact that there are more statistically significant results for these participants is an expected finding because these individuals have already decided to get the annual vaccine, which indicates that these people believe that getting the vaccine is important. Table 14 shows the mean scores and significant p values for each descriptive variable and each *Health Belief Model* category.

A cross-tabulation measurement was used specifically for the participants that received the influenza vaccine during either influenza season. These participants were also asked to answer whether or not they got the flu during this time period. Interestingly, 10.3% of the participants who received the vaccine during the 2009-2010 influenza

season reported having the flu during this time period. During the 2008-2009 influenza season 16.3% of the participants who received the vaccine got sick with the flu virus.

	Response	Barriers	p	Benefits	p	Susceptibility		Severity	p	Cues to Action	
		Mean		Mean		Mean	p	Mean		Mean	p
Gender	Male	1.98	0.168	3.97	0.425	2.22	0.915	3.45	0.025	2.38	0.092
	Female	1.81		3.87		2.24		3.86		2.73	
Chronic Condition	Yes	1.59	0.032	3.71	0.207	2.72	0.008	4.02	0.129	2.70	0.645
	No	1.93		3.93		2.14		3.66		2.57	
Healthcare Worker	Yes	1.52	0.006	4.33	0.002	2.43	0.252	3.95	0.201	2.59	0.972
	No	1.95		3.81		2.19		3.66		2.60	
Vaccine 2008-2009	Yes	1.47	0.000	4.22	0.000	2.42	0.020	3.73	0.880	2.81	0.048
	No	2.23		3.64		2.04		3.70		2.40	
Vaccine 2009-2010	Yes	1.56	0.000	4.13	0.000	2.37	0.054	3.74	0.851	2.79	0.044
	No	2.34		3.66		2.06		3.70		2.38	

Table 14 Mean Scores and Significant p values ($p < 0.05$) for each Descriptive Variable and Their Corresponding *Health Belief Model* Categories (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)

* $p < 0.05$

The ANOVA test that was performed showed no statistically significant differences, although it should be noted that the mean response for the subcategory of cues to action was much higher within the 50-59 and 60-88 age groups. The mean scores for these groups were 3.05 and 3.00 respectively and the total mean for all age groups was 2.60. This is practically significant because these results suggest that people between the ages of 50-88 may be more likely to change vaccine beliefs based on various cues to action.

The mean response scores for the barriers category were lower in the 60-88 age group when compared to the other four age categories. In addition, the oldest age group had a higher mean score for the benefits category when compared to the other age groups. Both of these results have practical significance because these findings suggest that people that are 60 years of age and older are more likely to believe that there are few barriers and many benefits to receiving the vaccine. This finding may be due to the fact that people in this age group are specifically targeted to receive the vaccine because they are in a high risk category.

A regression analysis was performed to evaluate whether or not a prediction of vaccination compliance can be made based on the four *Health Belief Model* categories. Perceived barriers, with an r^2 of 0.257, was the only category that was able to show a significant correlation between these variables. Perceived benefits, perceived susceptibility and perceived severity were not able to positively predict vaccination compliance. The results from this regression analysis indicate that most of the participants believed that perceived barriers to getting the vaccine were not strong enough

to discourage them from receiving the vaccine. This can be inferred to mean that most people felt that the vaccine did not take too much time or effort to get and it was available at a convenient time and/or location.

Conclusion

This study indicated that there are still many misconceptions about the influenza vaccine and these misconceptions vary depending on what type of population is being assessed. Implementing or improving educational programs that discuss information about influenza vaccines in a factual but easy to understand manner will help increase an individual's understanding of the vaccine. Targeting certain populations to increase their knowledge about a particular category within the *Health Belief Model* can increase vaccination compliance. These results indicate that targeted strategies may work better for different groups of people.

Young people, like college students living in a dormitory would be an easy population to give accurate information about the influenza virus. Focusing on the *Health Belief Model* category of susceptibility would resonate with this population because they are particularly vulnerable to becoming infected with the influenza virus. An educational program targeted towards college students that discuss their increased susceptibility of getting the flu and the severe consequences that may result from becoming infected with this virus may help. In addition, discussing the many benefits of getting the vaccine may persuade them to decide to get the vaccine. These same strategies can be used for other

vulnerable populations, such as families with young children or older adults with chronic conditions.

The category of perceived severity was only found to be statistically significant for gender; females were more likely to believe that the influenza virus could be severe. Other studies have indicated that a large majority of the general population does not understand the serious consequences that can result from becoming infected with the influenza virus (Douville, Myers, Jackson, & Lantos, 2010). Increasing the knowledge about the severe consequences of getting the flu within the general population may help increase vaccination rates.

Perceived barriers were the only positive predictor of vaccination compliance. This finding suggests that most participants who received the vaccine believed that perceived barriers to getting the vaccine, such as believing that the vaccine will make the person sick or believing that the vaccine costs too much, were not strong enough to discourage the participant from getting the vaccine. This implies that people who decide to get the vaccine feel that the vaccine will not harm them and it is not very difficult for them to obtain the vaccine. Educators should continue to convey this message to the general public.

Further studies regarding the attitudes and beliefs people have towards influenza vaccines are warranted. Additional research, using a larger sample size, is required to validate the results obtained in this study. Future research looking specifically at individuals who reported getting the vaccine and then becoming sick with the flu would provide valuable information about whether or not their beliefs regarding the vaccine

changed during this time period. Developing a questionnaire that includes questions about a person's socioeconomic status and/or highest level of education obtained may increase the knowledge about what the typical demographics for an individual that receives the influenza vaccine is. This information can also help determine what the typical characteristics are for a person that does not receive the vaccine.

Bibliography

- Bridges, C., Fukuda, K., Uyeki, T., Cox, N., & Singleton, J. (2002). Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR: Morbidity & Mortality Weekly Report*, 51(RR-3), 1-31.
- Chang, H. J., Burke, A. E., & Glass, R. M. (2009). Influenza. *JAMA*, 302(17), 1926.
- Douville, L.E., Myers, A., Jackson, M.A., & Lantos J. D. (2010). Health care worker knowledge, attitudes and beliefs regarding mandatory influenza vaccination. *Archives of Pediatrics and Adolescent Medicine* 164(1), 33-37.
- Nexoe, J., Kragstrup, J., & Sogaard, J. (1998). Decision on influenza vaccination among the elderly: A questionnaire study based on the Health Belief Model and the Multidimensional Locus of Control Theory. *Scandinavian Journal of Primary Health Care*, 17(2), 105-110.
- Rosenstock, I. M. (1974). Historical origins of the Health Belief Model. *Health Education Monographs*, 2(4), 328-335.

BIBLIOGRAPHY

- Baker, W. H., (1986). Excess pneumonia and influenza associated hospitalization during influenza epidemics in the United States. *American Journal of Public Health*, 76(7), 761-765.
- Beers, M. H. (2006). *The Merck Manual 18th Edition* (18 ed.). Philadelphia PA: Merck.
- Bresee, J. (2009, November 17). Questions and answers: Antiviral drugs, 2009-2010 flu season. Interview posted to <http://www.cdc.gov/H1N1flu/antiviral>
- Bridges, C., Fukuda, K., Uyeki, T., Cox, N., & Singleton, J. (2002). Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR: Morbidity & Mortality Weekly Report*, 51(RR-3), 1-31.
- Centers for Disease Control and Prevention. (2010). Interim results: State-specific seasonal influenza vaccination coverage – United States, August 2009-January 2010. *MMWR: Morbidity & Mortality Weekly Report*, 59(16), 477-484.
- Chang, H. J., Burke, A. E., & Glass, R. M. (2009). Influenza. *JAMA*, 302(17), 1926.
- Douville, L.E., Myers, A., Jackson, M.A., & Lantos J. D. (2010). Health care worker knowledge, attitudes and beliefs regarding mandatory influenza vaccination. *Archives of Pediatrics and Adolescent Medicine* 164(1), 33-37.

- Field, R. I. (2009). Mandatory vaccination of health care workers: Whose rights should come first? *P & T Journal*, 34(11), 615.
- Fiore, A. E., Shay, D. K., Broder, K., Iskander, J. K., Uyeki, T. M., Mootrey, G., Bresee, J. S., et al. (2009). Prevention and control of seasonal influenza with vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR: Morbidity & Mortality Weekly Report*, 58(early release). Retrieved April 15, 2010, from <http://www.cdc.gov/flu/professionals/acip/timing.htm>
- Gallaher, W. (2009). Towards a sane and rational approach to management of Influenza H1N1 2009. *Virology Journal*, 6(1), 51.
- Glanz, K., Rimer, B. K., & Lewis, F. M. (2002). *Health behavior and health education: Theory, research, and practice*. San Francisco, CA: Josey-Bass.
- Grabenstein, J. (2002). *Pharmacy-Based Immunization Delivery*. Washington, DC: The American Pharmaceutical Association.
- Howard, D.H., Sentell, T., Gazmarian, J.A. (2006). Impact of health literacy on socioeconomic and racial differences in health in an elderly population. *Journal of General Internal Medicine*, 21(8), 857-861.
- Jackson, L.A., Holmes, S.J., Mendelman, P.M., Huggins, L., Cho, I., Rhorer, J. (1999). Safety of a trivalent live attenuated intranasal influenza vaccine, FluMist™, administered in addition to parenteral trivalent inactivated influenza vaccine to seniors with chronic medical conditions. *Vaccine*, 17(15-16), 1905-1909.
- Lipman, M. (2010). Is it a cold or the flu? *Consumer Reports* 75(2), 14.

- MLN Matters. (2008). Influenza vaccine and the pneumococcal vaccine payment allowances based on 95 percent of the average wholesale price (AWP).*CMS.gov*. Retrieved July 6, 2010 from <http://www.cms.gov/MLNMattersArticles/downloads/MM6153.pdf>
- Mosby. (2002). *Mosby's pocket dictionary of medicine, nursing, & allied health* (4 ed.). New York: C.V. Mosby.
- Nexoe, J., Kragstrup, J., & Sogaard, J. (1998). Decision on influenza vaccination among the elderly: A questionnaire study based on the Health Belief Model and the Multidimensional Locus of Control Theory. *Scandinavian Journal of Primary Health Care*, 17(2), 105-110.
- Nichol, K. L., Lind, A., Margolis, K. L., Maureen, M., McFadden, R., Hauge, M., et al. (1995). The effectiveness of vaccination against influenza in healthy working adults. *New England Journal of Medicine* 333(14), 889-893.
- Parente, S. T., Salkever, D. S., DaVanzo, J. (2005). The role of consumer knowledge of insurance benefits in the demand for preventative health care among the elderly. *Health Economics*, 14(1), 25-38.
- Rosenstock, I. M. (1974). Historical origins of the Health Belief Model. *Health Education Monographs*, 2(4), 328-335.
- Rosenstock, I. M., & Kirscht J. P. (1974). The Health Belief Model and personal health behavior. *Health Education Monographs*, 2(4), 471-473.

- Schwartzberg, J. G., VanGeest, J.B., & Wang, C.C. (2004). *Understanding health literacy: Implications for medicine and public health*. New York: American Medical Association Press.
- Scott, T. L., Gazmarian, J. A., Williams, M. V., & Baker, D. W. (2002). Health literacy and preventive health care use among Medicare enrollees in a managed care organization. *Medical Care* 40(5), 395-404.
- Thompson, W., Shay D., Weintraub E., Brammer L., Bridges C., Cox N., Fukuda K. (2004). Influenza-associated hospitalizations in the United States. *JAMA* 292(11), 1333–1340.
- Williams, W., Hickson, M., Kane, M., Kendal, A., Spika, J., & Hinman, A. (1988). Immunization policies and vaccine coverage among adults. The risk for missed opportunities. *Annals Of Internal Medicine*, 108(4), 616-625.
- World Health Organization. (2005). Influenza vaccines. *Weekly Epidemiological Record*, 80(33), 279-287.
- World Health Organization. (2010). Recommended viruses for influenza vaccines for use in the 2010-2011 northern hemisphere influenza season. *World Health Organization*. Retrieved June 6, 2010 from http://www.who.int/csr/disease/influenza/201002_Recommendation.pdf.

Appendix: Influenza Questionnaire

Flu Shot Questionnaire

Instructions: This questionnaire is in regards to the flu shot. For each question please draw a circle around the evaluation scale response that most closely represents your **beliefs** about the flu shot.

Evaluation Scale: (1) Strongly Disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree

- | | | | | | |
|---|---|---|---|---|---|
| 1. I do not want to get the flu shot | 1 | 2 | 3 | 4 | 5 |
| 2. The flu shot will make me sick | 1 | 2 | 3 | 4 | 5 |
| 3. Getting the flu shot takes too much time | 1 | 2 | 3 | 4 | 5 |
| 4. Getting the flu shot takes too much effort | 1 | 2 | 3 | 4 | 5 |
| 5. The flu shot is not available at a convenient time | 1 | 2 | 3 | 4 | 5 |
| 6. The flu shot is not available at a convenient location | 1 | 2 | 3 | 4 | 5 |
| 7. Flu shots cost too much | 1 | 2 | 3 | 4 | 5 |
| 8. The flu shot is safe for me | 1 | 2 | 3 | 4 | 5 |
| 9. Taking the flu shot will prevent the flu | 1 | 2 | 3 | 4 | 5 |
| 10. I do not want to spread the flu to my family, friends &/or co-workers | 1 | 2 | 3 | 4 | 5 |
| 11. I have an increased risk of getting the flu | 1 | 2 | 3 | 4 | 5 |
| 12. I get sick more often than others my age | 1 | 2 | 3 | 4 | 5 |
| 13. Complications from the flu could be serious | 1 | 2 | 3 | 4 | 5 |
| 14. Getting the flu may lead to other serious health problems | 1 | 2 | 3 | 4 | 5 |
| 15. The recent H1N1 influenza outbreak media coverage influenced my decision to receive or not receive the flu shot | 1 | 2 | 3 | 4 | 5 |

Instructions: For each question please draw a circle around the answer that best describes you and write in your age.

Gender: Male Female

Age: _____ years

- | | | |
|--|-----|----|
| 1. Do you have one or more chronic medical conditions? | Yes | No |
| 2. Do you work in the healthcare field? | Yes | No |
| 3. Did you get the flu shot in 2009-2010? | Yes | No |
| a. If yes, did you get the flu? | Yes | No |
| 4. Did you get the flu shot in 2008-2009? | Yes | No |
| a. If yes, did you get the flu? | Yes | No |