NOTE TO USERS

This reproduction is the best copy available.

Knowledge, Attitudes, and Beliefs of Individuals Attending Influenza Immunization Clinics Sponsored by the Regional Municipality of York

by

Lara McLees

Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master in Public Health

Lakehead University
April 2008

Your file Votre référence
ISBN: 978-0-494-42166-6
Our file Notre référence
ISBN: 978-0-494-42166-6

ABSTRACT

The knowledge, attitudes, and beliefs about influenza and the influenza vaccine of individuals in the community are not well known. The purpose of this study was to conduct a review of current literature related to influenza and the influenza vaccine and then design and conduct a survey to examine the community's knowledge, attitudes, and beliefs. Demographic information and reasons for vaccine acceptance also were explored. Descriptive explorative research was conducted utilizing a self-administered survey on individuals aged 18 and over attending community clinics sponsored by the Regional Municipality of York Health Services Department. A total of 1,101 surveys were completed. Results showed 56.8% of participants were female, 75% of participants have physicians that recommend the flu shot, and 94.5% of participants had more than one flu shot in his/her lifetime. Females had significantly higher knowledge scores about influenza and the influenza vaccine than males. Individuals with family physicians who recommended the flu shot had significantly higher knowledge scores than individuals with physicians who did not. Knowledge scores were significantly related to levels of education, employment, income, having an underlying disease or condition and having a family physician who recommended the flu shot. Recommendations include increasing educational material available to the public and conducting further research. Of particular importance is dispelling the myth that the influenza vaccine causes influenza.

ACKNOWLEDGEMENTS

I would like to acknowledge and give sincere thanks to Dr. Darlene Steven, my academic advisor, for her guidance throughout this study. I would also like to thank the Regional Municipality of York Health Services Department and Infectious Disease Control Division for allowing me to conduct this research. Appreciation is also extended to the Canadian Institute for Health Research for helping to fund my MPH degree. I am very grateful to all the individuals who agreed to participate in this research. Last, but not least, I would like to thank my family for their support and understanding over the last 4 years while I pursued this endeavour.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION TO THE STUDY

Purpose of the Study

The purpose of this study was to examine the knowledge, attitudes, and beliefs about influenza and influenza immunization of adults aged 18 and over attending influenza immunization clinics sponsored by the Regional Municipality of York Health Services Department.

Objectives of the Study

1. To critically examine the current literature related to the knowledge, attitudes, and beliefs of influenza and influenza immunization.
2. To develop and conduct a survey related to the knowledge, attitudes, and beliefs of individuals about influenza and influenza immunization.
3. To identify variables to predict level of knowledge about influenza and influenza vaccination.
4. To recommend interventions to increase and enhance community and client demand for influenza immunizations.

Theoretical Framework

The theoretical framework chosen to guide this research was the health belief model (HBM), which was developed by a group of social scientists: Becker (1974), Hochbaum (1958), Kirscht (1974), and Rosenstock (1960, 1974). The HBM is a value-expectancy theory. The underlying assumptions of the model are the desire to avoid illness and to get well, and the belief that a specific health action will prevent illness (Janz, Champion, & Stretcher, 2002). This model was applicable to this study because it

provided constructs that were utilized to understand and recognize the many factors that affect vaccine uptake, opinions about vaccine uptake, and opinions about influenza.

The key concepts of the HBM are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. These concepts comprise three major components: health perceptions, health-modifying behaviours, and variables affecting the likelihood of action. Individual health perceptions include the factors that affect an individual's perception of illness, the importance of health to the individual, and the perceived susceptibility and severity of the illness. Health-modifying factors include demographic variables, sociopsychologic variables, perceived threat of the disease, and cues to action. The likelihood of action is based on the likelihood of the individual taking the appropriate preventive health action or health behaviour. How these constructs interact with and impact one and another is demonstrated in Figure 1 (Janz et al., 2002).

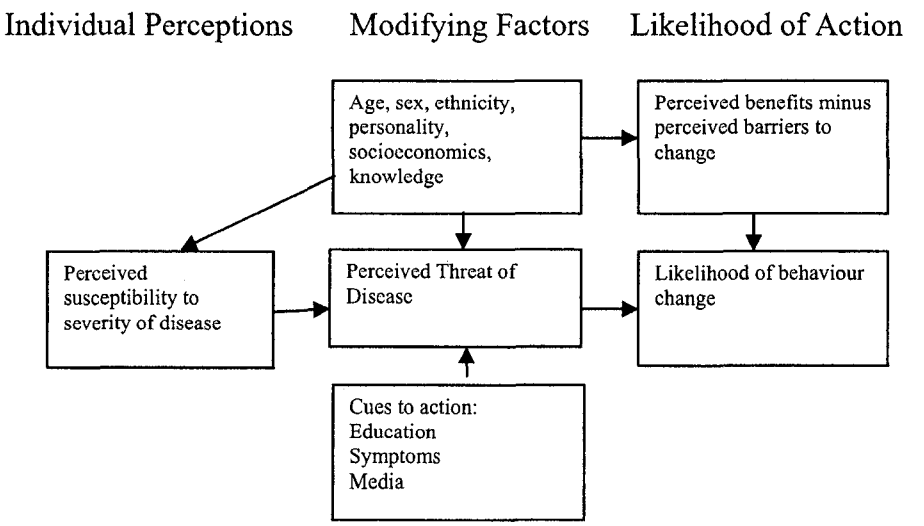

Figure 1. Conceptualization of the HBM.
From Health Behaviour and Health Education: *Theory, Practice and Research,* by K. Glanz, B. K. Rimer, & F. M. Lewis, 2002, p. 52.

Perceived Susceptibility

Perceived susceptibility is one's subjective opinion or perception of the risk of contracting a health condition (Janz et al., 2002). This would be one's belief that he/she can become sick from acquiring influenza. According to Janz et al., application of this concept is accomplished through the definition of the population at risk and the risk levels. Perceived susceptibility can be personalized by basing risk on one's characteristics or behaviour. Finally, perceived susceptibility should be consistent with the individual's actual risk. The survey utilized for this research contained a demographic section to help determine the study population, and a qualitative component of the survey gave the opportunity to reveal personal risk.

Perceived Severity

Perceived severity is one's opinion or perception of the seriousness of contracting a condition and its medical and clinical consequences (Janz et al., 2002). This would be the belief that the consequences or manifestations of influenza are serious enough to try to avoid. The combination of perceived susceptibility and perceived severity has been labeled the perceived threat. According to Janz et al., the concept of perceived severity can be applied by specifying the consequences of the risk and the conditions. For this research, the concept was addressed in the survey questions and the open-ended qualitative questions.

Perceived Benefits

Perceived benefits are one's belief in the efficacy of the advised action to reduce the risk or seriousness of the impact (Janz et al., 2002). This would be the belief that the influenza vaccine is the best way to avoid the seriousness of influenza. To apply

perceived benefits, the preferred action should be defined in terms of how, where, and when, and the positive effects to be expected (Janz et al.). This concept was addressed in the survey questions and indirectly through open-ended questions.

Perceived Barriers

Perceived barriers are one's opinion of the tangible and psychological costs of the advised action or the potential negative aspects of a particular health action. Perceived barriers may act as impediments to undertaking the recommended health behaviour (Janz et al., 2002). This would be the perceptions of barriers to influenza vaccination. According to Janz et al., perceived barriers should be identified and reduced through reassurance, correction of misinformation, incentives, and assistance. This concept was addressed in the survey questions.

Cues to Action

Cues to action are strategies to activate readiness (Janz et al., 2002). This could include the implementation of a mass media campaign, newspaper or magazine articles, memos, advice from others, letters, or other types of reminders. Cues to action can be focused on through the provision of how-to information, promotion of awareness, and employment of reminder systems. This concept was addressed in the qualitative component of the study.

Self-Efficacy

Self-efficacy, a later addition to the HBM, is one's estimate that a given behaviour will lead to certain outcomes. It is one's confidence in the ability to take action and produce the outcome. This would include the individual's perception of how likely he/she is to change behaviours (Janz et al., 2002). Being confident that receiving the

influenza vaccine will diminish the possibility of acquiring influenza would be described as self-efficacy. Self-efficacy can be addressed through the provision of training and guidance in performing an action. It is also important to use progressive goal setting, reduce anxiety, use verbal reinforcements, and demonstrate the desired behaviour (Janz et al.). This concept was addressed in the qualitative component of the questionnaire. Because all of the participants had obtained an influenza vaccine, the concept of self-efficacy was already achieved for this study sample.

One weakness of using the HBM is that it is difficult to measure concepts consistently. There are also difficulties establishing validity and reliability measures when a new study instrument is being developed (Janz et al., 2002). Another drawback to using this model is that there could be factors other than health beliefs, such as culture, socioeconomic status, or other previous experiences, that influence health behaviour practices. The effects of these factors can be minimized by collecting additional information about the individuals in the study (i.e., have the participants indicate their yearly income, indicate a cultural preference, etc.). These potential limiting factors were acknowledged in the study.

The HBM was an ideal model for this study. First, this model is well suited for the distribution of surveys. This study has questions to address knowledge, attitudes, and beliefs about influenza and influenza immunization that identify the concepts identified. This model can also be applied to a broad range of health behaviours and subject populations, including preventive health behaviours such as immunization.

CHAPTER 2: LITERATURE REVIEW

Introduction

A review of current literature is presented in this section. A definition of influenza is discussed first. A brief history of pandemics and the impact of a possible pandemic are presented. Next, the prevalence and incidence of influenza, including transmission, hospitalization, mortality rates, cost effectiveness, and vaccination rates, are discussed. Regulatory forces are presented. The literature review concludes with an appraisal of current research about the knowledge, attitudes, and beliefs of influenza and the influenza vaccine of parents, older adults, and health care workers, including physicians, nurses, midwives, and other targeted populations.

Definition of Influenza

Influenza is a contagious acute respiratory illness. Illness is characterized by fever, headache, myalgia, prostration, coryza, sore throat, and cough (Heymann, 2004). Symptoms vary by age. For example, children have similar symptoms to adults, including sudden onset of fever, cough, and sore throat, but they tend to have more complaints of rhinorrhoea and gastrointestinal complaints (Peltola, Ziegler, & Ruuskanen, 2003). Influenza viruses belong to the Orthomyxoviridae family, which includes four genera: influenzavirus A, influenzavirus B, influenzavirus C, and Thogotovirus (Moorman, 2003).

Brief History of Influenza Pandemics

A pandemic occurs when there is a sudden change in the influenza A virus that creates a new subtype of the virus that results in an antigenic shift that leaves entire populations without antibody protection against the virus. A new influenza virus is the

cause of a pandemic. Influenza pandemics occur in defined geographic areas and then spread throughout the world, causing high infection and mortality rates (Potter, 2001). There have been three major influenza pandemics in the last 100 years: the 1918 Spanish Flu, the 1957 Asian Flu, and the 1968 Hong Kong Flu. Each of these pandemics resulted in large numbers of deaths (Kilbourne, 2006). A common reservoir for influenza A is found in avian populations such as ducks and chickens. Many pandemics are thought to originate in Asia, where human populations live in close proximity to avian populations (Sarubbi, 2003).

The 1918 Spanish Flu was the worst influenza of the 20th century. A possible origin for the 1918 flu was military camps in the United States. Researchers have estimated that 50% of the world's population became ill and that there were approximately 40 to 50 million deaths globally (Heymann, 2004; Potter, 2001). The 1957 Asian Flu began in Southern China. It is suggested that 40% to 50% of people were affected, of which 25% to 30% had clinical disease. It is estimated there were over 1 million deaths worldwide, which occurred mostly in young children and elderly individuals. The 1968 Hong Kong Flu was first isolated in Hong Kong. It was the mildest of the three pandemics (Potter).

Possible Impact of a Pandemic in Canada

According to the Public Health Agency of Canada (PHAC, 2006), the impact of the next influenza pandemic in Canada is difficult to predict. On average, there are 4,000 deaths during a typical influenza season (Schanzer, Tam, Langley, & Winchester, 2007); 10% to 25% of the population become ill; and there are approximately 20,000 hospitalizations. When more severe influenza A seasons occur, there are as many as

6,000 to 8,000 deaths, 30% to 50% of the population become ill, and there are 30,000 to 40,000 hospitalizations. Historic data have indicated that 70% of the population may become infected if an influenza pandemic were to occur (PHAC).

A position statement by the Canadian Paediatric Society (2006) made these general assumptions about the possible impact of a pandemic in Canada: a widespread shortage of personnel to provide essential services and health care; overwhelmed health care facilities; a shortage of material resources for health care facilities, including vaccines and antivirals; and limited assistance from other provinces or countries due to widespread infection. There also could be economic and societal impacts (PHAC, 2006).

Incidence and Prevalence of Influenza

Transmission and Duration of Contagiousness

Influenza is primarily spread by airborne droplets of infected people through coughing and sneezing (Bridges, Kuehnert, & Hall, 2003). Individuals with influenza can become contagious before the symptoms occur because viral shedding may start at least 1 day prior to the onset of the clinical illness. Published reports cited by Smith et al. (2006) indicated that the duration of contagiousness varies depending on the age and immune status of the individual. Adults are usually infectious until 5 days after onset of illness, whereas children can be infectious for 10 days or more after the onset of illness. The typical incubation period is 1 to 4 days (Heymann, 2004).

Influenza Hospitalization and Mortality Rates

Influenza and pneumonia are the sixth-leading cause of death in Canada (Statistics Canada, 1997). Schanzer, Tam, et al. (2007) utilized the Canadian Vital Statistics database for 1989 to 1999, which uses coding from the ninth revision of the

International Classification of Disease (ICD), to determine the total number of deaths attributable to influenza in Canada. A Poisson regression model was used to predict all-cause, cause-specific mortality as a function of influenza-certified deaths while controlling for seasonality and trend. They estimated that there were approximately 4,000 deaths attributable to influenza annually from 1989 to 1999. This was a mortality rate of 13 deaths per 100,000 persons in Canada and accounted for 2% of all deaths in Canada. They found that 15% of the influenza deaths were due to pneumonia and 40% to other respiratory causes. They also noted that 65% of influenza-attributed deaths occurred in hospitals.

Thompson et al. (2004) utilized the National Hospital Discharge Survey data and World Health Organization Collaborating Laboratories influenza surveillance data to estimate the average annual number of hospitalizations from 1979 to 2001 associated with influenza in the United States every year. Codes from the ninth revision of the ICD were used to categorize hospitalizations. Age-specific Poisson regression models were utilized. They estimated that there were 18.5 primary pneumonia- and influenza-associated hospitalizations per 100,000 persons in the United States during the 1979-1980 through 2000-2001 respiratory seasons for individuals under the age of 5. This number decreased to 6.8 per 100,000 for individuals ages 5 to 49. The rates of primary pneumonia and influenza hospitalizations increased as individuals got older, with 37.9 per 100,000 for the age group 50 to 64, 71.1 for the age group 65 to 69, 127.8 for the age group 70 to 74, 219.5 for the age group 75 to 79, 302.2 for the age group 80 to 84 and finally the largest rate is 628.6 per 100,000 for individuals over age 85 (Thompson et al.).

Simonsen, Fukuda, Schonberger, and Cox (2000) studied American Hospital Discharge Survey data using coding from the ICD for 26 influenza seasons from 1970 to 1995 to estimate excess pneumonia and influenza hospitalizations. To estimate excess pneumonia and influenza hospitalizations, they first determined a baseline that did not include pneumonia and influenza average hospitalizations. Next, they calculated an average influenza and pneumonia hospitalization rate for the 24 November months included in the time period. The November baseline was then increased to the best fit of the level of pneumonia and influenza hospitalizations for the month of December during 6 seasons in which the influenza period started in January or later. A constant was iteratively added to the November baseline level so that the squared distance between November baseline and December estimates were minimized. Excess hospitalization was then determined as the number of pneumonia and influenza hospitalizations greater than the December baseline during an influenza season.

Simonsen et al. (2000) determined the average number of excess pneumonia and influenza hospitalizations per season to be 114,000 per season, which was an average rate of 49 per 100,000. They found that adults over age 65 had an excess of 64,000 influenza and pneumonia hospitalizations per season, which was a rate of 33 per 100,000. They also found that the excess pneumonia and influenza hospitalizations were positively correlated with excess pneumonia and influenza mortality rates (Pearson's $r = 0.8$, $p < .05$). The researchers further estimated that there were in excess of 3 million pneumonia and influenza hospitalizations during the 1969-1970 to 1994-1995 influenza seasons.

Schanzer, Langley, and Tam (2007) examined the hospital admission records of pregnant women admitted with respiratory conditions in Canada from 1994 to 2000 through the Canadian Institute of Health Information hospitalization database. These records were compared to admission records of nonpregnant women ages 20 to 34. A regression-model approach was used to examine the effects of influenza and other respiratory diseases on weekly admissions, and also to control for other factors that affected admissions, such as seasonality, holidays, the extended 3-week Christmas period, population growth, and reduced admission rates trends. They found that approximately 300 pregnant women were hospitalized each year, of which 140 had comorbidities. This hospitalization rate corresponded to 150 hospitalizations per 100,000 pregnant women per year (CI 140 to 170).

Moore et al. (2006) used surveillance information obtained from the Immunization Monitoring Program Active (IMPACT) to determine the characteristics of children up to age 18 admitted for hospitalization for influenza and its manifestations, and to acquire baseline data to aide with the implementation of new recommendations for immunizing children and their caretakers. IMPACT is a paediatric hospital-based surveillance network for Canada administered by the Canadian Paediatric Society that collects information about vaccine-preventable diseases and vaccine-adverse events. Information was obtained from virology laboratory reports and chart reviews from 9 tertiary care hospitals in 8 Canadian cities during the 2003-2004 influenza season. The case definition for the study was hospitalization due to influenza or related complications. A total of 505 children were admitted to hospital due to influenza. The median age was

1.7 years old, and 57% were under age 2. Over half of the 293 children (58%) were previously healthy, with the remaining 212 children having underlying illness.

Neuzil, Mellen, Wright, Mitchel, and Griffin (2000) conducted a retrospective cohort study of influenza-related hospitalization rates using Tennessee Medicaid files from 1973 to 1993 of children who were under age 15. The children were either enrolled in Tennessee Medicaid at birth, or for at least 1 year. Crude rates of hospitalization were calculated. The crude rate of influenza-attributable hospitalization was 467 per 10,000 for children under 6 months of age. The crude rates decreased for older age groups, with 263 per 10,000 for the age group 6 months to 11 months, 77 for ages 1 to 2, 39 for ages 3 to 4, and 15 for the age group 5 to 14. They calculated hospitalization rates to be 18% to 20% more in the winter compared to the summer. They also calculated there to be 24% to 35% more outpatient visits in winter compared to summer and 10% to 20% more courses of antibiotics ordered in the winter.

Cost Effectiveness of Vaccination

Nichol and Goodman (2002) determined the cost effectiveness of influenza vaccination for healthy adults between the ages of 65 and 74 years old through use of a Group Health database. Group Health is a health maintenance organization in the Minneapolis-St. Paul, Minnesota, area. The study utilized data from 6 consecutive influenza seasons from 1990-1991 to 1995-1996, with 66,435 person-periods of observation. Multivariate models were used to determine vaccination with reductions in the number of hospitalizations (Poisson regression) and the risk of death (logistic regression). Variables incorporated into the model were age, gender, vaccination status, and prior resource use.

The cost model utilized to determine net cost savings was the direct costs of vaccination plus the indirect costs of vaccination minus the direct costs of hospitalizations averted minus the indirect costs of productivity losses averted. For vaccination costs of $4.50, there was a net cost savings of $463,308 per 10,000 persons vaccinated (95% PI 822,169-182,928), which corresponded to a net costs savings of 57,942 per life saved (95% PI 97,699-35,251). For vaccination costs of $15.86, there was a net costs savings of $349,708 per 10,000 persons vaccinated (95% PI 709,305-93,056), which corresponded to a net costs savings of $43,735 (95% PI 79,449-14,841) per life saved (Nichol & Goodman).

Maciosek et al. (2006) studied the influenza vaccination heath impact and cost effectiveness among adults ages 50 to 64 as well as 65 and older. The objectives were to determine the clinically preventable burden and cost effectiveness of the influenza vaccine. Current literature and data sources from 1992 were searched, including Pub Med and the Cochrane Collaboration reviews for study data. Clinically preventable burden was defined as the proportion of disease, injury, and death prevented by the service in a typical practice if the service were offered to 100% of the target population at regular intervals as recommended. Cost effectiveness was calculated as the net cost of the preventive service divided by the number of quality-adjusted life years saved. Standards were utilized from the Panel on Cost Effectiveness in Health and Medicine. Study methods also were used as outlined in the technical report of the National Commission on Prevention Priorities (2005).

For a birth cohort of 4 million, if influenza vaccination were offered annually to individuals ages 50 and over, there would be 2,638,621 cases of influenza-like illness

prevented, 180,810 hospitalizations prevented, 40,477 deaths prevented, and 274,881 quality-adjusted life years saved. The direct costs of immunizations would be $1,199,653,037, the value of patient time and travel would be $2,015,469,432, and the direct cost savings would be $1,821,591,392. For individuals ages 50 and over, there would be a savings of $5.52 per person, and for persons ages 65 and older, there would be a savings of $17.16 per person (Maciosek et al., 2006).

Vaccination Rates

For the past season, the Ontario Ministry of Health and Long-Term Care (MOHLTC, 2006) ordered and distributed 5 million doses of influenza vaccine to an Ontario population of about 12 million people. Surveys conducted in 2000-2001 and 2001-2002 indicated that about 44% of Ontarians were immunized (MOHLTC). In Canada, 70% to 91% of residents of long-term care facilities and 20% to 40% of adults and children with medical conditions that make them at high risk for influenza-related complications receive the influenza vaccine annually (National Advisory Committee on Immunization [NACI], 2007).

Rapid Risk Factor Surveillance System (2006) is an ongoing telephone study occurring in various public health units across Ontario. On a monthly basis, a random sample of 60 to 100 adults ages 18 and over are interviewed about a variety of health topics, including risk behaviours, knowledge, attitudes, and awareness. Results from this survey indicated that in the Regional Municipality of York, 42.5% of adults ages 18 and over in September of 2004 received a vaccine for influenza. Further results from this survey indicated that 38.8% of males ages 18 and over received an influenza vaccine and 45.8% of females received an influenza vaccine. It was also shown that 39.2% of adults

ages 18 to 64 received an influenza vaccination; this number increased to 77.8% for individuals ages 65 and over. A total of 56.1% of individuals with chronic diseases received the influenza vaccine.

Regulatory Forces

There are several organizations that influence how influenza immunization is managed within Ontario and the Regional Municipality of York. The MOHLTC developed legal and guiding documents related to influenza. The *Health Protection and Promotion Act, R.S.O. 1990, c.H.7* sets out the legal authority of the ministry. Sections 7 and 9 are relevant to influenza. Section 7 authorizes the ministry to publish standards. These standards are published in the Mandatory Health Programs and Services Guidelines, which indicate minimum standards for public health units. The minimum standards related to influenza include the annual promotion of influenza vaccination; individual counselling, presentations, and distribution of materials about immunization; suggestions for immunization coverage targets for specific groups (i.e., 95% coverage for annual influenza vaccination of residents of long-term care facilities); provision of immunization clinics when immunization services are not otherwise available; vaccine distribution, and cold chain maintenance of the vaccines. Section 9 authorizes the boards of health to deliver additional programs and services according to local needs. The MOHLTC provides funding for the Universal Influenza Immunization Program (UIIP), which provides free influenza vaccine to all Ontario residents ages 6 months and up. The program also promotes influenza immunization.

The NACI (2007) produces a thorough statement about influenza and influenza vaccination every year. This statement contains the most current medical, scientific, and

public health advice related to influenza immunization. The results of the previous year's national and international influenza surveillance are presented, which is followed by the recommendations for the contents of the upcoming influenza season's vaccine. Public health units strongly adhere to these recommendations. The recommended recipients for influenza vaccination also are contained in this statement, which is discussed later in this section. Information also is given about the immunogenicity and efficacy of the vaccine. There is information about the recommended dosage schedule for the vaccine, storage of the vaccine, adverse reactions to the vaccine, contraindications, and precautions. The statement concludes with information about reducing the impact of influenza, immunization of health care workers, and the use of antiviral medication.

The World Health Organization (WHO) coordinates a worldwide surveillance system to detect the emergence of new influenza A viruses or variations. This surveillance is conducted so that preventive measures such as vaccine development and or reformulation can be taken to avoid influenza pandemics. The surveillance network is made up of 110 national influenza centres and WHO laboratories in 83 countries. In January to March of every year, meetings take place with the WHO, the Centers for Disease Control and prevention (CDC), and the Food and Drug Administration (FDA) to determine the components of the influenza vaccine for the following fall for the northern hemisphere region, which includes Canada. Three influenza strains (2 type A strains and 1 type B strain) are chosen and distributed to vaccine manufacturers. The vaccine that is created is usually matched to circulating strains for the upcoming season about 80% to 90% of the time (Valley & Blue, 2002).

The Centre for Infectious Disease Prevention and Control at PHAC maintains a national influenza surveillance program called FluWatch, whose objective is to provide a national picture of influenza activity across Canada during the influenza season. This program has several components. Laboratory-based influenza virus identification helps in the early detection of influenza activity in Canada. Influenza-like illness surveillance also occurs. Influenza activity levels are reported regularly by provincial and territorial epidemiologists, and the dissemination of information occurs through weekly reports. FluWatch also submits and monitors reports on influenza activity to and from the CDC and the WHO to assist with decision making for the upcoming influenza season vaccine components (Health Canada, 2001).

Other partners that assist with the surveillance portion include provincial and territorial ministries of health, participating laboratories, the College of Family Physicians of Canada-National Research System, sentinel practitioners, tertiary care paediatric hospitals through the Immunization Monitoring Program ACTive (IMPACT) program, and the National Microbiology Laboratory and the Immunization and Respiratory Infections Division at PHAC (2008).

Influenza Vaccine

Current research has indicated the most effective means to prevent or lessen the severity of influenza is through annual immunization with an influenza vaccine (NACI, 2007). Jefferson, Rivetti, Di Pietrantonj, Rivetti, and Demicheli (2007) searched the Cochrane Central Register of Controlled Trials Issue 4, 2005, which contains the Cochrane Acute Respiratory Infections Group trials register; MEDLINE from 1966 to 2006; and EMBASE from 1990 to 2006; they also contacted the researchers of the studies

that were reviewed. They chose to review randomized or quasi randomized studies that compared influenza vaccine in humans with placebo or no intervention.

Jefferson et al. (2007) also reviewed comparative nonrandomized studies to determine if there was evidence of the association between influenza vaccines and serious harm. Only healthy individuals ages 16 to 65 exposed to naturally occurring influenza were included in the research. In total, 48 reports were included with 66,248 participants. They estimated efficacy of the influenza vaccine to be 30% in preventing influenza-like illnesses (95% CI 17% to 41%) and 80% in preventing laboratory-confirmed influenza infections when properly matched to circulating strains (95% CI 56% to 91%). Effectiveness decreased to 50% when the vaccines were not well matched to circulating strains (95% CI 27% to 65%).

Langley and Faughnan (2004) searched MEDLINE and Cochrane databases to review 18 randomized controlled trial studies from 1966 to 2003 about influenza vaccination and the prophylactic use of neuraminidase inhibitors to determine the prevention of influenza in healthy adults and children. The studies had to have an outcome measurement of the clinical efficacy of preventing influenza in healthy people. The Canadian Task Force on Preventive Health Care methods were used to appraise the studies critically. More than 33,000 healthy adults met the inclusion criteria for the study. Influenza vaccination was determined to be effective in 15 of the studies. The relative risk reduction connected to influenza immunization ranged from 0% to 91%. In 15 studies, more than 45,000 healthy children ages 6 months to 19 years met the inclusion criteria for the study, and protection against influenza was found in 12 of the studies.

Most individuals are eligible for an influenza vaccine. Every year, the NACI (2007) distributes a statement about influenza and influenza vaccination for the upcoming influenza season. Certain individuals are indicated as recommended to receive the influenza vaccine; they are briefly summarized here: individuals at high risk of influenza-related complications, individuals who are capable of transmitting influenza to those at high risk of complications, individuals who provide essential community services, and individuals in direct contact with avian-influenza-infected poultry during culling operations. Healthy individuals ages 2 to 64 are also encouraged to receive the vaccine. The only individuals who should not receive an influenza vaccine include children under age 6 months, individuals who are allergic to any component of the vaccine, individuals who have had an anaphylactic reaction to a previous dose of the influenza vaccine, individuals with a history of Guillain-Barré syndrome, and anyone who has a moderate or severe illness with a fever (NACI).

Knowledge, Attitudes, and Beliefs About Influenza and Influenza Immunization

Parents of Young Children

Ma et al. (2006) examined the influence of media coverage and other factors that influenced parents' motivation to vaccinate their children during the 2003-2004 influenza season. This research was accomplished through the distribution of surveys from May to July 2004 at two university-affiliated pediatric clinics. There were 256 children ages 6 to 59 months in the study. Clinic visits and verification of some influenza vaccination dates were obtained from the clinic's computerized medical chart or the Tennessee State Immunization Registry. Media coverage was quantified through the following media sources: LexisNexis, CustomScoop, Google News, and NewsPowerOnLine. Influenza-

related media placements from October to December for 2002 and 2003 were used for comparison.

Face validity was determined through use of media experts, influenza experts, and pediatricians with good interrater reliability for 3 randomly selected weeks (r = 0.75; SE: 0.08). Multivariate analysis of their research showed that recalling a physician recommendation (odds ratio [OR] = 6.8, 95% CI = 2.3 to 19.7); having a family member who had received the influenza vaccine (OR = 9.5, 95% CI = 4.3 to 21.3); having a continuity clinic visit between October and January (OR = 4.5, 95% CI = 2.0 to 10.1); and having a high-risk medical condition (OR 2.9, 95% CI = 1.1 to 7.8) strongly predicted the influenza vaccination status in the children. They also found the rate of vaccinations increased (2.4 vs. 8.6 vaccinations per week) after media coverage began in the late fall ($p < .001$). Ma et al. (2006) concluded that media coverage and physician recommendation are associated with influenza vaccination rates.

One interviewer-administered survey of 153 caregivers of children ages 6 to 23 month olds examined the opinions about various factors influencing childhood influenza immunizations (Humiston, Lerner, Hepworth, Blythe, & Goeppe, 2005). English-speaking parents completed the surveys at either an ambulatory pediatric clinic or a pediatric emergency department of a large tertiary care teaching hospital in an unnamed city from June to August of 2003. Univariate statistical analyses were conducted on each variable to determine the relationship to the dependent variable. A total of 61% of parents believed that influenza is serious enough to have all children ages 6 to 23 months vaccinated. Almost half of the parents (49%) thought that the influenza vaccine can cause influenza.

The findings showed that 46% of caregivers identified safety about the vaccine as their most important concern. This was followed by the belief of 20% of the caregivers that the influenza immunization could cause influenza. Parents who believed that influenza was serious (85%) had greater intent to immunize than those who did not (66%). Parents who believed that the influenza vaccine does not cause influenza (87%) also had greater intent to immunize than those who did not (66%). In addition, parents who believed that all babies should be immunized (96%) had greater intent to immunize than parents who did not (49%). Humiston et al. (2005) suggested that caregivers' knowledge about influenza needs to be increased, the myth about the influenza vaccine causing influenza needs to be addressed, and physicians and other health professionals should direct patient care time toward educational and safety concerns.

Lin et al. (2006) studied the beliefs and attitudes about influenza immunization among parents of children ages 2 to 13 with chronic medical conditions over a 2-year period (2002-2003 to 2003-2004). The study was conducted at health centres located in urban neighbourhoods with large minority populations and large numbers of low-income children in an unnamed city. A total of 860 participants completed the 19-item survey. Chi-square tests were used to compare differences between the parents of vaccinated and unvaccinated children. A logistic regression was used to determine the association between vaccination status and parental attitudes and beliefs about vaccination.

The factors most related to influenza vaccination status were perceived doctor's recommendation (OR = 6.0, 95% CI = 3.7 to 9.7); parents' belief that their children should be vaccinated (OR = 5.4, 95% CI = 3.7 to 9.7); relatives' belief that the children should be vaccinated (OR 1.7, 95% CI = 1.4 to 4.2); and receipt of a reminder from the

doctor's office (OR = 1.7, 95% CI = 1.1 to 2.6). Lin et al. (2006) suggested that the following factors influence vaccination: recommendation from physician, reminder from physician, parents' beliefs, ease of access to obtain a vaccination, and recommendation from a relative.

Daley et al. (2006) questioned 316 English-speaking parents of children without chronic medical conditions ages 6 to 21 months old attending five pediatric clinics in Denver, Colorado, via a telephone survey before and after the 2003-2004 influenza season about their knowledge and attitudes regarding influenza infection and immunization. The survey content was based on the HBM. Data were analyzed with SAS software. McNemar's test for paired data was utilized for comparison of parental knowledge and attitudes regarding influenza disease and influenza vaccination before and after the 2003-2004 influenza season. In the preinfluenza season questionnaire, parents were asked about their children's perceived susceptibility to influenza infections. Results of the survey indicated that before the season, 47% of parents felt that their children were not very likely to get the flu, 38% thought that a healthy 40-year-old adult is more likely to get the flu than their own children, and 36% thought that compared with other children their children's age, their own children are more likely to get the flu. At the end of the influenza season the proportions agreeing changed to 41%, 18% and 40% ($p = .10$, $p < .01$ and $p = .23$).

Parents also were asked questions about the perceived severity of influenza infections (Daley et al., 2006). Just over half (58%) of them agreed that influenza infections are usually more serious in healthy 70-year-old adults than in healthy 1-year-old children, 25% agreed that influenza infections are usually more serious in healthy 40-

year-old adults than in healthy 1-year-old children, and 52% agreed that the flu is usually a mild disease. At the end of the influenza season, the proportions agreeing changed to 42%, 14%, and 43%, respectively ($p < .01$, $p < .01$ and $p = .01$).

Daley et al. (2006) also asked questions about the benefits of vaccination. Over half of the parents (59%) agreed that the flu vaccine prevents children from catching the flu, 56% agreed that giving the flu vaccine to children will decrease parents' lost time from work, and 69% agreed that the vaccine will decrease school absences. Results postseason also were significant, with corresponding percentages noted of 49%, 71%, and 77%, respectively ($p < .01$). Finally, parents were asked about the risks of vaccination, with 19% agreeing that the flu vaccine is not safe to give to a 1-year-old child, 69% agreeing that the flu vaccine can cause the flu in some people, and 88% agreeing that the vaccine will often cause minor reactions. After the influenza season, the proportions agreeing changed to 6%, 58% and 81%, respectively ($p < .02$, $p < .02$ and $p = .02$).

In multivariate analyses, positive predictors of immunization included a physician recommendation for immunization and an increase in the perception that immunization was the social norm over the 2003-2004 season. Negative predictors of immunization included high perceived barriers to immunization, less parental education, and preseason intention not to immunize. Daley et al. (2006) did not suggest any recommendations, but they did conclude that parental attitudes changed during the 2003-2004 influenza season and that physician recommendation is an important predictor of influenza immunization.

Taylor et al. (2002) studied the association between parents' perceptions of the barriers to vaccination, the immunization status of the children, and parents' preferences regarding specific strategies to decrease missed vaccination opportunities. The overall

contribution of the perception of barriers on underimmunization among children who are vaccinated in pediatricians' offices was estimated. Immunization data were collected on 13,520 children in 177 pediatrician offices in 42 states across the United States. Between 1998 and 2000, 13,516 parents of children ages 8 to 35 months participated in the survey while at a pediatrician's office. Immunization data were obtained from the practice medical record. Overall, 74% of the parents indicated that there was nothing difficult about obtaining vaccinations for their children. The next most common barrier cited by 22.6% of the parents was concerns about the side effects of the vaccines. Other barriers cited included a confusing vaccination schedule, the expense of the vaccines, the inconvenience of the vaccination process, a child who was too ill to receive vaccines, and religious objections. It was also noted that 13.7% of parents indicated that at least one of the barriers associated with immunization status was an important impediment to obtaining all recommended vaccines. The children of these parents were significantly more likely to be underimmunized than children of parents who did not identify at least one of the barriers (RR: 1.75; 95% CI: 1.59-1.92). The researchers concluded that parental perceptions of barriers did not appear to cause the underimmunization of children.

Older Adults

Santibanez et al. (2002) conducted a computer-assisted telephone survey based on the theory of reasoned action of 1,007 individuals over age 66 to determine their knowledge and beliefs about influenza, pneumococcal disease, and immunizations. The participants were recruited from several different areas, including rural medical practices, urban and suburban medical practices, medical centres, outpatient clinics in Veterans

Affairs centres, and inner-city neighbourhood health centres in Pittsburgh. The participants had to be currently residing in western or central Pennsylvania. Homeless individuals; nursing home residents; deaf individuals; and those with psychosis, senility, or dementia were excluded from the study. The participants were offered $20 to participate. Interviews were conducted between April and October of 2000. SUDAAN software was used to calculate proportions for the closed-ended items. Chi-square tests were utilized to compare those with vaccines and those without vaccines.

A total of 82% reported being vaccinated for influenza in the 1999-2000 season, and 71% reported being vaccinated for pneumonia. Santibanez et al. (2002) also found a lack of knowledge about the symptoms of influenza: They noted that only 44% of individuals could accurately describe at least one of the classic influenza symptoms and that 15% incorrectly associated gastrointestinal symptoms with influenza. Individuals unvaccinated for influenza indicated that the most important reason for nonvaccination was that he/she felt unlikely to contract influenza (19%), thought influenza vaccination causes influenza (14%), and had a past adverse reaction to the influenza vaccine (13%). The researchers found that vaccination against influenza and pneumonia was significantly related to the belief that vaccination is the best way to prevent the diseases ($p < .001$). The researchers concluded that knowledge deficits and beliefs must be addressed to increase vaccination rates and that physicians must take more of an active role in promoting vaccines.

Lewis-Parmar and McCann (2002) investigated the factors affecting influenza immunization in older people with diabetes in the United Kingdom through the use of a mailed survey. The contents and design of the survey were not specified, but there was an

indication that some open-ended questions were asked. All general practices in one health authority area were invited to participate in the study, with 111 of 114 choosing to participate. Of the 111 practices, 12 were randomly selected for inclusion in the study. A draft questionnaire was piloted for comments to selected practices. A total of 384 individuals completed the survey, resulting in a response rate of 56%. The data were analyzed with a Microsoft Access 97 database, Microsoft Excel, and Epi Info V. 6.1.

The factors that were significantly associated with vaccine uptake in people with diabetes included a history of previous vaccination (OR = 40, 95% CI = 9 to 206); recommendation by a health professional (OR = 14, 95% CI = 2.9 to 90); and the belief that the vaccine protects against influenza (OR = 5.6, 95% CI = 1.8 to 18.9). The factors that were significantly associated with vaccine uptake in older people included the belief that the vaccine protects against influenza (OR = 23, 95% CI = 8.4 to 69.4); a history of previous vaccination (OR = 10, 95% CI = 3.9 to 28.3); and not being concerned about side effects (OR = 4, 95% CI = 2.1 to 7.9). Lewis-Parmar and McCann (2002) concluded that these significant factors should be involved in promoting protective measures such as influenza vaccination. They also stressed that the information needs to be relevant to the particular population addressed.

A longitudinal telephone survey was completed by 253 patients who attended two community health centres in Pittsburgh after the 2002 and 2003 influenza seasons (Tabbarah et al., 2005). The self-reported survey examined the influenza immunization status, demographic characteristics, and decision-making behaviour of patients at the clinic. The survey was based on the Triandis model for consumer decision making from the theory of reasoned action. The interviews took place in August to October of 2002

and 2003. Statistical analysis was performed on SAS software and included factor analysis, chi-square tests, and multinomial logistic regression analyses. The reasons cited by individuals who had been vaccinated for each of the 3 years during the study included influenza prevention (75.4%), having a history of influenza (13.1%), and the recommendation of a physician or other medical professional (9.0%). The reasons cited by individuals for choosing not to be vaccinated in the previous 3 years included a previous bad or adverse reaction to the influenza vaccine (26.5%), a belief that he/she was unlikely to get influenza (25.0%), and a fear of side effects (23.5%).

This study (Tabbarah et al., 2005) was one of the few studies to report the location of where the patients had received the influenza vaccine. It was reported that patients were the most frequently vaccinated at a regular doctor's visit (66.7%), a clinic in the community (19.2%), and by the health department or other locale (2.5%). Three factors were identified with a factor analysis (with varimax rotation). One factor was entitled social influences and influenza risk, which was made up with the following four statements: My relatives/close friends think I should get a flu shot, my doctor thinks that I should get a flu shot, I feel that getting a flu shot is a wise thing to do, and I think that getting a flu shot is less trouble than it is worth. Individuals who agreed with the four statements were more than 15 times as likely to report being vaccinated for all 3 influenza seasons and 5 times more likely to report being vaccinated one to two times as those who disagreed with the statements. The researchers suggested that myths about influenza need to be dispelled. They also suggested that physicians should share personal experiences with patients about the incidence of hospitalization and death related to influenza.

The Medicare Current Beneficiary Survey was an ongoing nationally representative, multistage longitudinal survey of approximately 16,000 Medicare beneficiaries in the United States. Medicare beneficiaries were interviewed every 4 months, and they were specifically interviewed about influenza immunization in the fall of every year. The reasons for not receiving influenza vaccines are discussed here (CDC, 2004). SUDAAN software was used to calculate prevalence estimates, 95% CIs and adjusted ORs from multivariate logistic regression analysis. Multivariate logistic regression analyses also were performed. The top six responses of those who did not receive the influenza immunization for the seasons from 1997 to 2002 were the following: did not know it was needed, belief that the vaccine could cause influenza, belief that the vaccine could cause side effects, the vaccine was not available, did not think that the vaccine would prevent influenza, and forgot to get the vaccine. Exact percentages could not be cited because the statistics were presented in a figure. The researchers did not cite any conclusions for their research results.

Bosompra, Ashikaga, and Ruby (2004) conducted research through the utilization of a questionnaire based on the theory of reasoned action on 799 individuals ages 60 and over from Rutland and Windham Counties in Vermont to determine their attitudes, perceived norms, and intentions for influenza immunization. Telephone interviews were conducted. Descriptive statistics, factor analysis, reliability, analyses using Cronbach's alpha, bivariate correlation, and multiple linear regression using standardized coefficients were conducted on SPSS software. Two factors were identified about attitudes toward flu shots. The first factor consisted of 7 items that involved the benefits and side effects of obtaining flu shots. The second factor consisted of 6 items that involved issues such as

clinic access, lack of transportation, cost of obtaining a flu shot, availability of time, and attitude of clinic staff.

The research showed that intention to obtain an influenza vaccine was strongly correlated with perceived benefits of the influenza vaccine ($r = 0.66, p < .001$). Four indices were entered into a single multiple regression: perceived benefits, system factors, positive norms, and negative norms. Perceptions that benefits of flu shots outweigh the side effects ($\beta = 0.597, p < .001$); agreement with positive norms ($\beta = 0.080, p < .01$); and disagreement with negative norms ($\beta = 0.079, p < .001$) were statistically significant predictors of intention. Bosompra et al. (2004) suggested that the benefits associated with influenza immunization, the perceived side effects, and that most individuals hold positive views about the influenza vaccine should be stressed in intervention programs.

Lindley, Wortley, Winston, and Bardenheier (2006) reviewed the racial and ethnic disparities of influenza vaccination of adults over age 65. A cross-sectional telephone survey included 1859 White and 1685 African-American participants from five cities in the United States, including San Antonio, Chicago, Milwaukee, and Rochester, and 19 counties in the Mississippi Delta region. Data analysis was performed on SAS and SUDAAN software. Weighted proportions were calculated for respondent characteristics, attitudes toward influenza vaccination and for self-reported race/ethnicity. Multivariate modeling was also utilized.

Lindley et al. (2006) found that 79% of White individuals, compared to 50% of African-Americans, had a flu shot in the previous year. Approximately one third of unvaccinated respondents believed that the influenza vaccinations made them sick (29.8% White and 32.7% African American). In addition, over half of the unvaccinated

respondents (50.8% White and 66.5% African-American) had concerns about unknown vaccine components. Just over 40% of unvaccinated respondents felt that the flu shot prevents influenza (43.4% White and 41.2% African-American). One finding of this study was that the respondents with negative attitudes about influenza vaccination and with a provider who recommended the influenza vaccine had vaccination rates 2 to 3 times higher than those respondents with negative attitudes who did not have a provider who recommended the influenza vaccine. The researchers concluded that even after controlling for specific respondent attitudes, there was a difference in vaccination coverage, which suggests that future research should focus on other factors such as vaccine-seeking behaviours. Physicians should also continue to offer influenza vaccines.

Through telephone surveys, Bardenheier et al. (2006) examined the knowledge and attitudes of Medicare recipients ages 65 and over who were not vaccinated for influenza. Behaviour-related questions were based on the HBM. English- and Spanish-speaking interviewers were used. The project was funded by the CDC. Data were collected from five sites in the United States: Chicago, Milwaukee, selected counties in rural Mississippi, Rochester, and San Antonio between February 2004 and May 2004. A total of 4,988 interviews were completed. Responses were analyzed and categorized into four clusters through use of FASTCLUS procedure with SAS. The first cluster identified was Potentials (45%), individuals who indicated that they would receive the influenza vaccine to prevent disease. The second was Fearful Uninformeds (9%), individuals who were unsure if the influenza vaccine causes illness. The third was Doubters (27%), who were unsure if the influenza vaccine is efficacious. Finally, the Misinformeds (19%) believed that the influenza vaccine causes illness. Almost all (98%) of the Potentials

believed that influenza is serious in the elderly, followed by 68% of Fearful Uninformeds, 87% of Doubters, and 58% of Misinformeds. Less than 1% of Potentials did not know if influenza is serious in the elderly, followed by 14% of Fearful Uninformeds, 8% of Doubters, and 17% of Misinformeds.

Bardenheier et al. (2006) also examined the benefits of influenza vaccination. A total of 74% of Potentials indicated that they would be vaccinated to prevent illness, followed by 62% of Fearful Uninformeds, 26% of Doubters, and 19% of Misinformeds. It was noted that 84% of Potentials believed that the flu vaccine is efficacious, followed by 72% of Fearful Uninformeds, 3 % of Doubters, and 3% of Misinformeds. The researchers also noted that 64% of Doubters did not know if the flu vaccine is efficacious, followed by 42% of Misinformeds, 0% of Potentials, and 1% of Fearful Uninformeds.

Bardenheier et al. (2006) also noted barriers to influenza vaccination in their research. They reported that 81% of Misinformeds believed that the influenza vaccine causes illness, followed by 42% of Potentials, and no Fearful Uninformeds or Doubters. When asked if they did not know if the flu shot causes illness, 92% of Fearful Uninformeds agreed, followed by 60% of Doubters, and no Potentials or Misinformeds. Individuals were also asked if they were concerned about something in the flu vaccine that they were unaware of: Seventy-three percent of Fearful Uninformeds agreed, followed by 63% of Misinformeds, 57% of Doubters, and 55% of Potentials. Another barrier asked of the individuals was if they did not know if they were concerned about something in the flu vaccine that they were unaware of: Thirteen percent of Doubters agreed with the statement, followed by 5% of Potentials, 5% of Fearful Uninformeds, and

10% of Misinformeds. The researchers suggested that using identifying clusters could be beneficial for targeting health education strategies.

Health Care Workers

A cross-sectional survey by Canning, Phillips, and Allsup (2005) was performed in two Liverpool hospitals to determine the beliefs of health care workers about influenza vaccine and the reasons for nonvaccination. A total of 144 health care workers from medical wards, surgical wards, and geriatric wards, as well as a few multiward workers, completed the surveys. Data analysis was conducted with Microsoft Access and SPSS software. Only 7.6% of workers indicated that they had been vaccinated in the previous year. The main reasons indicated for not being vaccinated included: did not think it was needed (29%), not aware of the vaccine (18%), did not want the vaccine (14%); and concerned about side effects (11%). The main perceived benefits of vaccinations included reduced sick leave (44%) and personal protection against influenza (28%). Most of the individuals surveyed in this study were female (76.2%). Canning et al. suggested that a hospital promotional program, increased education, and methods to increase interest in the vaccine would be beneficial to increase vaccine uptake.

Saluja, Theakston, and Kaczorowski (2005) studied the emergency department health care workers' attitudes about influenza immunization with a cross-sectional survey at four teaching hospitals in London, Ontario. The survey was distributed to 426 staff mailboxes between March and April of 2000, with 343 completing the survey. The staff surveyed included emergency physicians and residents, nurses, respiratory therapists, and other allied health care workers. The majority of participants were female (74.3%). Univariate logistic regression analysis was performed with SPSS software. The overall

vaccination rate for these four hospitals was 37.0% (95% CI 31.9-42.4%). Multivariate logistic regression analysis revealed that age greater than or equal to 41; (OR = 1.9; 95% CI 1.1-3.4; $p = 0.04$); and a chronic medical condition (OR = 1.6; 95% CI, 1.0-2.5; p = 0.02) were positively associated with influenza vaccination.

Saluja et al. (2005) noted that 28.3% of the respondents thought that adverse effects are common postimmunization. Another interesting finding was that 26.8% of staff believed that patients are at increased risk of contracting influenza from emergency department staff and 58.3% of staff believed that emergency department staff are at increased risk of contracting influenza through exposure to patients. The researchers suggested that strategies to improve attitudes about influenza immunization need to be developed and implemented.

Mah et al. (2005) examined participation in influenza vaccination, motivations, perceptions, and preferences through utilization of a self-administered questionnaire that was given to 363 staff at a cancer centre in Calgary in September 2002. The staff surveyed consisted of allied health professionals, support staff, nurses, student nurses, physicians, medical trainees, and others not identified. Two thirds of the staff (69%) were involved in direct patient care. Epi Info was utilized for statistical analysis. The reasons reported for being vaccinated four or five times in the previous 5 years included (statistics shown in figures, with most exact percentages not cited): to protect myself from influenza, to protect my patients from influenza, to protect my family from influenza, and the vaccine is strongly recommended in the workplace. Reasons reported for being vaccinated one to three times in the previous 5 years included did not work in health care for the past 5 years, previous vaccination made me ill, no suitable time to get vaccinated,

and away during vaccination campaign. Reasons reported for nonvaccination included vaccine is not effective (45%), vaccine may harm my health (19%), vaccine has unpleasant side effects, I am not at risk of influenza, did not know vaccination was expected, did not know the vaccine was provided free, and no time to get vaccinated at work.

Thirteen percent of the staff believed that the influenza vaccine is unsafe. The reasons reported for this included the vaccine weakens the immune system, I know someone harmed by the vaccine, I avoid the vaccine because of allergies, the vaccine can harm the joints, and a physician indicated the vaccine is unsafe. Mah et al. (2005) suggested that as perceptions about influenza vaccination vary according to past influenza vaccination history, strategies to promote influenza vaccination also should vary, depending on the group targeted.

Another study published in 2003 by Martinello, Jones, and Topal reviewed the correlation between health care workers' knowledge of the influenza vaccine and their choice to be vaccinated. A cross-sectional survey of 212 individuals was distributed at Yale-New Haven Hospital, a teaching hospital, from October to December 2001. The exact method of survey distribution was not indicated. The sample consisted of physicians, house staff, medical students, nurses, and patient care associates. Females made up 69% of the participants, and 52% of the individuals studied were physicians. Chi-Square, Fisher's exact test, and Wilcoxon rank sum tests were determined with SAS software. One part of the survey contained five questions about general knowledge of influenza.

Martinello et al. (2003) found that the health care workers who answered all five basic knowledge questions about the influenza correctly (84%) were significantly more likely to have been immunized than those who declined the vaccine and did not answer all five questions correctly (64%, $p = .002$). Physician vaccination rates did not differ significantly between those who did (81%) and did not answer all five questions correctly (92%, $p = .459$). Physicians (82%) were more likely than nurses (62%) to be vaccinated ($p = .009$). Reasons cited by nurses for not receiving the vaccine included a concern that influenza vaccination will cause an influenza-like illness (44%), belief that they are not at risk for influenza (15%), concern regarding lack of vaccine efficacy (13%), concurrent pregnancy or breast-feeding (15%) and an aversion to needles (15%). Reasons cited for physicians not receiving the vaccine were different from those given by nurses, with 32% citing a lack of convenience, 26% citing forgetfulness, and 6% citing the availability of neuraminidase inhibitor medications. The researchers suggested that it may be beneficial to have separate influenza vaccination strategies for physician and nursing populations.

The attitudes toward and practices of influenza vaccination were studied by La Vela et al. (2004). The research involved a massive cross-sectional study of 1,556 health care workers working in any of 23 Veterans Affairs spinal injury centres across the United States in the spring of 2002. The objective of their research was to examine predictors for receipt of the influenza vaccine. The sample consisted of nurses, nurse aides, physicians, physicians' assistants, nurse practitioners, physical therapists, occupational therapists, respiratory therapists, therapeutic recreation therapists, vocational counsellors, kinesiotherapists, social workers, psychologists, rehabilitation counselors, and other aides. Statistical analysis consisted of chi-square tests, logistic

regression and a likelihood ratio test with SAS software. A total of 69% of staff felt that it is very important for health care workers to receive the influenza vaccine to decrease transmission to patients, and a further 27% believed that it is somewhat important. Less than half (43%) thought that the vaccine is very effective in preventing influenza and its complications, followed by 53% who thought that it is somewhat effective.

The influenza vaccination rate was 51% for the 2001-2002 season (La Vela et al., 2004). The main reasons for immunization included self-protection (77%) and patient protection (49%). The main reason cited for nonimmunization was the concern about side effects (49%). Also, 14% of participants indicated inconvenience as a reason for nonimmunization. According to logistic regression results, the probability of immunization significantly increased with an age of 50 or older (OR = 1.47, $p = .021$); male gender (OR = 2.5, $p < .001$); strong belief in vaccine effectiveness (OR = 19.03, $p = .008$); and the importance of health care worker vaccination (OR = 20.50, $p = .005$). It was also noted by the researchers that the health care workers who recommended the vaccine to coworkers, patients, or patients' families were significantly more likely to be vaccinated themselves (OR = 3.20, $p < .001$). Finally, health care workers who did not believe that the influenza vaccine is protective ($p < .001$) or effective ($p < .001$) were less likely to recommend it to their patients. Suggestions by the researchers included addressing concerns about vaccine side effects, effectiveness, protective value of the vaccine, and access to it.

Hofmann, Ferracin and Dumas (2006) conducted a literature review of attitudes and beliefs about influenza vaccination of health care workers. Articles published up to June 2004 obtained through a MEDLINE search using keywords related to influenza

immunization, and the perception and coverage among health care workers were included in the review. The reference lists of the articles obtained also were searched. Most studies utilized closed-ended questions. Of the 25 studies included in the review, the 5 most common themes encouraging influenza vaccination included to protect oneself, to protect patients, the vaccine is free and convenient, a history of vaccination, and following the example set by peers. The 7 most prevalent themes preventing influenza vaccination included fear of adverse effects, misconception that the influenza vaccine can cause influenza, perception that the individual does not feel at risk of getting influenza, the times and location of influenza vaccination clinics were unsuitable, doubt that influenza is a serious disease, belief that the vaccine is ineffective, and fear of injections.

Hofmann et al. (2006) suggested that influenza vaccination campaigns should be tailored to the specific needs of the health care institution. Campaigns also should contain factual information about possible reactions and the incidences. Finally, health care workers need to understand their role in influenza transmission and prevention.

Takayanagi, Cardoso, Costa, Araya, and Machado (2007) examined the attitudes of health care workers to influenza vaccination. A questionnaire with open-ended and close-ended questions was utilized to assess reasons for acceptance and nonacceptance of the influenza vaccine. A total of 258 employees (nurses, nurses' aides, physicians, and administrative staff) from a hospital in Brazil completed the questionnaires in 2004 after attendance at an influenza educational program. The majority of respondents (85.3%) were female. The influenza immunization rate at this hospital was 34.4% in 2003. The main reasons cited for having an influenza vaccine included self-protection (87%), to protect the patient (56%), considered it was better to have the vaccine than to contract

influenza (38%), recommendation by their immediate superior (28%), to avoid missing work (28%), believed that the vaccine did not cause influenza (18%), a physician recommended it (10%), or they had received a written request to comply with vaccination (10%).

The main reasons cited for not having an influenza vaccine included a belief of a risk of serious adverse effects (22%), the individual had forgotten to get a vaccine (19%), he/she was unaware that vaccination was necessary (14%), had insufficient time (13%), the individual had serious adverse effects after a previous vaccination (8%), or he/she considered the vaccine to be ineffective (6%) or unnecessary (6%). A multivariate analysis showed that the main factors associated with compliance were older age ($p = .008$), believing that most departmental colleagues had been vaccinated ($p < .001$) and having cared for a patient suffering from acute influenza ($p = .031$). Takayanagi et al. (2007) suggested that health professional attitudes about influenza vaccination are important to know and understand when running educational campaigns.

Weir, Brunton, Jennings, Smith, and Litt (2004) conducted a postal survey of primary care practitioners and primary care nurses, and a telephone survey of people ages 65 years and older in New Zealand to determine knowledge, attitudes, and beliefs that influence influenza immunization from November 2001 to February 2002. The exact number of participants was not clearly indicated. The participants in the study generally scored high on the knowledge questions, with more than 90% of the participants agreeing that influenza can be serious in older people (99% practitioners, 99% nurses, and 93% age over 65).

In the age group of 65 and over, 30% believed that people can get influenza from the vaccination, and 22% believed that healthy older people do not need the influenza injection because they rarely get sick. Vaccinated individuals over age 65 scored higher on knowledge questions than nonvaccinated individuals, with 91% versus 45% agreeing that influenza immunization prevents complications of influenza ($p < .001$). A total of 64% nonvaccinated individuals, compared to 5% of vaccinated individuals, agreed with the statement that influenza vaccination is not needed if you rarely get sick ($p < .001$). Both primary care physicians (50%) and primary care nurses (42%) ranked increasing the subsidy for influenza vaccination in the top two of the suggested strategies for improving or maintaining vaccination coverage. Weir et al. (2004) also suggested more promotion of the influenza vaccine.

Physicians/Residents

The knowledge and attitudes about the influenza vaccine of physicians was studied by Wodi et al. (2005). Surveys were distributed to 196 physicians enrolled in training programs at the University of Medicine and Dentistry of New Jersey in Newark, New Jersey, in April and May of 2004. Statistical analysis consisted of two-tailed tests and chi-square analysis on JMP software. The influenza vaccination rate was 38.3%. The survey contained 20 questions related to knowledge about influenza immunization. The mean knowledge score about influenza vaccination was 13.7 (± 2.6) from a total of 20.

Wodi et al. (2005) noted that the physicians who had intentions of being vaccinated had higher knowledge scores than the physicians who had no intention of being vaccinated ($p = .01$). Of the physicians who were immunized in the 2003-2004 season, 93.3% indicated self-protection as the primary reason for being immunized. Of

the physicians who were not immunized in the 2003-2004 season, 47.1% cited a lack of time as a factor, and 9.1% of these physicians indicated that it was the most important factor in their decision not to be immunized. The researchers suggested that education about influenza vaccination should be increased and that innovative ideas would be beneficial to target physicians who have never been vaccinated.

The knowledge, perceptions, and attitudes of vaccinated and unvaccinated house staff (interns, residents, and fellows registered at a Toronto university) were studied by Lester, McGeer, Tomlinson, and Detsky (2003). In this study, 43% of those surveyed were female. A questionnaire was sent out in April of 2000 to 1,159 individuals, with 670 utilized for the study. Statistical analysis consisted of *t* tests, a bootstrap test, chi-square test, methods for paired proportions, and a z test. Overall, 51.3% of the participants had received the influenza vaccine in the 1999-2000 season. The top reasons reported by vaccinated individuals were self-protection (86.3%), protection of patients (62.6%), protection of family (30.7%), protection of colleagues (21.9%) and hospital staff insisted (7.6%). The most common reasons cited for not getting vaccinated were busy schedules (52%), inconvenience of vaccination (31.7%) fear of side effects (30%), do not get sick (21.8%), flu is not severe enough (17.8%), vaccine is not effective (9.2%), and unaware of availability of the influenza vaccine (5.8%).

Illness and absenteeism rates were also examined by Lester et al. (2003). Approximately one third (36.7%) of residents reported being ill with influenza-like illnesses between September 1999 and April 2000. The mean length of illness was 6.6 days, with 2.5 days worked while ill. The researchers suggested that improving influenza

vaccination may be accomplished by mandating the influenza vaccine. They also suggested targeted educational and convenience campaigns.

Pavia, Foresta, Carbone, and Angelillo (2003) studied the knowledge, attitudes, and practices of influenza and pneumococcal immunization of general practitioners about the elderly in Calabria, Italy. A total of 148 general practitioners completed a mailed questionnaire from May to December of 2000. The influenza results only are discussed. A small portion (17.1%) of respondents correctly identified the individuals for whom influenza and pneumococcal vaccinations were most recommended. It was interesting to note that the results of a multiple logistic regression analysis showed that knowledge that the elderly would benefit from an influenza vaccine and pneumococcal vaccine (62.8%) was significantly greater in older general practitioners than in younger general practitioners.

Results of the responses to statements reflecting attitudes about influenza where the practitioner could choose agree, uncertain, or disagree are as follows: A total of 74.3% agreed that influenza is a dangerous disease, 96.6% agreed that influenza is more serious for the elderly, 83% agreed that the influenza vaccine can prevent the illness, 91.2% agreed that the influenza vaccine reduce the severity of the illness, 95.2% agreed that administration of the influenza vaccine can reduce hospitalization, and only 82.2% agreed that the influenza vaccine is not dangerous. It was not indicated in this study if the physicians themselves received the influenza vaccine. Pavia et al. (2003) suggested that efforts are needed to increase the knowledge of practitioners about the influenza vaccine, influenza guidelines, and targeted recipients for the influenza vaccine.

Toy, Janosky, and Laird (2005) conducted a cross-sectional survey of medical residents from a western Pennsylvania hospital about health beliefs, attitudes, and medical knowledge about the influenza vaccine in 2004. A small sample of 43 residents completed the survey. Just over half of the residents (58.1%) had received an influenza vaccine in the 2003-2004 season. Most residents knew other residents who had received the influenza vaccine (86%). The three top reasons cited for getting a flu shot included felt at risk because of their work (80%), felt at risk of transmission to patients (68%), and felt the vaccine was generally safe (56%). The four most cited reasons for not getting the flu shot included procrastinated/forgot (44%), not interested (16.7%), not in a high-risk group (16.7%), and not likely to get the flu (16.7%). The scores on the knowledge portion of the survey ranged from 11 to 28 correct out of 30, with a mean of 22.53 and a standard deviation of 5.13. Residents who scored higher on the knowledge portion were more likely to recommend the influenza vaccine strongly ($p = .04$) and receive the influenza vaccine ($p = .022$).

Toy et al. (2005) also noted that the higher the postgraduate year level, the higher the immunization rates, with 47.4% immunized the first year, 50% the second year, and 100% the third year. The researchers noted the following trends in their research, namely, that rates of influenza immunization were associated with knowledge of prior vaccination of others, higher postgraduate levels had higher vaccination rates, and higher knowledge scores were more indicative of recommending the vaccine to patients.

Midwives

Lee, Saskin, McArthur, and McGeer (2005) noted some very interesting findings about the beliefs and practices of Ontario midwives with respect to influenza

immunization. A survey was mailed out to midwives in February of 2002, and 113 midwives completed the survey. Lee et al. noted that only 37% of the midwives believed that the influenza vaccine is effective and 22% believed that the influenza vaccine is a greater risk than influenza. In addition, only 26.9% of midwives had received an influenza immunization in the year previous to the study. What makes this research interesting is that these reported rates are very different than rates reported in other health care worker research.

According to unpublished information from the MOHLTC cited by Lee et al. (2005), 61% of hospital and nursing home health care workers and volunteers, 42% of community-based health care workers, and 41% of emergency service workers are immunized for influenza. In the Regional Municipality of York, 79.6% of staff working in long-term care facilities are vaccinated, and 36.7% of staff working in the 3 largest hospitals are vaccinated (York Region Health Services Department, 2006). Lee et al. suggested that the roles of midwives in regard to patient education about influenza immunization needs to be clarified and that improving vaccination rates needs to start at a personal level of the midwife.

Nurses

McEwen and Farren (2005) examined the actions and beliefs related to hepatitis B and influenza immunization among registered nurses in Texas. Thirteen forced-choice questions were completed by 246 nurses. The year of the data collection was not indicated. Their study was sent to 1,000 registered nurses; the response rate was 24.6%. Only the influenza related findings are discussed. The methods utilized for statistical analysis were not indicated. Their findings included that 86% of the respondents reported

ever having had a flu shot, 69% reported being immunized during 2 of the previous 4 years, and 50% of respondents had received five or more flu shots. The reasons cited for declining influenza immunization included concerns about side effects (37.3%), not concerned about getting the flu (29.9%), and being ill in the past despite receiving a flu shot (28.4%). The reasons cited for receiving an influenza immunization included a belief that the vaccine is effective in preventing the flu (81.8%), it is provided by the employer free of charge (75.1%), concern about being at risk for exposure to influenza (66.3%), he/she works with clients who are high risk (44.2%), he/she had the flu in the past and does not want to experience it again (37.6%), and the respondent was over 50 years of age (35.4%). The researchers concluded that vaccine should continue to be free of charge for nurses. They also believed that the side effects of immunizations need to be addressed in further research.

The attitudes and beliefs about influenza and the influenza vaccine of nurses were assessed in eight 1-hour focus groups conducted in Birmingham, Alabama ($n = 34$) and Detroit, Michigan ($n = 37$). The focus groups were 1 hour long and conducted in English by a professional moderator. Notes were taken in these focus groups by the moderator and the observers. Willis and Wortley (2007) found that both vaccinated and unvaccinated nurses had concerns about the safety of the influenza vaccine. Some nurses thought that the influenza vaccine contains a live influenza virus, so they associated receipt of the vaccine with acquiring the disease. Another concern included the lack of information about the effectiveness of the vaccine. Many of the unvaccinated nurses felt that they are not at risk because they do not fall into high-risk groups. They also found that the vaccinated nurses seemed to have a higher knowledge level about the vaccine

than non-vaccinated nurses. The researchers proposed that educational efforts should focus on determining the most effective ways to disseminate information about influenza and vaccination to nurses, emphasizing the rationale for health care worker vaccination and developing comprehensive approaches.

Cultural and Ethical Practices and Other Populations

A qualitative study conducted by Adonis-Rizzo and Jett (2006) examined the health beliefs, attitudes, and cultural practices related to influenza prevention of Haitian elders living in the United States. Interviews and participant observation conducted in Creole were utilized in this study. The researchers respected the cultural etiquette of the community and accepted and participated in meals and recreational activities after the interviews were completed. The sample consisted of 10 adults (6 females and 4 males), over the age of 55 who were recruited from a Catholic church and who were born in Haiti. Thematic joint analysis by the researchers revealed themes of competing paradigms, taking care of self, fear of sickness, and cautious willingness. All of the participants had preexisting beliefs about influenza that were contrary to those of health professionals. For example, many thought that influenza was simply a big cold. Prevention of influenza through immunization was not considered.

The taking care of self theme revealed that participants would use self remedies such as herbal tea to cure illnesses (Adonis-Rizzo & Jett, 2006). Prayer also was identified as important for maintaining health. The fear of sickness theme uncovered a fear of getting sick from the vaccine or having other conditions worsen due to receiving the vaccine. The cautious willingness theme showed that although the participants were uncertain of the vaccine, they would try the vaccine if a health professional such as a

physician or nurse recommended it. Many elders did not drive and were dependent on others such as children for transportation. This study was one of the few qualitative studies conducted that was available in recent literature. The researchers suggested that influenza immunization rates may be increased through targeted educational efforts, clinics in convenient locations, and involvement of the community surrounding the elder.

Blue and Valley (2002) conducted a descriptive study derived from the HBM of a random sample of 207 service and clerical workers who worked at a large Midwestern university in the United States to determine predictors of influenza vaccine acceptance. A questionnaire was mailed to the workers via campus mail with a return envelope included. SPSS was utilized for data analysis. About half (54.8%) indicated that they had received an influenza vaccine. A reduced model logistic regression showed that benefits, barriers, and cues to action were important in predicting acceptance of the influenza vaccine. The chi square for the reduced model was 77.97 ($df = 3, p < .01$). For benefits, the OR was 4.68, indicating that individuals who accepted the influenza vaccine were 4.5 times more likely to believe the vaccine has health benefits than individuals who did not receive the vaccine. The cues to action OR was 3.43, indicating that individuals were over 3 times more likely to accept the vaccine because of cues than individuals who did not receive the influenza vaccine.

Blue and Valley (2002) summarized successful immunization strategies cited by Streed (2000): Identify departmental champions to reinforce vaccine education and program promotion, offer educational programs, create a positive attitude in campaigns, have the vaccine readily available, and offer incentives such as cash prizes. The

researchers believed that the HBM is a useful framework for identifying perceptions about influenza and the influenza vaccine.

Summary

All four of the studies conducted on parents occurred in the same period of 2002 to 2004, were in the form of a survey, were conducted at clinics, and were conducted in English. The age groups of each study varied, with Lin et al. (2006) studying the parents of 2- to 13-year-olds, Ma et al. (2006) studying the parents of children ages 6 to 59 months, Humiston et al. (2005) studying the parents of children ages 6 to 23 months, Daley et al. (2006) studying the parents of children ages 6 to 21 months old, and Taylor et al. (2002) studying children ages 8 to 35 months. The demographic characteristics of the individuals in these studies were not detailed. Three studies (Lin et al., Ma et al., & Daley et al.) noted that recommendation from a physician is a significant positive indicator of influenza immunization. The researchers of two of these studies (Lin et al.; Ma et al.) also noted the importance of reminders either in the form of a card in the mail or a continuity clinic visit. In addition, all of the studies, with the exception of the research by Taylor et al., were conducted at the local level and expanded the results beyond the study population should be performed with caution.

One obvious similarity of all the studies conducted on older adults was the age: All of the participants were 65 and older, with the exception of research by Bosompra et al. (2004), who studied individuals ages 60 and older. All of the studies cited were American, with the exception of the study by Lewis-Parmar and McCann (2002), which was conducted in the United Kingdom. Two studies were conducted at a national level (CDC, 2004; Lindley et al., 2006). With the exception of the studies by Tabbarah et al.

(2005) and Lewis-Parmar and McCann, all of them had large sample sizes of 799 participants or higher. All of the researchers utilized telephone surveys or interviews, with the exception of the Medicare Current Beneficiary Survey (CDC), which utilized in-person interviewing, and the research by Lewis-Parmar and McCann, which utilized a mailed survey.

Four studies noted a belief of the participants that the influenza vaccine causes influenza or makes one ill (Bardenheier et al., 2006; CDC, 2004; Lindley et al., 2006; Santibanez et al., 2002). Two studies specifically noted that the participants were concerned about possible side effects of the influenza vaccine (CDC; & Tabbarah et al., 2005). Most of the studies had a majority of female participants, with Lindley et al. with 62%, Bosompra et al. (2004) with 65%, and Tabbarah et al. with 68%. The only exception was research by Santibanez et al., where there were only 46% female participants. Bardenheier et al. did not specify the number of female participants. The conclusions reached by the researchers included physician involvement either in the form of recommending influenza vaccines (Santibanez et al.; Lewis-Parmar & McCann, 2002) continuing to offer influenza vaccination (Lindley et al.), or providing examples of personal experiences (Tabbarah et al.).

The knowledge, attitudes, and beliefs of health care workers about influenza and the influenza vaccine were the focus of the majority of research. A total of 15 studies were reviewed in this section. The studies consisted of 1 qualitative study (Willis & Wortley, 2007); 1 review of the literature (Hofmann et al., 2006); and 13 mostly cross-sectional studies. The cross-sectional surveys consisted of 8 surveys conducted on site and distributed via interoffice mail at an educational in-service or on a specific ward of a

hospital (Canning, Phillips, & Allsup, 2005; La Vela et al., 2004; Mah et al., 2005; Martinello et al., 2003; Saluja et al., 2005; Takayanagi et al., 2007; Toy et al., 2005; Wodi et al., 2005); 4 mailed surveys (Lee et al., 2005; Lester et al., 2003; McEwen et al., 2005; Pavia et al., 2003); and 1 survey that united both telephone interviewing and a mailed survey (Weir et al., 2004). The number of participants in each of the studies ranged from 43 to 1,140. There were 71 individuals in the focus group study performed by Willis and Wortley. The majority (8) of the studies had fewer than 300 participants (Canning et al.; Lee et al.; Martinello et al.; McEwen et al.; Pavia et al.; Takayanagi et al.; Toy et al.; Wodi et al.). Four studies surveyed more than 300 participants (La Vela et al.; Lester et al.; Mah et al.; Saluja et al.), and the number of participants was not indicated in 1 study (Weir et al.).

The majority of research had a larger percentage of female participants, with a range of 69% to 96% participation. When the sample studied consisted only of medical residents or physicians, the percentage of female participation decreased, with a range of 17.2% to 46.5% noted in three studies (Lester et al., 2003; Pavia et al, 2003; Toy et al., 2005). In four studies, the percentage of female or male participants was not indicated (Lee et al., 2005; Mah et al., 2005; Weir et al., 2004; Wodi et al., 2005).

The research conducted on health care workers took place all over the world, including Italy (Pavia et al., 2003); England (Canning et al., 2005); Brazil (Takayanagi et al., 2007); and New Zealand (Weir et al., 2004). The majority of the research was completed in North America, with 6 studies from the United States (La Vela et al., 2004; Martinello et al., 2003; McEwen et al., 2005; Toy et al., 2005; Wodi et al., 2005) and 4

studies from Canada (Lee et al., 2005; Lester et al., 2003; Mah et al; 2005; Saluja et al., 2005).

Many reasons were cited in the research reviewed for obtaining an influenza vaccine. Many studies cited reasons of protection. Six studies noted one of the reasons for obtaining an influenza vaccine is self-protection (Canning et al., 2005; La Vela et al., 2004; Lester et al., 2003; Mah et al., 2005; Takayanagi et al., 2007; Wodi et al., 2005). Five studies also noted that the recipients wanted to protect patients (La Vela et al.; Lester et al.; Mah et al.; Takayanagi et al.; Toy et al., 2005). Two studies noted a desire to protect family, and 1 study noted the protection of colleagues (Lester et al.; Mah et al.). Many studies also noted some form of recommendation as a reason for obtaining an influenza vaccine. This included recommendation from a superior (Takayanagi et al.), recommendation from a physician (Takayanagi et al.), or recommendation from the workplace (Mah et al.). Stronger forms of recommendation were also noted, with either receipt of a written request to comply with a hospital vaccination policy (Takayanagi et al.) or hospital staff insistence (Lester et al.).

Other reasons cited in the literature review of health care workers for obtaining an influenza vaccine focused around the vaccine itself, including a belief that the vaccine was safe (Toy et al., 2005); effective (McEwen et al., 2005); did not cause influenza; and was a better alternative to the disease (Takayanagi et al., 2007).

Many reasons also were cited in the literature review by health care workers for not obtaining an influenza vaccine. Six studies noted concern of side effects as a reason for nonvaccination (Canning et al., 2005; La Vela et al., 2004; Lester et al., 2003; Mah et al., 2005; McEwen et al., 2005; Takayanagi et al., 2007). In 4 studies, the respondents

indicated they did not know or think that the vaccine was necessary (Canning et al.; Lester et al.; Mah et al.; Takayanagi et al.). In 5 of the studies reviewed, the respondents indicated the influenza vaccine is ineffective (Lee et al., 2005; Lester et al.; Mah et al.; Martinello et al., 2003; Takayanagi et al.). Many reasons cited centred around time, where respondents indicated a lack of time to obtain a vaccine (Mah et al.; Takayanagi et al.; Wodi et al., 2005); too busy to obtain a vaccine (Lester et al.); forgot (Martinello et al.; Takayanagi et al.; Toy et al., 2005); or the form of delivery of the vaccine was inconvenient (LaVela et al.; Lester et al.; Martinello et al.). Some reasons centred around the safety of the vaccine, and the respondents indicated a serious adverse event in the past (Takayanagi et al.); a belief that the vaccine causes influenza (Weir et al., 2004); or the belief that vaccine may harm one's health (Mah et al.). The last category of reasons for nonvaccination was the belief in one's health, where respondents felt that they are not in a high-risk group (Toy et al.); not at risk of influenza (Martinello et al.); are unlikely to get sick (Lester et al.; Toy et al.); and are not worried about getting the flu (McEwen et al.).

One final similarity noted in four studies about health care workers was that higher knowledge scores were significantly related to higher rates of vaccination (Martinello et al., 2003; Toy et al., 2005; Weir et al., 2004) or intentions of vaccination (Wodi et al., 2005).

CHAPTER 3: NEEDS ASSESSMENT

Introduction

In this section, an overview of the Regional Municipality of York is given. This section begins with an overview of geographic environmental forces. The demographic data, population trends, and education levels of the Regional Municipality of York are next presented. The economy and how health services are offered are discussed. Finally, culture, language, and immigration of the Regional Municipality of York are discussed.

Environmental Forces: Geography

In urban areas and villages, there are 1,371 people per square kilometre. In total, there is 1,756 square kilometres of land, with 34% of the land base designated as part of the Regional Greenlands System, 5% designated as protected Environmentally Significant Areas, and 37% designated as farmland (York Region Health Services, 2005). A map of the Regional Municipality of York can be viewed in Figure 2. The Regional Municipality of York has a mix of geographical forces.

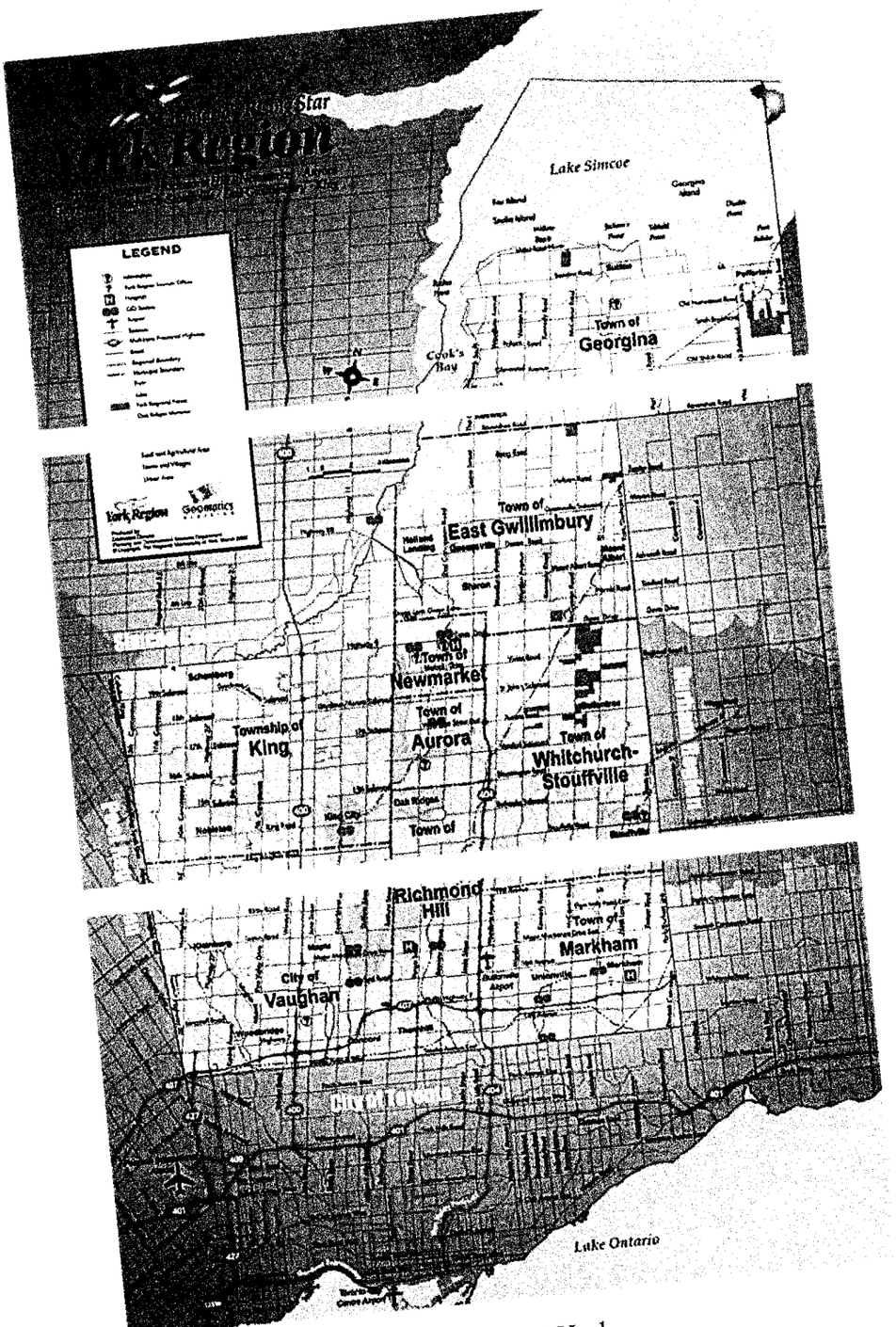

Figure 2. Map of the Regional Municipality of York.
From *York Region 2001 Annual Report*, by the Regional Municipality of York, 2002.

Demographic and Population Trends

The Regional Municipality of York is a rapidly growing region. As viewed in Table 1, according to Statistics Canada (2006), the population increased by 163,458 residents between 2001 and 2006. This was a 22.4% increase. The population of the Regional Municipality of York increased by 136,809 residents between 1996 and 2001. This was a 23.1% increase. When statistics for the Regional Municipality of York are compared to the average growth for the province of Ontario, with rates of 6.6% and 6.1%, the average growth rate for these 10 years is almost 4 times greater.

Table 1

Demographic Information

Characteristics	Regional Municipality of York	Ontario
Population in 2006	892,712	12,160,282
Population in 2001	729,254	11,410,046
Population in 1996	592,445	10,753,573
2001 to 2006 population change (%)	22.4	6.6
1996 to 2001 population change (%)	23.1	6.1
Land area (square km)	1,761.84	907,573.82

From *Community Profiles*, by Statistics Canada, 2006, Adapted – no further permission required from author.

The region has been growing by about 33,000 people per year for the past 5 years. When the age characteristics of the Regional Municipality of York are compared to the rest of Ontario, the Regional Municipality of York compared very similarly to the average for Ontario (see Table 2). For example, when the percentages of people ages 15 and over are compared, the Regional Municipality of York had 80.1% of its population in this age group, and Ontario had 81.1% of its total population aged 15 and older. The median age of individuals residing in the Regional Municipality of York is age 37.5, which is only slightly younger than the median age of Ontario residents, which is 39.0. In the Regional Municipality of York, there are 58,840 residents ages 20 to 24, which is

6.6% of the population, and in the province of Ontario, there are 797,255 residents in this same age group, which is also 6.6% of the total population. The age group 60 to 64 also compares very similarly. In the Regional Municipality of York, there are 37,455 residents, which is 4.2% of the population, and the province of Ontario has 581,985 residents, which is 4.8% of the population (see Table 3).

Table 2

Age Statistics for the Regional Municipality of York and Ontario

Characteristics	Regional Municipality of York			Ontario		
	Total	Male	Female	Total	Male	Female
Age characteristics of the population						
Total – All persons	892,710	437,500	455,210	12,160,285	5,930,700	6,229,580
Age 0-4	53,075	27,070	26,010	670,770	343,475	327,290
Age 5-9	58,585	30,070	28,520	721,590	369,670	351,920
Age 10-14	66,245	34,225	32,020	818,445	420,705	397,740
Age 15-19	67,635	34,930	32,705	833,115	427,185	405,925
Age 20-24	58,840	30,390	28,455	797,255	400,445	396,815
Age 25-29	50,250	24,330	25,920	743,695	360,525	383,170
Age 30-34	57,365	26,915	30,450	791,955	382,030	409,925
Age 35-39	70,035	32,980	37,050	883,990	430,220	453,770
Age 40-44	81,190	38,690	42,505	1,032,415	507,130	525,280
Age 45-49	77,930	37,515	40,415	991,970	486,390	505,585
Age 50-54	65,925	31,995	33,925	869,400	423,345	446,060
Age 55-59	56,255	28,020	28,240	774,530	378,530	395,995
Age 60-64	37,455	18,660	18,800	581,985	283,545	298,440
Age 65-69	29,580	14,555	15,025	466,240	222,640	243,600
Age 70-74	23,615	11,465	12,150	401,950	187,510	214,445
Age 75-79	17,930	8,070	9,860	338,910	149,585	189,325
Age 80-84	11,910	4,705	7,205	250,270	97,240	153,035
Age 85 and over	8,885	2,925	5,965	191,810	60,555	131,260
Median age of population	37.5	36.7	38.2	39.0	38.1	39.9
% population age 15 and over	80.1	79.1	81.0	81.8	80.9	82.7
Total population 15 and over	714,800	346,140	368,660	9,949,480	4,796,850	5,152,635
Never legally married (single)	207,085	109,255	97,825	3,143,960	1,662,930	1,481,025
Legally married (and not separated)	424,990	211,940	213,045	5,168,660	2,585,115	2,583,545
Separated, but still legally married	16,660	6,680	9,925	345,075	150,090	194,980
Divorced	32,950	12,450	20,500	679,990	283,150	396,840
Widowed	33,175	5,810	27,365	611,805	115,565	496,235

From *Community Profiles*, by Statistics Canada, 2006, Adapted – no further permission required from author.

Education

The Regional Municipality of York generally has a higher level of education than the rest of Ontario (see Table 3). According to Statistics Canada (2001) data, only 8.9% of the population of the Regional Municipality of York ages 20 to 34 has less than a high school graduation certificate, compared to 13.2% of the Ontario population. In the Regional Municipality of York, 32.8% of the population ages 20 to 34 has a university certificate, diploma, or degree, compared to 25.7% of all Ontarians. This trend also continues for the population ages 35 to 44 and the population ages 45 to 64, with the following corresponding percentages noted of 33.3 % and 27.2% for the Regional Municipality of York and 24.3 % and 21.5% for all of Ontario.

Table 3

Highest Level of Education

	Regional Municipality of York			Ontario		
	Total	Male	Female	Total	Male	Female
Ages 20 to 34						
Total population	142,110	69,910	72,205	2,263,910	1,112,910	1,150,995
% population > high school graduation certificate	8.9	10.8	7.0	13.2	14.9	11.5
% population with high school graduation certificate and/or some postsecondary	32.7	35.0	30.5	33.7	36.1	31.5
% population with trades certificate or diploma	6.7	8.2	5.2	7.9	9.6	6.2
% population with college certificate or diploma	19.0	16.9	21.0	19.5	16.5	22.4
% population with university certificate, diploma or degree	32.8	29.2	36.3	25.7	23.0	28.4
Ages 35-44						
Total population	132,215	62,520	69,700	1,949,840	954,260	995,580
% population > high school graduation certificate	12.6	13.1	12.2	17.3	18.8	16.0
% population with high school graduation certificate and/or some postsecondary	24.1	21.7	26.2	25.6	23.7	27.5
% population with trades certificate or diploma	9.0	11.5	6.7	11.5	15.0	8.2
% population with college certificate or diploma	21.1	18.8	23.1	21.2	18.0	24.3

% population with university certificate, diploma or degree	33.3	35.0	31.8	24.3	24.6	24.1
Ages 45-64						
Total population	176,715	87,945	88,775	2,684,705	1,311,380	1,373,325
% population > high school graduation certificate	24.2	22.0	26.2	27.5	26.5	28.4
% population with high school graduation certificate and/or some postsecondary	22.3	18.0	26.5	22.9	19.9	25.7
% population with trades certificate or diploma	10.2	13.6	6.9	11.6	15.8	7.7
% population with college certificate or diploma	16.2	14.8	17.6	16.6	13.8	19.2
% population with university certificate, diploma or degree	27.2	31.7	22.7	21.5	24.0	19.0

From *Community Profiles*, by Statistics Canada, 2001. Adapted – no further permission required from author.

Economic Data

The Regional Municipality of York is prosperous region. It had a Gross Domestic Product (GDP) of $33.2 billion in 2002. The economy is larger than that of any of the Atlantic provinces in Canada. The total exports of the Regional Municipality of York exceed those of six Canadian provinces (Essential Economics Corporation Community Benchmarks, 2004).

Individuals in the municipality generally have more income than the average Ontarian (see Table 4). The median total income of persons ages 15 years and over is $28,566 for the Regional Municipality of York, which is 15% more than the average of $24,816 for Ontario. The average wage for individuals working a full year full time in the Regional Municipality of York is $54,210, which also is 15% more when compared to $47,299 for Ontario. The unemployment rate was 4.5% for the Regional Municipality of York compared to the Ontario average of 6.1% (Statistics Canada, 2001). These results indicated that more individuals from the Regional Municipality of York are working and making more money than the average Ontarian.

Table 4

Earnings and Income in 2001

	Regional Municipality of York			Ontario		
	Total	Male	Female	Total	Male	Female
Average earnings ($)	40,892	50,222	30,728	35,185	42,719	26,894
Average earnings ($) - Worked full year, full time	54,210	62,690	42,326	47,299	53,937	37,962
Median total income of persons ≥ 15 yrs ($)	28,566	-	-	24,816	-	-
Unemployment rate (%)	4.5	-	-	6.1	-	-

From *CommunityProfiles*, by Statistics Canada, 2001. Adapted – no further permission required from author.

Health Services

Physician statistics are changing. There are 27,148 active members of the College of Physicians and Surgeons of Ontario according to statistics for 2004. The average age of practicing physicians is 51, up from 49 years in 2000. In 2004, 16.5% of family physicians accepted new patients; in 2000, 39% were accepting new patients. The Regional Municipality of York has 505 family practitioners, or 6.5 physicians per 10,000 population. The Regional Municipality of York ranks 36 out of the 49 health regions/and counties in Ontario. Frontenac ranks 1st, with 14 family physicians per 10,000, and Sudbury ranks 49th, with 4.3 family physicians per 10,000 patients. The Ontario average is 8.4 family physicians per 10,000 individuals (Chan & Schultz, 2005). These statistics indicated that the Regional Municipality of York is below the provincial physician average.

The Regional Municipality of York provides influenza immunization services for its residents. In 2005, 22,174 individuals were immunized for influenza in these clinics. There were 35 advertised clinics for the general public and 16 nonadvertised clinics for special groups such as the elderly and police (York Region Health Services, 2005). In

2003-2004, approximately 5.52 million doses of vaccine were administered, for a coverage rate of 44% of all Ontarians. In Ontario, during the period 2002 to 2003, 61.4% of respondents in an Ontario study indicated receiving their flu shot in a doctor's office, and 5.5% in public health units (Kurji, 2004).

Culture, Language, and Immigration

In the Regional Municipality of York, there are many different languages spoken. The municipality has 53.3% of its residents claiming their first learned language as English, with 45.7% of its residents claiming to have another language as their first learned language. Ontario has very different statistics, with 68.4% of its residents claiming English as the first learned language and 27.2% of its residents claiming to have another language as their first learned language (Statistics Canada, 2006).

Ontario has a higher percentage of Canadian-born population at 70.8%, compared to the Regional Municipality of York at 56.3% of the population (Statistics Canada, 2006). Visible minorities account for 29.8% of the Regional Municipality of York's population, compared to 19.1% of Ontario's population. Of the 481,510 Chinese individuals in Ontario, 100,710, or one fifth, reside in the Regional Municipality of York (Statistics Canada, 2001).

Summary

A review of the Regional Municipality of York was conducted. An overview of geographic environmental forces was presented. The demographics of the Regional Municipality of York are different from those of the province of Ontario, with higher rates of growth noted for the Regional Municipality of York. The municipality also has higher levels of education that the province of Ontario. The GDP of the Regional

Municipality of York in 2002 was $33.2 billion. The average earnings rates for the municipality also are higher than the average earnings rates for the province of Ontario. The Regional Municipality of York has a low rate of physicians per population. Finally, it has higher rates of visible minorities compared to the province of Ontario. Of particular note is that one fifth of all Chinese Ontarians reside in the Regional Municipality of York.

CHAPTER 4: RESEARCH METHOD

Research Design

A descriptive exploratory survey design was utilized to amass quantitative and qualitative data about individuals who attended and received an influenza immunization at clinics sponsored by the Regional Municipality of York Health Services Department Infectious Diseases Control Division. The survey included questions about knowledge, attitudes, and beliefs about influenza and the influenza vaccine.

The central focus of descriptive research is to examine facts about people and their corresponding attitudes and opinions. The purpose of descriptive research is to draw attention to the degree to which two events or phenomena are related (Merriam & Simpson, 2000). According to Bradley, Curry, and Devers (2007), "Qualitative research is well suited for understanding phenomena within their context, uncovering links among concepts and behaviors, and generating and refining theory" (p. 1759). Descriptive research was chosen for this study because one of the aims of the study was to determine attitudes and beliefs about influenza and the influenza vaccine. Six significant characteristics are emphasized in qualitative research, according to Streubert Speziale and Carpenter (2007):

> A belief in multiple realities, a commitment to identifying an approach to understanding that supports the phenomenon studied, commitment to the participant's viewpoint, conduct of inquiry in a way that does not disturb the natural context of the phenomena of interest, acknowledged participation of the researcher in the research, and the reporting of the data in a literary style rich with participants commentaries. (p. 21)

Exploratory research is utilized when there is not an earlier model to use as a basis of one's study. Sometimes, an earlier model may be utilized, but in a different context. Other reasons for not using a previous model include the need to not restrict the

description of the topic, the chosen study does not fit existing theories, to further explore and understand phenomena, and distrust of earlier descriptions and explanations (Pentti, 2007). The population attending the Regional Municipality of York Health Services Department influenza immunization-sponsored clinics has not been studied before. The attitudes, knowledge, and beliefs about influenza and the influenza vaccine of the general public attending clinics also have not been studied before. As demonstrated in the literature review, very few studies had a qualitative component to their research. Explorative research was determined to be an appropriate choice for this research.

Setting

The varied settings for this research included the Regional Municipality of York Health Services Department influenza immunization clinics located in community centers, shopping malls, seniors' centres, and municipally owned buildings. A total of 33 immunization clinics were run from November 18 to December 18 of 2006. Surveys were distributed in all but two areas within the municipality. Surveys were completed in clinics held within the communities of East Gwillimbury, Georgina, Markham, Newmarket, Richmond Hill, Vaughan, and Whitchurch Stouffville. Surveys were not completed in the community of Aurora or the township of King. This setting or field was chosen to maintain a natural setting where the phenomenon (immunization) occurred. The researcher was not in control of this setting. The participants decided which information they wished to share. The researcher was able only to make a first impression with the participants. Qualitative research methods require good interpersonal skills and a willingness to relinquish control. Given the fast pace of the setting and the short contact period with each participant, there was the possibility that this did not occur.

Sample

The sample included 1,101 male and female adults all age 18 or older. The researcher attended the middle third of 15 clinics. In the fall of 2006, the Regional Municipality of York Health Services Department immunized 12,476 individuals at 33 clinics. In total, 7,564 individuals were immunized at the 15 researcher-attended clinics, resulting in a response rate of 14.6% of participants who were willing to complete the survey. The lowest response rate at a clinic was 4.9%, and the highest response rate at a clinic was 26%. The actual response rate was probably much higher (approximately 3 times higher) because only the middle third of clinics were attended by the researcher.

Nonprobability sampling was employed in this study. A convenience sample was used to recruit the participants for this study. This method of obtaining the sample was chosen because the participants were selected in part or in whole at the convenience of the researcher. No attempt or only a limited attempt was made by the researcher to ensure that the sample represented an accurate representation of a larger population. Representativeness of the population could not be made, which diminished the researcher's ability to generalize the findings beyond the sample studied. There was the risk of drawing incorrect conclusions if any attempts had been made to draw conclusions about the broader general population based on this sample. This method was chosen because it is less expensive and less complicated than other methods. Explorative research lends itself to nonprobability sampling techniques, which allows for an impression of the range of responses from the participants.

Data Collection

Each individual arrived at the clinic and picked up and completed a consent form for influenza immunization from a clerk. The consent contained information about the vaccine and questions to determine the individual's eligibility for vaccination. There were four sections in the clinic: the consent area, the waiting area, the immunization area, and the recovery area. After the consent was completed, the individual waited in line for an influenza vaccination. After waiting in line, the individual was taken by a nurse into the immunization area, who reviewed the consent and determined eligibility for the influenza vaccine with the individual. Eligibility for the influenza vaccine was assessed by the nurse by determining contraindications to influenza vaccination, such as previous history of an allergy to the vaccine, allergy to components in the vaccine, presence of underlying medical conditions that may be contraindicated to vaccination, inappropriate age of the individual, and women in their first trimester of pregnancy. If eligible, the individual was vaccinated. The nurse then recommended that the individual proceed to the recovery area to be monitored for 10 to 15 minutes to ensure that the individual did not have any adverse reactions to the vaccine. This process is illustrated in Figure 3.

Figure 3. Influenza clinic procedure.

For this study, the participants were asked to volunteer to complete a questionnaire by the researcher after receiving an influenza immunization en route to the recovery area of the influenza clinic. The participants were asked to read a cover letter (see Appendix A), sign a consent form (see Appendix B), and then complete the survey

(Appendix C). A survey was utilized because it is time efficient, easy to administer, allows for large sample sizes, and is low cost. The survey used in this study took approximately 10 minutes to complete. The survey was given to individuals ages 18 and over. Individuals who could not read English were excluded from the study. The participants were assured that the data would remain confidential and secure. The participants were informed that their participation was voluntary and that they were free to withdraw from the study at any time.

Survey Instrument

To collect the data, the researcher utilized a descriptive exploratory survey. Survey research involves recording, describing, analyzing, and interpreting conditions that currently exist. The results reveal what is happening in a particular setting (Neutens & Rubinson, 2001). The survey utilized in this study was developed by the researcher based on a review of surveys published in current literature as well as the beliefs incorporated in the HBM. Several of the questions contained in the survey were similar to questions asked by Lee et al. (2005) and Martinello et al. (2003).

The survey is divided into three sections. The first section of the survey contains primarily demographic data, including gender, age, marital status, ethnicity, highest level of education obtained, yearly income, and employment status. The second section of the survey contains information about an individual's knowledge, attitudes, and beliefs about the disease influenza and influenza vaccination. These questions are answered on a 5-point Likert scale from *strongly agree* to *strongly disagree*. There also are questions regarding views about children and health professionals. To obtain a more comprehensive

description about the knowledge, attitudes, and beliefs of individuals, three open-ended questions also are asked to obtain qualitative information.

Validity and Reliability

Validity is the strength of the conclusions or propositions. It is the degree to which an instrument accurately reflects the concept that the researcher is attempting to measure. There are two types of validity that concern researchers: external and internal validity. Neutens and Rubinson (2001) defined internal validity as "control for all influences between the groups being compared in an experiment, except for the experimental groups" (p. 82). Internal validity is difficult to achieve because there are often many extraneous variables to control. As one attempts to control internal validity, external validity can be influenced. External validity refers to the ability to generalize the results of the study to other settings.

Internal threats to validity relevant to this study included the following:

1. *History*, which is defined as those events that occur at the same time as the study. These events can be unrelated to the study and can interfere with the individual's performance in the study (Neutens & Rubinson). It is possible that individuals in the study heard about influenza and the influenza vaccine in the media in either positive or negative viewpoints near the time of completing the survey.
2. *Differential selection*, which occurs when there is bias in choosing individuals for group selection (Neutens & Rubinson). There could have been differential selection in this research because not all individuals who were approached agreed to complete the survey. The generalizability of

the findings of this research may need to be limited to the sample of individuals utilized for the survey.

3. *Contamination*, which also can be a threat to internal validity (Neutens & Rubinson). This occurs when the researcher had previous knowledge about the individuals in the experiment. A researcher could inadvertently give hints to the individuals in the sample. This could have occurred in this study because there were many staff working at the clinic who had knowledge of the survey contents.

External threats to the validity of this study included the following:

1. *Population validity*, which is the extent to which the results of a study can be generalized from the specific sample that was studied to a larger population (Neutens & Rubinson). A convenience sample was utilized for this study; therefore, the results should be generalized beyond the sample with caution.

Reliability is the consistency and repeatability of the measurement, or the extent to which an experiment, test, or instrument measures the same way each time it is utilized under the same conditions.

A consideration for reliability includes the following:

1. *Inter-Observer Reliability*, or inter-rater reliability, is used to assess the degree to which different raters give consistent estimates of the same phenomenon (Neutens & Rubinson, 2001). An expert panel of 10 individuals working in the infectious disease field examined the survey. The expert panel answered the nine knowledge questions, and a

correlation was computed to ensure that the answers were consistent. All members of the expert panel had the same responses to the nine knowledge questions.

Rigor of the Work

In qualitative research, Streubert Speziale and Carpenter (2007) suggested that the following operational techniques can be used to support the rigor of the work: credibility, dependability, confirmability, and transferability.

Credibility refers to the activities that can increase the probability that credible findings will be produced. One way to do this is through prolonged engagement with the participants. Another way is to see if the participants recognize the findings of the study to be true to their own experiences, also called member checking. For this study, it was not possible to have prolonged engagement with the participants or do member checking. Interpretations of the data will be brought to a group of individuals receiving an influenza immunization (who may or may not have completed the study) at another influenza immunization clinic, and they will be asked their opinions about the conclusions obtained in this study.

Dependability is a criterion met once credibility has been demonstrated. Triangulation methods can contribute to the dependability of the findings. Triangulation is the use of multiple approaches (e.g., data, investigators, theories, and methods) in research. The strengths of one approach can help to compensate for the weaknesses of another approach. This strategy also is used to ensure the completeness of the findings or to confirm the findings. For this study, qualitative and quantitative data were collected and analyzed. Multiple sources of literature were used, including research journals and

books. The researcher and two assistants (university graduates) analyzed the data. Input from colleagues also was obtained.

Confirmability is an audit trail of the recording of the activities that other researcher can follow. This is done to show the evidence and thought processes that led the researcher to reach conclusions. In this study, all of the processes were documented, organized, and categorized.

Transferability refers to the ability of the findings to have meaning to others in similar situations. The results of this study will be shared with interested groups, including staff in the Infectious Diseases Control Division of the Regional Municipality of York working in both influenza immunization clinics and clinics for other immunizations, and interested members of the public.

Data Analysis

Qualitative and quantitative data were collected from this survey. The quantitative data were entered into a database spreadsheet and analyzed with SPSS. The data were first analyzed by running descriptive statistics and frequencies on each of the questions. This technique was helpful for examining the variability of the data, describing the sample, and checking statistical assumptions before performing more complex analysis.

A knowledge score was determined next by adding up the correct responses for the first nine questions (reverse scoring for Question 6). Scores for three categories were obtained, including the total score for all nine questions, influenza disease score (the first four questions), and influenza vaccine score (the next five questions). One point was added for each correctly answered statement, and no points were added for incorrectly answered statements. The influenza disease category had a maximum score of 4, and the

influenza vaccine category had a maximum score of 5, resulting in a combined total maximum of 9.

To determine differences between groups, the *t* test was utilized. Differences of $\leq .05$ were considered significant. The predictor variables were reclassified into dichotomous variables so that an OR could be calculated. The total knowledge score was converted into high and low knowledge scores. High scores were greater than or equal to the median knowledge score; low scores were lower than the median knowledge score. A logistic regression was conducted to determine if any of the variables had a significant, unique contribution relative to the other variables to predict knowledge of influenza and knowledge about the influenza vaccine.

Qualitative analysis was conducted on the three open-ended questions in the third part of the survey. According to Bradley et al. (2007), to conduct qualitative analysis, the entire dataset should be read and then coded. Coding provides a formal system to organize the data and determine any links between or within concepts. Coding includes the development, finalization, and application of the code structure. During development of the code structure, it is important to have a clear, well-designed, and comprehensive code structure. The codes and code structure are considered finalized at the point of theoretical saturation, which is when no new concepts are being uncovered or emerging. The final step is applying the finalized code structure. The researcher and two assistants reviewed 50 surveys independently and then compared the coding results. A few minor discrepancies were discussed until all three individuals were in agreement. The researcher continued independently for the remainder of the surveys.

According to Bradley et al. (2007), three types of results can be obtained from qualitative studies: taxonomy, themes, and theory. They commented:

> Taxonomy is a system for classifying multifaceted, complex phenomena according to common conceptual domains and dimensions. Themes are general propositions that emerge from diverse and detail-rich experiences of participants and provide recurrent and unifying ideas regarding the subject of inquiry. Theory emphasized the nature of correlative or causal relationships, often delving into the systematic reasons for the events, experiences and phenomena of inquiry. Theory predicts and explains phenomena. (p. 1758)

The results obtained from the qualitative data were analyzed with reference to taxonomy, themes, and theory.

Ethical Review

An application to the Ethics Review Board at Lakehead University was obtained. This process included submitting an application regarding the intent of the research and an explanation how the research would meet ethical requirements including, but not limited to, assurance of confidentiality, consent to participation, and storage of data. An online ethics course was completed. Approval also was obtained from the Regional Municipality of York Health Services Department.

CHAPTER 5: RESULTS

Demographics

In the fall of 2006, the Regional Municipality of York Health Services Department immunized 12,476 individuals in 33 clinics. The sample of 1,101 participants consisted of 625 females (56.8%) and 462 males (42%). Fourteen participants did not specify their gender. The demographic information about age, education, employment, marital status, income, and ethnicity is presented in Table 5 and is discussed next.

Table 5

Demographic Information of Participants

Demographic	Total	Frequency (%)
Age (years)		
< 20	201	(18.3)
21-25	43	(3.9)
26-30	33	(3.0)
31-35	72	(6.5)
36-40	116	(10.5)
41-45	128	(11.6)
46-50	110	(10.0)
51-55	95	(8.6)
56-60	96	(8.7)
61-65	83	(7.5)
66-70	48	(4.4)
71-75	39	(3.5)
75-80	22	(2.0)
> 80	12	(1.1)
N/A	3	(.3)
Gender		
Male	462	(42.0)
Female	625	(56.8)
N/A	14	(1.3)
Marital status		
Divorced	50	(4.5)
Married or common-law	697	(63.6)
Single	300	(27.2)
Separated	5	(.5)
Widowed	45	(4.1)
N/A	4	(.4)
Income		
0-$30,000	382	(34.7)
$30,001-60,000	246	(22.3) Table 5 cont'd

$60,000-90,000	191	(17.3)
$90,000 and up	161	(14.6)
N/A	121	(11.0)
Education		
Less than high school	189	(17.2)
High school completed	167	(15.2)
Some college or university	126	(11.4)
College diploma	151	(13.7)
University undergraduate degree	336	(30.5)
University Masters Degree	100	(9.1)
University doctorate degree	15	(1.4)
N/A	17	(1.5)
Ethnicity		
Canadian	511	46.4
Chinese	215	19.5
English	44	4.0
Jewish	37	3.4
East Indian	28	2.5
Italian	23	2.1
German	13	1.2
Other	178	16.2
N/A	52	4.7
Employment		
Full-time	459	(41.7)
Part-time	191	(17.3)
Not presently employed	433	(39.3)
N/A	18	(1.6)

$N = 1,101$

Demographics of the Sample

Age. The participants ranged in age from less than 20 to over 80. The ages were grouped into categories. The age group with the highest percentage of participants was 20 and younger (18.3%), followed by the 41-45 (11.6%), 36-40 (10.5%), and 46-50 (10.0%) age groups, respectively.

Education. The majority of the participants (54.7%) had completed postsecondary education training. Only 17.2% of them had less than a high school education.

Employment. Most of the participants were employed (59%) either full-time (41.7%) or part-time (17.3%). It was indicated by 39.3% of the individuals that they were not employed, although it should be noted that 45.5 % of individuals were ages 20 and younger or 56 and older.

Marital status. Over half (63.3%) were married or living common-law, and 27.2% were single.

Income. Incomes earned by the participants were grouped into $30,000 categories: under $30,000 (34.7%), $30,001-60,000 (22.3%), $60,001-90,000 (17.3%) and over $90,000 (14.6%). It was interesting to note that 11% of the participants did not answer this question. This also was the question that most of the participants did not answer out of all of the questions on the questionnaire.

Ethnicity. Most participants identified themselves as Canadian (46.5%). This was followed by Chinese (21.2%). When two ethnicities were selected, if one of the ethnicities selected was Canadian, then the other ethnicity was chosen as the dominant ethnicity. Only the seven most common ethnicities identified are listed. Some ethnicities may have had an underrepresentation because only the top 20 ethnic origins in the Regional Municipality of York were included in the survey and some participants may have self-identified as Canadian.

Comparison of Demographic Information to Census Canada Data

To strengthen the potential generalizability of this research, the demographic characteristics of the sample were compared to the demographic characteristics of the Regional Municipality of York. Table 6 shows a breakdown of the age groups of the study participants and comparisons with attendance at the 15 Regional Municipality of

York influenza immunization clinics included in the study, the Regional Municipality of York's population, and Ontario's population from the Statistics Canada (2001) census. Individuals ages birth to 17 were not eligible to complete the questionnaire, so this was taken into consideration when making comparisons between the groups. In addition, age group categories were different for each statistical database. For example, the Regional Municipality of York collected information for individuals ages 6 months to 18 years old, whereas the Statistics Canada age group category was from birth to 19.

Table 6

Age Group Comparison

Influenza study		The 15 Regional Municipality of York clinics		The Regional Municipality of York population		Ontario population	
Total	%	Total	%	Total	%	Total	%
Age < 20		Age 0.5 to 18		Age 0-19		Age 0-19	
201	18.3	2,681	35.8	210,500	28.9	2,218,285	20.9
Age 21-65		Age 19-64		Age 20-64		Age 20-64	
776	70.4	4,106	54.1	452,460	62.0	6,935,725	65.3
Age ≥ 66		Age ≥ 65		Age ≥ 65		Age ≥ 65	
121	11.0	777	10.3	66,300	9.1	1,472,175	13.8
N/A							
3	.3						
Totals		Totals		Totals		Totals	
1101	100.0	7564	100.0	729,255	100.0	10,626,185	100.0

From *Community Profiles* by, Statistics Canada (2006).

A comparison between groups when the children are not included is shown in Table 7. Although the age groups were slightly different, these statistics indicated that the influenza study sample was very similar to the age groups population at the 15 Regional Municipality of York clinics. When children are not included in the statistics, 13.5% of participants in this study were over age 65. Statistics collected by the Regional Municipality of York Health Services Department indicated that 16% of participants were age 65 and over at the clinics. In the Regional Municipality of York, 12.8% of residents are ≥ 65; in Ontario, 17.5% of residents are ≥ 65.

Table 7

Age Group Comparisons When Children Are Removed

Influenza study		15 Regional Municipality of York clinics		The Regional Municipality of York population		Ontario population	
Total	%	Total	%	Total	%	Total	%
Age 21-65		Age 19-64		Age 20-64		Age 20-64	
776	86.5%	4082	84%	452,460	87.2	6,935,725	82.5%
Age ≥ 66		Age ≥ 65		Age ≥ 65		Age ≥ 65	
121	13.5%	777	16%	66,300	12.8%	1,472,175	17.5%
Totals		Totals		Totals		Totals	
897	100.0%	4859	100.0%	518,760	100.0%	8,407,900	100.0%

From *Community Profiles* by, Statistics Canada (2006).

Gender comparisons were made with the Regional Municipality of York Health Services Department clinic data, the Regional Municipality of York, and the province of Ontario. In this study, 56.8% of participants were females, and 42% were males, with 1.2% unspecified. Data from the Regional Municipality of York Health Services Department 15 clinics indicated that 53.7% of attendants were female and 46.3% of attendants were male. The Regional Municipality of York Health Services Department did not provide gender and age subgroup breakdowns. In the Regional Municipality of York, 50.7% of its residents are female, and 49.3% of its residents are male, which compares very similarly to Ontario statistics, where 51.1% of residents are female and 48.9% of residents are male. These statistics indicated that more females than males attend the clinics.

In this study, 53.3% of the participants had a university degree or higher. According to Statistics Canada (2006), 32.8% of the population ages 20 to 34 have a university certificate, diploma, or degree; 33.3% of the population ages 35 to 44; and 27.2% of the population ages 45 to 64. The corresponding results for the province of

Ontario are 25.7%, 24.3%, and 21.5%, respectively. These results suggested that university degrees were overrepresented in this study.

This study did not have a sample representative of the ethnic diversity of the Regional Municipality of York. According to Statistics Canada (2006), 20.2% of residents indicate their ethnic origin as Canadian. In this study, 46.5% of the participants claimed to be Canadian. Chinese was also overrepresented, with Statistics Canada showing 14.3% and this study showing 19.5%. The overrepresentation of Chinese could have been because the Regional Municipality of York Health Services Department specifically targetted some advertising of clinics to Chinese individuals, with one clinic being held at the Chinese Health Fair.

Other Health-Related Information About the Sample

Other health related information was collected about the sample. This information is presented in Table 8 and is discussed following the table.

Table 8

Other Health Information

Individuals in home residence under age 2	Total	%
Yes	66	6.0
No	1027	93.3
N/A	8	0.7
Presence of underlying diseases or conditions		
Yes	98	8.9
No	999	90.7
N/A	4	0.4
Presence of underlying diseases or conditions in household member		
Yes	188	17.1
No	900	81.7
N/A	13	1.2
Family physician opinion of influenza immunization		
Yes	806	73.2
No	59	5.4
Don't know	195	17.7
Do not have a family physician	33	3.0
N/A	8	0.7
Health care worker occupation		
Yes	73	6.6
No	1018	92.5
N/A	10	0.9
Influenza immunization intentions		
Yes	1080	98.1
No	10	0.9
N/A	11	1.0
Influenza immunizations		
1	51	4.6
2	120	10.9
3	153	13.9
4	232	21.1
5	152	13.8
6	78	7.1
7 or more	305	27.7
N/A	10	0.9

$N = 1,101$

Individuals in the home residence under age 2. The majority of the participants (93.9%) indicated that there were not any individuals age 2 or younger at home.

Presence of underlying diseases or conditions. Very few individuals (8.9%) indicated that they had heart disease, lung disease, diabetes, cancer, kidney disease, immunodeficiency, immunosuppression, anemia, or hemoglobinopathy.

Presence of underlying diseases or conditions in a household member. It was indicated by 17.1% of the participants that there was someone living in the household who had one or more of the following conditions: heart disease, lung disease, diabetes, cancer, kidney disease, immunodeficiency, immunosuppression, anemia, or hemoglobinopathy.

Family physician opinion. It was noted that 73.2% of the participants have physicians who recommend the flu shot. Only 5.4% of the participants have physicians who do not recommend the flu shot, and 17.7% of the participants do not know if their family physician recommends the flu shot. A total of 3% of participants do not have a family physician.

Occupation as a health care worker. Health care workers made up 6.6% of the study sample.

Total influenza immunizations and future intentions. Most participants had received more than one flu shot (94.5%) in their lifetime. Over one quarter of the participants (27.7%) had been given seven or more flu shots in their lifetime. These statistics suggested that the vast majority of individuals attending the Regional Municipality of York Health Services Department-sponsored influenza immunization clinics have a history of flu shots. In addition, 98.1% of the participants indicated that they are planning on getting a flu shot next year.

Opinions About Health Professionals

The participants most strongly agreed with the statement that all health professionals should get a flu shot (58.2%), and a total of 92.3% of participants either agreed or strongly agreed with this statement. The participants also agreed with the

statement that health professionals can spread influenza to their patients (44.1%). A total of 85.2% of the participants either strongly agreed or agreed with this statement. One tenth of the participants (11.1%) were neutral on this question. Table 9 shows the percentages of responses for each of the opinions about health professionals.

Table 9

Opinions About Health Professionals

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	N/A
I think that all health professionals should get a flu shot.	58.2	34.1	6.3	0.4	0	1.1
I think that health professionals can spread influenza to their patients.	41.1	44.1	11.1	2.2	0.6	1.0

$N = 1,101$

Opinions About Children

A total of 80.2% of the participants either agreed or strongly agreed that the flu shot is safe for children. Less than 1% of participants disagreed with this statement (0.9%). Two thirds of the participants (66.8%) either agreed or strongly agreed that flu shots should be mandatory for all school-aged children. This statement had the most neutral responses from the participants (25%) and the most respondents who disagreed or strongly disagreed with an opinion statement about children (6.8%). Most participants (88.4%) agreed or strongly agreed that they would recommend the flu shot for their own children. Very few participants disagreed or strongly disagreed with this statement (1.9%). The responses are shown in Table 10.

Table 10

Opinions About Children

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	N/A
I think the flu shot is safe for children.	20.7	59.5	16.7	0.7	0.2	2.2
I think that flu shots should be mandatory for all school-aged children.	23.4	43.4	25.0	5.4	1.4	1.4
I would recommend the flu shot for my children (or if I had children).	35.5	52.9	8.2	1.5	0.4	1.5

N = 1,101

Opinions About Influenza

When asked if they thought that they knew a lot about the disease influenza and the flu shot, many of the participants chose to be neutral on this question (40.7%). Of all the Likert scale questions, this question received the most neutral responses. A further 44% either strongly agreed or agreed with this statement, and 14% of the participants disagreed or strongly disagreed with this statement.

Most of the participants (89.6%) agreed or strongly agreed that there are far more benefits than risks to the flu shot. Only 8.6% answered neutral to this statement, and only 1 person disagreed or strongly disagreed with this statement.

Just over half of the participants (52.2%) agreed or strongly agreed that a lot of false information about the flu shot has been disseminated. One tenth of the participants (11%) disagreed or strongly disagreed with this statement, and one third (35.1%) chose to answer neutral to this statement. The majority of respondents were in favour of the flu shot, and 91.9% of the participants agreed or strongly agreed with this statement. The responses to the statements are shown in Table 11.

Table 11

Opinions About Influenza

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	N/A
I think that I know a lot about the disease influenza and the flu shot.	7.4	36.6	40.7	12.5	1.5	1.3
I think that there are far more benefits of the flu shot than risks.	26.9	62.7	8.6	0.4	0	1.5
I think that there is a lot of false information being spread about the flu shot.	12.5	39.7	35.1	10.5	0.5	1.5
I am generally in favour of the flu shot.	33.0	58.9	6.8	0.5	0.1	0.7

$N = 1,101$

Knowledge About the Disease Influenza

The majority of participants either strongly agreed or agreed with the influenza knowledge statements. The results are shown in Table 12. A total of 91.2% of participants agreed or strongly agreed that influenza can be a serious illness. This was the influenza knowledge statement that had the highest percent of agreement. For the next statement, 87.3% of the participants agreed or strongly agreed that some people get serious complications from getting influenza. A total of 87% agreed or strongly agreed that the influenza virus is very contagious. Finally, 85.5% of the participants agreed or strongly agreed that if infected with influenza, they are likely to transmit the disease influenza to other people.

Table 12

Knowledge About the Disease Influenza

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	N/A
I think that influenza can be a serious illness.	36.2	55.0	5.8	1.8	0.5	0.6
I think that some people get serious complications from getting influenza.	35.8	51.5	8.1	3.1	0.9	0.6
I think the influenza virus is very contagious.	38.0	49.0	9.2	1.4	0.5	1.9
If infected with influenza, I am likely to transmit influenza to other people.	31.8	53.7	11.0	2.0	0.7	0.8

$N = 1101$

Knowledge About the Influenza Vaccine (Flu Shot)

Five statements addressed knowledge about the influenza vaccine. Most participants (91.1%) strongly agreed or agreed that the flu shot has been carefully tested and is safe for the general public. Almost one fifth of the participants think that it is possible to get influenza from the flu shot. A further 20.3% of the participants were neutral on this topic, and only 59.1% disagreed or strongly disagreed with this statement. Note that this statement was scored in the opposite direction from the others. A total of 85.8% of the participants agreed or strongly agreed that the flu shot is very effective in preventing influenza. Most participants (91.6%) believed that getting the flu shot is important to protect other people. This statement had the highest level of agreement among the participants for the influenza vaccine knowledge statements. Finally, 83.5% of the participants strongly agreed or agreed that in general, there are very few adverse reactions to the flu shot. Table 13 shows the percentages of responses.

Table 13

Knowledge About the Influenza Vaccine (Flu Shot)

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	N/A
I think that the flu shot has been carefully tested and is safe for the general public.	31.2	59.9	7.9	0.5	0	0.5
I think it is possible to get influenza from the flu shot.	2.2	17.6	20.3	38.9	20.2	0.8
I think the flu shot is very effective in preventing influenza (when properly matched to the circulating strains).	22.1	63.7	12.0	0.9	0.2	1.2
I think that getting the flu shot is important to protect other people.	36.2	55.4	6.5	1.2	0.2	0.5
I believe that in general there are very few adverse reactions to the flu shot.	17.6	65.9	13.5	1.6	0.2	1.1

$N = 1101$

The data for these questions were combined to create a knowledge score. If the participant correctly indicated strongly agree/agree (strongly disagree/agree to Question 6) to the statement, a score of 1 was awarded. A score of 0 was awarded for incorrect, neutral, or missing responses. Less than one fifth (18.4%) of the participants had a score of 6 out of 9 or lower, and 66.4% of the participants scored 8 or higher. The total number of questions correct is shown in Table 14. The mean score was 7.62, the median score was 8.00, and the standard deviation was 1.549.

Table 14

Total Number of Influenza and Influenza Vaccine Knowledge Questions Correct

Total number of questions correct	Frequency	%	Cumulative %
0	5	.5	.5
1	1	.1	.5
2	6	.5	1.1
3	14	1.3	2.4
4	29	2.6	5.0
5	54	4.9	9.9
6	94	8.5	18.4
7	167	15.2	33.6
8	361	32.8	66.4
9	370	33.6	100.0
Total	1101	100.0	

Separate subscores also were created for knowledge about influenza disease (four questions) and knowledge about the influenza vaccine (five questions). For knowledge about influenza disease, 69.4% of individuals scored 4 out of 4. The mean was 3.51, the median was 4.00, and the standard deviation was 0.873. For knowledge about the influenza vaccine, 79.3% of individuals had a score of 4 or higher out of 5. Only 44.2% of individuals scored 5 out of 5. The mean was 4.11, the median was 4.00, and the standard deviation was 1.048. Tables 15 and 16 contain the total number of questions answered correctly, along with the corresponding percentages.

Table 15

Number of Influenza Knowledge Questions Correct

Total number of questions correct	Frequency	%	Cumulative %
0	17	1.5	1.5
1	29	2.6	4.2
2	93	8.4	12.6
3	198	18.0	30.6
4	764	69.4	100.0
Total	1101	100.0	

Table 16

Number of Influenza Vaccine Knowledge Questions Correct

Total number of questions correct	Frequency	%	Cumulative %
0	8	.7	.7
1	25	2.3	3.0
2	63	5.7	8.7
3	131	11.9	20.6
4	387	35.1	55.8
5	487	44.2	100.0
Total	1101	100.0	

Predictors of Influenza Knowledge

Gender. Females ($M = 7.72$, $SD = 1.39$) had significantly higher knowledge scores than males ($M = 7.50$, $SD = 1.719$), $t(867.110) = -2.312$, $p = .021$. One of the two subscores also reported significant results. Females ($M = 3.59$, $SD = .798$) had significantly higher influenza disease knowledge scores than males ($M = 3.41$, $SD = .945$), $t(891.536) = -3.327$, $p = .001$. Females ($M = 4.13$, $SD = .99$) did not have significantly higher influenza vaccine knowledge scores than males ($M = 4.09$, $SD = 1.128$), $t(915.878) = -.679$, $p = .497$.

Illness. Individuals who had diseases or conditions, including heart disease, lung disease, diabetes, cancer, kidney disease, immunodeficiency, immunosuppression, anemia, or hemoglobinopathy ($M = 8.08$, $SD = 1.17$), had significantly higher knowledge scores than individuals who did not have the mentioned diseases or conditions ($M = 7.58$, $SD = 1.58$), $t(134.074) = 3.94$, $p < .001$. One of the two subscores also reported significant results. Individuals who had diseases or conditions ($M = 3.64$, $SD = .75$) did not have significantly higher influenza knowledge scores than individuals who did not have the mentioned diseases or conditions ($M = 3.50$, $SD = .885$), $t(125.074) = 1.813$, $p = .072$. Individuals who had diseases or conditions ($M = 4.44$, $SD = .761$) had significantly

higher influenza vaccine knowledge than individuals who did not have the mentioned diseases or conditions ($M = 4.08$, $SD = 1.069$), $t(137.730) = 4.284$, $p < .01$.

Illness in the family. Individuals who had household members who had diseases or conditions, including heart disease, lung disease, diabetes, cancer, kidney disease, immunodeficiency, immunosuppression, anemia, or hemoglobinopathy ($M = 7.52$, $SD = 1.55$), did not score significantly higher than individuals who did not have household members with those diseases or conditions ($M = 7.64$, $SD = 1.55$), $t(1086) = -1.01$, $p = .31$.

Working in the health care field. Individuals working in the health care field ($M = 7.96$, $SD = 1.218$) scored significantly higher than individuals not working in the health care field ($M = 7.59$, $SD = 1.573$), $t(90.16) = 2.42$, $p = .018$. The two subscores varied. Individuals working in the health care field ($M = 3.67$, $SD = .746$) did not score significantly higher for knowledge about the disease influenza than nonhealth care workers ($M = 3.50$, $SD = .883$), $t(87.107) = 1.89$, $p = .062$. Health care workers ($M = 4.29$, $SD = .772$), however, did score significantly higher knowledge levels about the influenza vaccine ($M = 4.10$, $SD = 1.068$), $t(92.980) = 1.985$, $p = .050$.

Family physician who recommends the influenza vaccine. Individuals who have a family physician who recommends the flu shot ($M = 7.83$, $SD = 1.37$) had significantly higher knowledge scores than individuals who either have a physician who does not recommend the flu shot, do not know if their physician recommends the flu shot, or do not have a family physician ($M = 6.76$, $SD = 1.85$), $t(62.74) = 4.34$, $p < .001$). The two subscales also produced significant results. Individuals who have a family physician who

recommends the flu shot (M = 3.60, SD = .774) have significantly higher influenza disease knowledge than individuals who have physicians that do not recommend the flu shot (M = 3.28, SD = 1.067), t(398.189) = 4.615, p < .01. Individuals who have a family physician who recommends the flu shot (M = 4.23, SD = .959) have significantly higher influenza vaccine knowledge than individuals who have physicians who do not recommend the flu shot (M = 3.79, SD = 1.199), t(423.194) = 5.639, p < .01.

Children under age 2. Individuals who have a child under age 2 living in the household (M = 7.76, SD = 1.45) did not have significantly higher knowledge scores than individuals who do not have a child under age 2 living in their household (M = 7.61, SD = 1.56), t(75.039) = .781, p = .438. Differences were noted on the two subscales. Individuals with a child under age 2 living in their home scored significantly higher about influenza disease knowledge (M = 3.70, SD = .764) than individuals who do not have children under age 2 living in the home (M = 3.5, SD = .879), t(76.495) = 2.006, p = .048. Individuals with a child under age 2 living in the home did not score significantly higher about influenza vaccine knowledge (M = 4.06, SD = 1.021) than individuals who do not have an individual under age 2 living in the home (M = 4.11, SD = 1.051), t(74.129) = -.403, p = .688.

Income. Individuals with a yearly income of $60,000 or greater ($M$ = 8.01, SD = 1.277) had significantly higher knowledge scores than individuals who earned less than $60,000 ($M$ = 7.43, SD = 1.622), t(873.451) = -6.157, p <.01. Individuals with a yearly income of $60,000 or more ($M$ = 3.67, SD = .695) had significantly higher influenza disease knowledge subscale scores than individuals with a yearly income of $60,000 or less ($M$ = 3.43, SD = .950), t(911.315) = -4.476, p < .01. Individuals with a yearly

income of $60,000 or more ($M$ = 4.34, SD = .914) did have significantly higher influenza vaccine scores than individuals with yearly incomes less than $60,000 ($M$ = 4.00, SD = 1.088), t(835.127) = -5.225, p < .01. The total knowledge score was positively correlated with income, r(980) = .203, p < .001.

Education. Individuals with completed postsecondary education (college diploma or higher; M = 7.91, SD = 1.257) had significantly higher knowledge scores than individuals with less than a college diploma (M = 7.27, SD = 1.802), t(823.304) = -6.658, p < .01. Both subscales also were significant. Individuals with completed postsecondary education (M = 3.65, SD = .712) had significantly higher influenza disease knowledge scores than individuals with less than a college diploma (M = 3.34, SD = 1.018), t(829.744) = -5.646, p < .01. Individuals with completed postsecondary education (M = 4.26, SD = .925) had significantly higher influenza vaccine knowledge scores than individuals with less than a college diploma (M = 3.93, SD = 1.167), t(903.413) = -5.148, p < .01. The total knowledge score was positively correlated with level of education completed r(1084) = .254, p < .001.

Logistic Regression

The predictor variables were entered into a logistic regression to identify which made unique contributions to higher knowledge, relative to the other variables, and OR were obtained for each predictor. The dependent variable, knowledge score, was dichotomous and scored 1 for low score (below the median) and 2 for high score (above or equal to the median). Table 17 shows the results for selected variables. The omnibus test was significant, (chi square [13] = 92.309, p < .001). This set of variables made significant contributions to predicting higher knowledge scores. The Cox and Snell and

Nagelkerke coefficients indicated 9.4% to 13.1% of the variance for knowledge about influenza, and the influenza vaccine was accounted for by this set of variables.

Table 17

Logistic Regression of Selected Variables

Variable		*df*	Sig.	EXP (B)	95% CI for EXP(B)
Clinic date		1	.010	1.495	1.101-2.031
Next flu shot		1	.067	3.839	.911-16.177
Physician flu shot recommendation		1	.000	2.015	1.458-2.784
Underlying diseases family member		1	.042	.677	.465-.985
Underlying diseases		1	.452	1.240	.708-2.170
Health care worker		1	.599	1.176	.642-2.155
Employment		1	.217	1.236	.883-1.728
Education		1	.000	1.810	1.306-2.510
Income		1	.051	1.418	.998-2.013
Individual under age 2 at home		1	.822	1.077	.566-2.047
Marital status		1	.529	1.117	.791-1.579
Age		1	.006	1.608	1.145-2.258
Gender		1	.077	1.308	.971-1.763
Omnibus tests	92.309	13	.000		
Cox and Snell r square	.094				
Nagelkerke r square	.131				

Significance at $p < .05$

The predictor variables were significantly related to the knowledge score dependent variable, chi square (13) = 92.309, $p < .001$. Five variables contributed significant unique prediction, relative to the other variables. An individual was 1.5 times more likely to have a high score if he/she attended a later flu clinic. The OR was 1.495, $p = .010$, with 95% confidence interval of 1.101 to 2.031.

An individual was 2 times more likely to have a high knowledge score if his/her physician recommends the influenza vaccine. The OR was 2.015, $p < .001$, with 95% confidence interval of 1.458 to 2.784.

An individual was 1.5 times more likely to have a low knowledge score if a household member the individual lives with has an underlying medical disease or

condition, such as heart disease, lung disease, diabetes, cancer, kidney disease, immunodeficiency, immunosuppression, anemia, or hemoglobinopathy. The OR was .677, p = .042, with 95% confidence interval of .465 to .985.

An individual was 1.8 times more likely to have a high knowledge score if he/she had completed postsecondary education. The OR was 1.810, $p < .001$, with 95% confidence interval of 1.306 to 2.510.

An individual was 1.6 times more likely to have a high knowledge score if he/she was over age 50. The adjusted OR was .1608, p = .006, with 95% confidence interval of 1.145 to 2.258.

Qualitative Data

The participants were asked three open-ended questions in the third part of the survey: (a) Why is getting a flu shot important to you? (b) What convinced you to get a flu shot? and (c) What do you think could be done to encourage more people to get the flu shot? These responses are discussed.

In terms of taxonomy, two domains clearly emerged from the first question. These two domains included protecting self and protecting others. Examples of these two domains are shown on Table 18. A list of comments can be viewed in Appendix D.

Table 18

Responses: Why Is Getting a Flu Shot Important to You?

Protecting self
• I have had pneumonia several times and although flu is different, I believe in getting as much protection as possible
• To be healthy and not miss work
• I don't want to be bed ridden , with the flu
• Minimize risk of getting bad flue strain
• Don't want to get sick
• Being sick is no fun
• I have asthma
• Want to prevent getting ill

• I don't want the flu, so if this helps, great! • I want to avoid a serious – lengthy illness (flu) • To minimize the risk of my getting influenza; to minimize the risk of complications if I do get influenza
Protecting others
• To protect the elderly and infants in my family • I have elderly parents that I want to protect, and I have 2 children & a husband that I need to be healthy for if they are sick • To protect my family & others around me • Work with children • Work outside and with general public • I have grandchildren and an aging senior who could become very ill if I passed on the flu • To protect my children and grandchildren • To help minimize flu spread within my community • To minimize the risk of my transmitting influenza to others. Also: to enable me to be healthy enough to continue to meet my caregiver role for my chronically ill daughter

Within the domain were many dimensions (i.e., conceptual subcodes). There were many protecting self-dimensions notes. Some participants simply indicated a desire to stay healthy. Reasons also were given for staying healthy, including a need not to miss work or a need to minimize exacerbation of underlying health problems. Some participants had past experience with influenza and did not wish to repeat it. Dimensions within the protecting others included a need to protect family, including the elderly or children. There also was a need noted to protect members of the public or vulnerable populations.

Regarding the second qualitative question, four domains clearly emerged: protecting self and protecting others, but two other domains emerged, including recommendations and no particular reason. A sample of these responses is shown in Table 19.

Dimensions of the protecting self domain included wanting to remain healthy and avoid illness. Dimensions of the protecting others domain included not wanting to make others sick and protecting children, elderly, spouses, vulnerable individuals, and other members of the general public. Recommendations came from many sources, including

physicians, family members, the workplace, the media, and schools. Recommendations were either mandatory, simple suggestions or educational literature. The no particular domain contained a variety of dimensions, including common sense, the fact that the vaccine was free, a long habit of getting an influenza immunization, the convenience of attending clinics, and it is an easy thing to do.

Table 19

Responses: What Convinced You to Get a Flu Shot?

Protecting self
• I get one every year – for health concerns • Don't want to be sick • Prevention • I always get it every year. However, the first time I got it was because I had the flu that year. It felt horrible, so from that point on, I got my flu shot. • To protect myself getting sick. Flu is easily acquired. Can contaminate person through coughing and sneezing • I had the flu last time • Not wanting to get sick in the first place • Prior to getting a flu shot, I was usually having 3-5 days of flu symptoms in Jan/Feb. Since getting immunized every year, I have avoided illness.
Protecting others
• Don't want to make others sick • Safety for my family, not wanting to continue the spread of the flu • My husband has a lot of health problems and I don't wish to expose him to the flu • My mom in a nursing home • My newborn • If we can avoid getting the flu, then it will benefit our whole family
No particular reason
• No convincing common sense • Why not • Its free • The safety efficacy • Well me and my grandma go every year to get the flu shot, we just always go • Nothing specific, I got my first shot my first year of university (biology major)
Recommendation
• Doctor • My mother is a nurse, my family doctor is pro flu shot • Health care course • Media/medical community • My discussion with family and friends • Understanding of the shot through workplace seminar by nurse • My parents • News coverage

Three clear domains emerged from the final question: promotion, education, and involvement of people. Examples of responses are shown in Table 20.

Dimensions within the promotion domain were varied. One dimension promoted the influenza vaccination clinics via advertising on the television, in the newspaper, or through rap videos. The other dimension indicated was to use promotion via administration of efficient clinics. This included having short line-ups, convenient locations (schools and workplaces), convenient times, and free vaccine. Another way of promoting the vaccine is to make it mandatory.

The dimensions of the domain education included providing education programs. The importance of accurate, current information, specifically information that dispels myths about the influenza vaccine was noted. Providing education about the benefits and risks of immunization and acquiring the disease not only included educating people about the vaccine but also making sure that professional researchers, scientists, and other experts in their respective fields are using the highest level of their expertise to determine components of the vaccine, report side effects accurately, and present the vaccine in an unbiased way by continuing to do surveys and studies.

The involvement of people dimensions called for the utilization of experts, television personalities, celebrities, nurses, pharmacists, and doctors. This included involving people in the administration process, education process, and input into advertising. One individual suggested having children educate their parents about influenza immunization. Word of mouth also was mentioned.

Table 20

Responses: What Do You Think Could Be Done to Encourage More People to Get the Flu Shot?

Promotion
• Local paper should advertise dates before the clinic. For example, this year our paper didn't have an ad for the clinic. Local drugstores should post flyers advising of clinic locations and dates.
• Making it free was great. I used to pay $15
• More advertising.
• Have more clinics
• More convenient times and locations,
• Short line ups at clinics
• Make this mandatory, especially in institutional environments!!!
• Well researched awareness communication
• Commercials re: benefits
• Make sure that you are not using "junk science" to promote its use
• Utilize rap videos
• Emphasize negative aspect of getting the flu in media ads
• Publicity about safety
• Discuss the risks
Education
• More learning about the flu shot.
• Have education and knowledge on it.
• Education programs
• Show them what could happen if the shot was not taken
• Get irrefutable evidence that the vaccine works.
• Ensure that you have the vaccine for the most prevalent virus each year
• Publish statistics regarding side effects or allergies in terms of ratio of population immunized
Involvement of people
• Family doctor should encourage it/ recommend it
• Educate children to educate their parents
• More community work

There were two recurrent themes between the first and second questions. The domains protect self and protect others were noted in both of these questions.

For the third open-ended question, the education, promotion, and people involvement domains overlapped for this situation. For example, educational material can be utilized for promotional purposes, and television personalities can provide educational material to promote the vaccine.

Discussion

This study demonstrated that the knowledge, attitudes, and beliefs of individuals (the general public) attending the Regional Municipality of York-sponsored influenza immunization clinics were very similar to the knowledge, attitudes, and beliefs of individuals from other settings, including parents of small immunized children, older immunized adults, and immunized health care workers. Results from this study, including gender, family physician recommendations, previous vaccination history, knowledge, health care worker occupation, influenza vaccine attitudes, and influenza suggestions, were compared to current literature. The applicability of the HBM also was examined.

Gender

A total of 56.8% of the study participants indicated they are female, and 42% indicated that they are male. In the majority of studies conducted on older adults, there was a larger percentage of female participants, with a range of 62% to 68% (Bosompra et al., 2004; Lindley et al., 2006; Tabbarah et al., 2005). The only exception was Santibanez et al. (2002), who had only 46% female participants in their study. The majority of research conducted on health care workers also had a larger percentage of female participants, with a range of 69% to 96% participation. When the sample studied consisted only of medical residents or physicians, the percentage of female participation decreased, with a range of 17.2% to 46.5% noted in three studies (Lester et al., 2003; Pavia et al, 2003; Toy et al., 2005).

Family Physician

Past research has shown that individuals who have a family physician who recommends the flu shot are more likely to get a flu shot (Ma et al., 2006; Daley et al.,

2006; Lewis-Parmar & McCann, 2002; Lin et al., 2006; Lindley et al., 2006; Tabbarah et al., 2005). Although this study did not survey individuals who did not get a flu shot, three quarters of the participants indicated that their family physician recommends the flu shot, a finding that was consistent with past research.

Previous Vaccination

Most participants in this study had received an influenza immunization before. Having a history of previous vaccination was significantly associated with vaccine uptake in past research (Lewis-Parmar & McCann, 2002; Tabbarah et al., 2005).

Knowledge Scores

Knowledge scores about influenza and the influenza vaccine were higher in females (M = 7.72) than males (M = 7.50). In the qualitative portion of the results, several participants indicated that a wife, mother, or girlfriend had convinced them to obtain an influenza immunization. The researcher was unable to review other studies that have investigated gender differences in influenza or influenza vaccine knowledge. Reasons for the higher female knowledge scores need to be explored further.

Knowledge scores were also higher in individuals who have a physician that recommends the influenza vaccine (M = 7.83) than individuals who either have a physician who does not recommend the flu shot, do not know if their physician recommends the flu shot, or do not have a family physician (M = 6.76). Research by Baron, De Wals and Milord (2001) noted that vaccinated physicians in Quebec (85.5%) recommended influenza vaccination to their older patients more often than unvaccinated physicians (72.2%, p = .004). LaVela et al. (2004) also noted that health care workers who thought the influenza vaccine was effective (93%) were more likely to recommend

the vaccine to patients than health care workers who did not think the vaccine was effective (56%, $p < .001$). Finally, Toy, Janosky, and Laird (2005) noted that medical residents who had higher influenza immunization knowledge scores were more likely to strongly recommend the influenza vaccine ($p = .04$) and be immunized for influenza ($p = .022$). The results of this study and the studies cited could suggest that individuals with higher knowledge scores have been exposed to influenza information from his/her physician.

Health Care Workers

Very few individuals working in the health care field were participants in this study (6.6%). Most individuals working in the Regional Municipality of York at long-term care facilities, in hospitals, or at other health care agencies have access to influenza immunization clinics at their worksites. In the Regional Municipality of York, the average immunization rate for health care workers working at the 3 largest hospitals and 28 long-term care facilities were 36.7% and 79.6%, respectively (York Region Health Services Department, 2006). The type of health care field where the participants in this study work and their reasons for accessing the Regional Municipality of York Health Department-sponsored clinics requires further investigation.

Influenza Vaccine Causing Influenza

Humiston et al. (2005) noted that half of the parents in their study (49%) thought that the influenza vaccine can cause influenza. The results of the current study were comparable, with 19.8% of individuals agreeing or strongly agreeing with this statement and a further 20.3% choosing to be neutral to the statement.

The reasons why individuals believe the influenza vaccine causes influenza is beyond the scope of this research however two hypotheses are offered. The influenza vaccine is typically offered in the months of October and November. The active influenza season as described by the Public Health Agency of Canada (2008) is October to May. It is possible that an individual could be incubating the influenza disease at the same time that the vaccine is given with symptoms of illness thus presenting after administration of the vaccine. It is also possible that any respiratory illness could be attributed to receipt of the influenza vaccine.

Availability heuristic is when a single example is considered as representative of the whole rather than as a single example. It is possible that an individual could get ill with influenza after an influenza vaccination (i.e., vaccine failure, sufficient time had not lapsed prior to immunity being acquired, exposure to an influenza virus not contained in the vaccine, etc.) which would simply be an unusual case rather than the typical scenario following receipt of an influenza vaccine.

Adverse Influenza Immunization Attitudes

Most participants (83.5%) felt that in general, there are very few adverse reactions to the flu shot, and 91.1% of the participants felt that the flu shot has been carefully tested and is safe for the general public. This finding was consistent with research by Gnanasekaran et al. (2006), who found that children are more likely to be vaccinated if their parents express little worry about the adverse effects of the vaccine (OR 1.3; 95% CI 1.0 to 1.6).

Suggestions to Encourage More People to Get the Flu Shot.

Takayanagi et al. (2007) asked the participants in their study what steps could be taken to increase compliance with influenza vaccination. Employees at this hospital setting suggested that the vaccination should occur at the workplace, further information (classes) should be held about the vaccine, further information should be contained in the influenza campaign, and the use of noninjectable vaccines should be considered. Lewis-Parmar and McCann (2002) also recommended the provision of more information about influenza and the influenza vaccine, as well as better access to influenza vaccination. Responses to the question, "What do you think could be done to encourage more people to get the flu shot?" showed similar suggestions.

Reasons for Obtaining a Flu Shot

Tabbarah et al. (2005) noted that reasons cited for getting a flu shot include influenza prevention, a history of influenza, and recommendation from a physician. La Vela et al. (2004) identified self-protection and patient protection as reasons for obtaining an influenza vaccination. Lester et al. (2003) reported self-protection, protection of patients, protection of family, protection of colleagues and hospital staff insistence. Hoffmann, Ferracin, Marsh, and Dumas (2006) noted a need to protect oneself, to protect patients, the fact that the vaccine is free and convenient, a history of vaccination, and following the example set by peers. McEwen and Farren (2005) noted a belief that the vaccine is effective in preventing the flu, it is provided by the employer free of charge, concern about being at risk for exposure to influenza, works with clients who are high risk, had the flu in the past and do not want to experience it again, and over 50 years of age. Reasons cited by Takayanagi et al. (2007) included self-protection, to protect the patient, it is better to have the vaccine than to contract influenza, recommendation by

immediate superior, to avoid missing work, belief that the vaccine does not cause influenza, a physician recommended it, or written request to comply with vaccination. Toy et al. (2005) noted that the individuals in their study felt at risk because of their work, felt at risk of transmission to patients, and felt that the vaccine is generally safe. In this study, a very similar question asked participants what could be done to encourage more people to get the flu shot.

Applicability of the HBM

The HBM was appropriate to guide this study because the attitudes, beliefs, practices, utilization of health services, and general health motivations of individuals are central to the HBM. The HBM can be broken down into six key elements, including Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, and Self-Efficacy. The elements of this model that were addressed in this study are discussed next.

Perceived Severity was examined by asking participants to answer the following statement, "I think that influenza can be a serious illness and I think that some people get serious complications from getting influenza." Many participants (91.2%) perceived influenza to be a serious disease. In addition, 87.3% of participants believed there is the possibility of serious complications from getting influenza. This would indicate that the participants did have a perceived severity of influenza. Bardenheier et al. (2006) found that almost all individuals (98%) who indicated that they would receive the influenza vaccine to prevent disease believed that influenza is serious in the elderly.

Perceived Benefits were also addressed in this study by having the participants indicate why getting a flu shot is important to them and what convinced the participants

to get a flu shot. The perceived benefits were noted in the following domains that were identified, including to protect others and protect oneself from acquiring influenza. Bardenheier et al. (2006) noted that only 1% of individuals who indicated that they would receive the influenza vaccine to prevent disease did not know if the vaccine is efficacious. In this study, 85.6% of participants indicated that the flu shot is very effective in preventing influenza.

The participants did feel that there are perceived barriers to getting a flu vaccine. This element of the HBM was addressed by having the participants indicate what could be done to encourage more people to get the flu shot. The participants indicated that there needs to more education, promotion, and publicity of various aspects about influenza and the influenza vaccine. Daley et al. (2006) noted that the barriers reported by parents included long waiting times, difficulties making appointments, inconvenient office hours, and cost. The participants also were asked if they felt that they know a lot about influenza and the flu shot. It was interesting to note that only 44% of the participants felt that they know a lot about influenza and the influenza vaccine, and a further 40.7% of participants chose to be neutral about this topic.

Cues to Action were addressed by asking what convinced the participants to get a flu shot. The domains included protection of self, protection of others, recommendations, and no particular reason. Under the domain recommendations, one dimension that was revealed was recommendation from a family member, friend, health professional, or work colleague. It also was indicated by several participants that they knew someone who had had influenza in the past or that they had experienced influenza themselves. As indicated in the literature review, several studies have noted that individuals who have a

family physician who recommends the flu shot are more likely to get a flu shot (Daley et al., 2006; Lewis-Parmar & McCann, 2002; Lin et al., 2006; Lindley et al., 2006; Ma et al., 2006; Tabbarah et al, 2005). In this study, three quarters of the participants indicated that their family physician recommends the flu shot.

Self-efficacy was not a factor because all participants who completed a survey had received an influenza vaccination. To further address this concept, the participants were asked if they were going to return next year for a flu shot (98.1%) and how many flu shots they had received in their lifetime. Most participants indicated having more than one flu shot (94.5%) in their lifetime.

Study Limitations

In evaluating the significance of the results from this study, some limitations were noted. Only individuals ages 18 and over who were able to read and understand English were able to participate. Because of the large volume of clinics held in the Regional Municipality of York, surveys were distributed only to the middle third of 15 clinics. A convenience sample was used. The researcher was able to administer the questionnaire only to individuals receiving the influenza vaccine because individuals who choose not to have the vaccine generally do not attend the influenza clinics and are not present in the recovery area.

The survey had to be short because participants wait in the recovery for only 15 minutes after receiving a vaccine. A more in-depth analysis could have been conducted with a longer survey. Although most individuals who were approached agreed to complete the survey, it is possible that some individuals chose not to complete the survey because of their limited comprehension of English. Also, there may be implications for

cultural bias with an English-only survey. Not all municipalities within the Regional Municipality of York were included in the study. Surveys were not completed in the community of Aurora or the township of King.

It was difficult to determine a true response rate because only the middle third of the clinics were attended by the researcher, so some individuals may have refused to go to the recovery area. In addition, some clinics had two recovery areas, making it impossible for the researcher to distribute surveys in both areas and determine exact response rates. The response rate was estimated at 68%. This number was obtained by determining the number of individuals over age 18 who attended the clinics (4,883) and dividing by 3 = (1,627.67) to determine approximately how many individuals where in attendance during the middle third of the clinics. The number of participants in the study (1,101) was then divided by 1,627 for an estimated response percentage rate of 68%.

Recommendations

The following recommendations are offered to improve the health of residents of the Regional Municipality of York. It is important to recognize that these recommendations would need to take place at the individual, local, and provincial levels.

- Provide more detailed information about the influenza vaccine.
- Utilize multiapproach advertising and education campaigns targeted at different demographic groups, such as less and higher educated and different genders.
- Continue to dispel myths about influenza in educational material and advertising campaigns.

- Have clear and concise information about the risks and benefits of influenza immunization.
- Utilize reminders for influenza immunizations, such as e-mail, letters, or postcards.
- Utilize various members of the public in educational campaigns, including physicians, pharmacists, nurses, and television personalities.
- Communicate the supporting views of physicians about the influenza vaccine to the public.
- Address reasons for vaccination refusal.

Future Implications for Research

The following recommendations are offered for future research.

- Conduct similar studies in other municipalities.
- A convenience sample was used for this research. Perhaps this survey could be modified so that comparisons with other groups, such as health care workers or other health units could be made.
- Make minor alternations to the survey used for this research and conduct a cross-sectional survey of individuals through distribution of surveys at schools, physician offices, laboratory waiting rooms, hospital waiting rooms, community events or long term care facilities so that immunized and unimmunized individuals could be included.
- Make minor alternations to the survey used for this research and conduct a random digit telephone survey or mail survey to capture information about immunized and unimmunized individuals in the general public.

- Not a lot of research has been done on children receiving influenza immunization or the motivation of their parents. Perhaps this survey could be modified so that research on children and their parents attending clinics could be obtained. It also was noted that the age groups between 21 and 35 were poorly represented in this study.
- Further explore the potential influence of women on receipt an influenza immunization.
- Develop more detailed knowledge questions to have a more in-depth representation of the level of knowledge of the participants.
- Use a different theory to determine survey content to see if similar results are obtained.

Summary

This study examined the knowledge, attitudes, and beliefs about influenza and influenza vaccination of individuals attending the Regional Municipality of York Health Services Department-sponsored influenza immunization clinics. The objectives were to describe the individuals attending the immunization clinics; explore current knowledge, attitudes, and beliefs about influenza and influenza immunization; and determine variables to predict level of knowledge about influenza and influenza vaccination of individuals attending the Regional Municipality of York Health Services Department-sponsored influenza immunization clinics. The HBM was used as the conceptual framework to guide this study. A survey was developed to determine the knowledge, attitudes, and beliefs of this group of individuals.

Highlights of the results of this study are many. There was a large sample size of 1,101 participants. All participants in this study had received an influenza immunization, so it was not necessary to have the participants self-report based on memory or check medical records. Most research conducted in the past had a majority of participants who were female; in this study, only a small majority (56.8%) of the participants were female. Almost three quarters (73.2%) of the participants have physicians who recommend the flu shot. The majority (94.5%) of participants had had more than one flu shot in their lifetime. Females had significantly higher knowledge scores than males. Individuals who have a family physician who recommends the flu shot had significantly higher knowledge scores than individuals who do not. Knowledge scores were significantly related to levels of education, employment, and income; having an underlying disease or condition; and having a family physician who recommends the flu shot. An individual was 2 times more likely to have a high knowledge score if the family physician recommends the flu shot. An individual with an underlying disease or condition was 2 times more likely to have a high knowledge score.

Several recommendations were made, ranging from simply adding more educational material to conducting further research. Of particular importance is the need to dispel the myth that the influenza vaccine causes influenza.

The findings from this study were consistent with those from past research. The results from this study will be disseminated to health professionals, the Regional Municipality of York Health Services Department, interested participants of this study and a research journal for other researchers to utilize.

REFERENCES

Adonis-Rizzo, T. M., & Jett, K. F. (2006). Health beliefs of Haitian elders related to influenza prevention. *Public Health Nursing, 24*(1), 18-25.

Bardenheier, B. H., Wortley, P. M., Winston, C. A., Washington, M. L., Lindlye, M. C., & Sapsis, K. (2006). Do patterns of knowledge and attitudes exist among unvaccinated seniors? *American Journal of Health Behavior, 30*(6), 675-683.

Baron, G., De Wals, P., & Milord, F. (2001). Vaccination practices of Quebec family physicians. *Canadian Family Physician, 47*, 2261-2266.

Becker, M. H. (1974). The health belief model and personal health behavior health. *Education Monographs, 2,* 324-473.

Blue, C. L., & Valley, J. M. (2002). Predictors of influenza vaccine: Acceptance among healthy adult workers. *AAOHN Journal 50*(5), 227-233.

Bosompra, K., Ashikaga, T., & Ruby, A. (2004). Attitudes, perceived norms, and intentions: A needs assessment study of the influenza immunization intentions of elderly citizens in Vermont. *Journal of Rural Health, 20*(2), 125-130.

Bradley, E. H., Curry, L. A., & Devers, K. J. (2007). Qualitative data analysis for health services research: Developing taxonomy, themes, and theory. *Health Services Research, 42*(4), 1758-1772.

Bridges, C. B., Kuehnert, M. J., & Hall, C. B. (2003). Transmission of influenza: Implications for control in health care settings. *Clinical Infectious Diseases, 37*(8), 1094-1101.

Canadian Paediatric Society. (2006). Pandemic influenza and Canada's children. *Paediatrics and Child Health, 11*(6), 335-337.

Canning, H. S., Phillips, J., & Allsup, S. (2005). Health care worker beliefs about influenza vaccine and reasons for non-vaccination – A cross-sectional survey. *Journal of Clinical Nursing, 14,* 922-925.

Center for Disease Control and Prevention. (2004). Influenza vaccination and self-reported reasons for not receiving influenza vaccination among Medicare beneficiaries aged ≥ 65 years--- United States, 1991-2002. *Morbidity and Mortality Weekly Report, 53*(43), 1012-1015.

Chan, B. T. B., & Schultz, S. E. (2005). *Supply and utilization of general practitioner and family physician services in Ontario*. Toronto, ON: Institute for Clinical Evaluative Sciences.

Daley, M. F., Crane, L. A., Chandramouli, V., Beaty, B., Barrow, J., Allred, N., et al. (2006). Influenza among health young children: Changes in parental attitudes and predictors of immunization during the 2003 to 2004 influenza season. *Pediatrics, 117*(2), e268-e277.

Essential Economics Corporation Community Benchmarks. (2004). *The Economy of York Region: Executive summary and overview.* Retrieved from http://www.region.york.on.ca/NR/rdonlyres/rsedsqi4sc67tqgwbi2rvfh4hdzmmo37eb3ifbns4upiw5p6x6pozt yz2vh5haov5rjwkjfguqinfcfv5cqcad2dwa/Dec+1+Economy+att+1.pdf

Glanz, K., Rimer, B. K., & Lewis, F. M. (2002). *Health behaviour and health education: Theory, practice and research.* San Francisco: John Wiley and Sons.

Gnanasekaran, S. K., Finkelstein, J. A., Hohman, K., O'Brien, M., Kruskal, B., & Lieu, T. A. (2006). Parental perspectives on influenza vaccination among children with asthma. *Public Health Reports, 121*(2), 181-188.

Health Canada. (2001). *Respiratory disease in Canada.* Retrieved from http://www.phac-aspc.gc.ca/publicat/rdc-mrc01/pdf/rdc0901e.pdf

Health Protection and Promotion Act, R.S.O. 1990, c. H.7

Heymann, D. (Ed.). (2004). *Control of communicable diseases manual* (18th ed.). Washington, DC: American Public Health Association.

Hochbaum, G. M. (1958). *Public participation in medical screening programs: a sociological study, US Public Health Service Pub No 572.* Washington, DC: U.S. Public Health Service.

Hofmann, F., Ferracin, C., Marsh, G., & Dumas, R. (2006). Influenza vaccination of healthcare workers: A literature review of attitudes and beliefs. *Infection, 34*(3), 142-147.

Humiston, S., Lerner, B., Hepworth, E., Blythe, T., & Goepp, J. G. (2005). Parent opinions about universal influenza vaccination for infants and toddlers. *Archives of Pediatric and Adolescent Medicine, 159,* 108-112.

Janz, N. K., Champion, V. L., & Strecher, V. J. (2002). The HBM. In K. Glanz, B. K. Rimer, & F. M. Lewis (Eds.), *Health behavior and health education: Theory and research practice* (3rd ed., pp. 56). San Francisco: John Wiley and Sons.

Jefferson, T. O., Rivetti, D., Di Pietrantonj, C., Rivetti, A., & Demicheli, V. (2007). Vaccines for preventing influenza in healthy adults. *Cochrane Database of Systematic Reviews* 2007, Issue 2. doi: 10.1002/14651858.CD001269.pub3.

Kilbourne, E. D. (2006). Influenza pandemics of the 20th century. *Emerging Infectious Diseases, 12*(1), 14.

Kirscht, J. P. (1974). The health belief model and illness behavior. *Health Education Monographs, 2,* 2387-2408.

Kurji, K. (2004, April). The Ontario experience with universal vaccination. *National Influenza Vaccine Summit*, Symposium conducted in Atlanta, USA.

Langley, J. M., & Faughnan, M. E. (2004). Prevention of influenza in the general population. *Canadian Medical Association Journal, 171*(10), 1213-1222.

LaVela, S. K., Smith, B., Weaver, F. M., Legro, M. S., Goldstein, B., & Nichol, K. (2004). Attitudes and practices regarding influenza vaccination among healthcare workers providing services to individuals with spinal cord injuries and disorders. *Infection Control and Hospital Epidemiology, 25*(11), 933-940.

Lee, T., Saskin, R., McArthur, M., & McGeer, A. (2005). Beliefs and practices of Ontario midwives about influenza immunization. *Vaccine, 23,* 1574-1578.

Lester, R. T., McGeer, A., Tomlinson, G., & Detsky, A. S. (2003). Use of, effectiveness of, and attitudes regarding influenza vaccine among house staff. *Infection Control and Hospital Epidemiology, 24*(11), 839-844.

Lewis-Parmar, H., & McCann, R. (2002). Achieving national influenza vaccine targets: An investigation of the factors affecting influenza vaccine uptake in older people and people with diabetes. *Communicable Diseases of Public Health, 5*(2), 119-126.

Lin, C. J., Nowalk, M. P., Zimmerman, R. K., Ko, F. S., Zoffel, L., Hoberman, A., et al. (2006). Beliefs and attitudes about influenza immunization among parents of children with chronic medical conditions over a two-year period. *Journal of Urban Health, 83*(5), 874-883.

Lindley, M. C., Wortley, P. M., Winston, M. A., & Bardenheier, B. H. (2006). The role of attitudes in understanding disparities in adult influenza vaccination. *American Journal of Preventive Medicine, 31*(4), 281-285.

Ma, K. K., Schaffner, W., Colmenares, C., Howser, J., Jones, J., & Poehling, K. A. (2006). Influenza vaccinations of young children increased with media coverage in 2003. *Pediatrics, 117*(2), e157-e163.

Maciosek, M. V., Solberg, L. I., Coffield, A. B., Nichol, M., Edwards, M. S., & Goodman, M. J. (2006). Influenza vaccination health impact and cost effectiveness among adults aged 50 to 64 and 65 and older. *American Journal of Preventive Medicine, 31*(1), 72-79.

Mah, M. W., Hagen, N. A., Pauling-Shepard, K., Hawthorne, J. S., Mysak, M., Lye, T., et al. (2005). Understanding influenza vaccination attitudes at a Canadian cancer center. *American Journal of Infection Control, 33*(4), 243-250.

Martinello, R. A., Jones, L., & Topal, J. E. (2003). Correlation between healthcare workers' knowledge of influenza vaccine and vaccine receipt. *Infection Control and Hospital Epidemiology, 24*(11), 845-847.

McEwen, M., & Farren, E. (2005). Actions and beliefs related to hepatitis B and influenza immunization among registered nurses in Texas. *Public Health Nursing, 22*(3), 230-239.

Merriam, S. B., & Simpson, E. L. (2000). *A guide to research for educators and trainers of adults* (2nd ed.). Malabar, FL: Krieger.

Ministry of Health and Long-Term Care. (2006). *Influenza fact sheets.* Retrieved from http://www.health.gov.on.ca/english/providers/program/pubhealth/flu/flu

Moore, D. L., Vaudry, W., Scheifele, D. W., Halperin, S. A., Dery, P., Ford-Jones, E., et al. (2006). Surveillance for influenza admissions among children hospitalized in Canadian immunization monitoring program active centers, 2003-2004. *Pediatrics, 118*(3), e610-e619.

Moorman, J. P. (2003). Viral characteristics of influenza. *Southern Medical Journal, 96*(8), 758-763.

National Advisory Committee on Immunization. (2007). Statement on influenza vaccination for the 2007-2008 season. *Canada Communicable Disease Report, 33,* 1-38.

Neutens, J. J., & Rubinson, L. (2001). *Research techniques for the health sciences* (3rd ed.). San Francisco: Benjamin Cummings.

Neuzil, K. M., Mellen, B. G., Wright, P. F., Mitchel, E. F., & Griffin, M. R. (2000). The effect of influenza on hospitalizations, outpatient visits, and courses of antibiotics in children. *New England Journal of Medicine, 342*(4), 225-231.

Nichol, K. L., & Goodman, M. (2002). Cost effectiveness of influenza vaccination for healthy persons between ages 65 and 74 years. *Vaccine, 20*(Suppl. 2), S21-S24.

Pavia, M., Foresta, M. R., Carbone, V., & Angelillo, I. F. (2003). Influenza and pneumococcal immunization in the elderly: knowledge, attitudes, and practices among general practitioners in Italy. *Public Health, 117*(3), 202-207.

Peltola, V., Ziegler, T., & Ruuskanen, O. (2003). Influenza A and B virus infections in children. *Clinical Infectious Diseases, 36,* 299-305.

Pentti, R. (2007). *Models in the research process.* Retrieved from http://www2.uiah.fi/projects/metodi/177.htm

Potter, C. W. (2001). A history of influenza. *Journal of Applied Microbiology, 91*(4), 572-579.

Public Health Agency of Canada. (2006). *Canadian pandemic influenza plan for the health sector.* Retrieved from http://www.phac-aspc.gc.ca/influenza/pandemicplan_e.html

Public Health Agency of Canada. (2008). *Flu watch.* Retrieved from http://www.phac-aspc.gc.ca/fluwatch/index.html

Rapid Risk Factor Surveillance System. (2006). *York Region RRFSS 2006.* Retrieved from www.rrfss.on.ca/

Regional Municipality of York. (2002). *York region 2001 annual report.* Retrieved from http://www.region.york.on.ca/nr/ykregion/extpg/finance/AnnualReport2001/map_york_region.asp

Rosenstock, I. M. (1960). What research in motivation suggests for public health. *American Journal of Public Health, 50,* 295-301.

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs, 2,* 328-335.

Saluja, I., Theakston, K. D., & Kaczorowski, P. (2005). Influenza vaccination rate among emergency department personnel: a survey of four teaching hospitals. *Canadian Journal of Emergency Medicine, 7*(1), 17-21.

Santibanez, T. A., Nowalk, M. P., Zimmerman, R. K., Jewell, I. K., Bardella, I. J., Wilson, S. A., et al. (2002). Knowledge and beliefs about influenza, pneumococcal disease, and immunizations among older people. *Journal of the American Geriatric Society, 50,* 1711-1716.

Sarubbi, F. A. (2003). Influenza: A historical perspective. *Southern Medical Journal, 96*(8), 735-736.

Schanzer, D. L., Langley, J. M., & Tam, T. (2007). Influenza-attributed hospitalization rates among pregnant women in Canada 1994-2000. *Journal of Obstetrics and Gynaecology Canada, 29*(8), 622-629.

Schanzer, D. L., Tam, T. W., Langley, J. M., & Winchester, B. T. (2007). Influenza-attributable deaths, Canada 1990-1999. *Epidemiology and Infection, 135*(7), 1109-1116.

Simonsen, L., Fukuda, K., Schonberger, L. B., & Cox, N. J. (2000). The impact of influenza epidemics on hospitalizations. *Journal of Infectious Diseases, 181*(3), 831-837.

Smith, N. M., Bresee, J. S., Shay, D. K., Uyeki, T. M., Cox, N. J., & Strikas, R. A. (2006). Prevention and control of influenza. *Morbidity and Mortality Weekly Report, 55*(RR10), 1-42.

Statistics Canada. (1997). *Selected leading causes of death, by sex. 1997.* Retrieved from http://www.statcan.ca/english/Pgdb/People/Health/health36.htm

Statistics Canada. (2001). *Community highlights*. Retrieved from http://www12.statcan.ca/english/profil01/CP01/Details/Page.cfm?Lang=E&Geo1=CD&Code1=3519&Geo2=PR&Code2=35&Data=Count&SearchText=york%20region&SearchType=Begins&SearchPR=01&B1=All&Custom=

Statistics Canada. (2006). *Community profiles.* Retrieved from http://www12.statcan.ca/english/census06/data/profiles/community/Details/Page.cfm?Lang=E&Geo1=PR&Code1=35&Geo2=PR&Code2=01&Data=Count&SearchText=ontario&SearchType=Contains&SearchPR=35&B1=All&Custom=

Streubert Speziale, H .J., & Carpenter, D. R. (2007). *Qualitative research in nursing: Advancing the humanistic imperative.* Philadelphia: Lippincott Williams & Wilkins.

Tabbarah, M., Zimmerman, R. K., Nowalk, M. P., Janosky, J. E., Troy, J. A., Raymund, M., et al. (2005). What predicts influenza vaccination status in older Americans over several years? *Journal of the American Geriatrics Society, 53,* 1354-1359.

Takayanagi, I. J., Cardoso, M. R. A., Costa, S. F., Araya, M. E. S., & Machado, C. M. (2007). Attitudes of health care workers to influenza vaccination: Why are they not vaccinated? *American Journal of Infection Control, 35*(1), 56-61.

Taylor, J. A., Darden, P. M., Brooks, D. A., Hendricks, J. W., Wasserman R. C., & Bocian, A. B. (2002). Association between parents' preferences and perceptions of barriers to vaccination and the immunization status of their children: a study from pediatric research in office settings and the national medical association. *Pediatrics, 110*(6), 1110-1117.

Thompson, W. W., Shay, D. K., Weintraub, E., Brammer, L., Bridges, C. B., Cox, N. J., et al. (2004). Influenza-associated hospitalizations in the United States. *JAMA, 292*(11), 1333-1340.

Toy, W. C., Janosky, J. E., & Laird, S. B. (2005). Influenza immunization of medical residents: knowledge, attitudes, and behaviors. *American Journal of Infection Control, 33*(8), 473-475.

Valley, J., & Blue, C. L. (2002). Influenza: Overview and recommendations for control. *Topics in Advanced Nursing eJournal, 2*(1). Retrieved from http://www.medscape.com/viewarticle/421478_print

Weir, R., Brunton, C., Jennings, L., Smith, L., & Litt, J. (2004). Knowledge and attitudes about influenza vaccination: A New Zealand study of primary care practitioners and elderly people. *International Congress Series, 1263,* 276-280.

Willis, B. C., & Wortley, P. (2007). Nurses' attitudes and beliefs about influenza and the influenza vaccine: A summary of focus groups in Alabama and Michigan. *American Journal of Infection Control, 35*(1), 20-24.

Wodi, A. P., Samy, S., Ezeanolue, E., Lamour, R., Patel, R., Budnick, L. E., et al. (2005). Influenza vaccine: Immunization rates, knowledge, and attitudes of resident physicians in an urban teaching hospital. *Infection Control and Hospital Epidemiology, 26*(11), 867-873.

York Region Health Services Department. (2005). *Focus on our environment: York region's state of the environment report 2005.* Newmarket, ON: Regional Municipality of York.

York Region Health Services Department. (2006). *Influenza immunization statistics file* [Unpublished raw data].

APPENDIX A: LETTER TO PARTICIPANT

Lakehead

School of Nursing and Masters of Public Health

(807) 343-8643
(807) 343-8246
darlene.steven@lakeheadu.ca

Dear potential participant,

Thank-you for volunteering to participate in a study to determine opinions and general knowledge about influenza and influenza vaccination.

Masters of Public Health candidate Lara McLees Dalla-Vicenza under the supervision of Dr. Darlene Steven with the School of Nursing and the Masters of Public Health program is conducting a study entitled, "Knowledge, attitudes and beliefs about influenza and influenza immunization".

The purpose of the study is to determine the knowledge, attitudes and beliefs of individuals attending influenza clinics in York Region. The information gained from this study can be used to determine factors influencing influenza immunization rates in York Region. This information is currently lacking in this area.

The objectives of this study are to:

1. Determine current knowledge, attitudes and beliefs about influenza and influenza immunization of individuals attending York Region influenza immunization clinics.
2. Examine interventions to increase and enhance community and client demand for influenza immunizations.
3. Explore (if any) demographic, cultural differences among individuals attending York Region influenza immunization clinics.

You are asked to complete a survey which will take about 15 minutes of your time. Your participation is voluntary. Questions include but are not limited to the following: age, gender, educational and economic status, language, current health status, current knowledge about the influenza vaccine and disease.

All answers to the survey are kept confidential and are completely anonymous. You may withdraw from the study at any time. You may decline to answer any question. The information from all of the surveys will be coded, analyzed and securely stored at Lakehead University for seven years and then shredded. No individual will be identified in any report of the results. The survey will not be labeled to identify who completed it. The results will be shared with York Region Health Services and an article will be prepared for publication. A summary of the report may be obtained in July 2007 by sending an e-mail to [redacted] or by contacting Dr Darlene Steven at the telephone number or e-mail listed below.

If you have questions or concerns about the survey you may contact Dr. Steven by telephone at (807) 343-8643 or by e-mail at [redacted] or Lara McLees Dalla-Vicenza at

[redacted]

APPENDIX B: CONSENT FORM

I _____ have read and understood the covering letter of the study entitled, "Knowledge, attitudes and beliefs about influenza and influenza immunization", by Masters of Public Health candidate Lara McLees Dalla-Vicenza and Dr. Steven and I agree to participate.

I am aware that I am asked to complete a survey. I can choose to skip any question that I am not comfortable answering. I am a volunteer and may withdraw at any time from the study. All information that I provide will remain anonymous, and be securely stored at Lakehead University for seven years. A report of the results may be requested by contacting Dr Steven by telephone at (807) 343-8643 or by e-mail at darlene.steven@lakeheadu.ca or Lara McLees Dalla-Vicenza at influenzastudy@hotmail.com. My name, or any other identifying information, will not appear in this report.

Signature of Participant Date

APPENDIX C: INFLUENZA AND INFLUENZA IMMUNIZATION SURVEY
Knowledge, Attitudes and Beliefs Survey

Please answer the following demographic questions.

Ex.	**I like music?**	√ Yes O No

What is your gender?	O Male	O Female

How old are you?	O 20 years or younger O 21-25 O 26-30 O 31-35 O 36-40	O 41-45 O 46-50 O 51-55 O 56-60 O 61-65	O 65-70 O 71-75 O 75-80 O 80 years or older

What is your marital status?	O Single O Married or common law O Widowed	O Separated O Divorced

What is your ethnicity? **(top 20 ethnic origins for York Region listed)**	O Canadian O Chinese O Dutch O East Indian O English O Filipino O French	O German O Greek O Iranian O Irish O Italian O Jamaican O Jewish	O Polish O Portuguese O Russian O Scottish O Ukrainian O Other

Are there children under age 2 at home?	O Yes	O No

What is your approximate yearly income?

O 0-$30,000	O $30,001-$60,000	O 60,001-$90,000	O $90,000 and up

What is your highest level of education?

O Less than high school O High school completed O Some college or university	O College diploma O University undergraduate degree	O University masters degree O University doctorate degree

Are you employed?	O Full Time	O Part Time	O Not presently employed

Do you work in the health care field?	O Yes	O No

Do you have any of the following diseases or conditions: heart disease, lung disease, diabetes, cancer, kidney disease, immunodeficiency, immunosuppression, anemia, or hemoglobinopathy ?

O Yes	O No

Does anyone in your household have any of the following diseases or conditions: heart disease, lung disease, diabetes, cancer, kidney disease, immunodeficiency, immunosuppression, anemia, or hemoglobinopathy ?

O Yes	O No

Does your family physician recommend the flu shot?	O Yes O No	O Don't know O Do not have a family physician

How many flu shots (including today) have you had in your life?	O 1 O 2	O 3 O 4	O 5 O 6	O 7 or more

Do you plan on getting the flu shot next year?	O Yes	O No

For the following questions, please circle the response that most applies:

Ex.	**I enjoy music.**	Strongly Agree	(agree)	Neutral	Disagree	Strongly Disagree

Influenza Disease

1.	**I think that influenza can be a serious illness.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
2.	**I think that some people get serious complications from getting influenza.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3.	**I think the influenza virus is very contagious.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4.	**If infected with influenza, I am likely to transmit influenza to other people.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Influenza Vaccine (Flu Shot)

5.	**I think that the flu shot has been carefully tested and is safe for the general public.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6.	**I think it is possible to get influenza from the flu shot.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7.	**I think the flu shot is very effective in preventing influenza (when properly matched to the circulating strains).**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8.	**I think that getting the flu shot is important to protect other people.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
9.	**I believe that in general there are very few adverse reactions to the flu shot.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Opinions About Health Professionals

10.	**I think that all health professionals should get a flu shot.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
11.	**I think that health professionals can spread influenza to their patients.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Opinions About Children

12.	**I think the flu shot is safe for children.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
13.	**I think that flu shots should be mandatory for all school aged children.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
14.	**I would recommend the flu shot for my children (or if I had children).**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Opinions About Influenza

15.	**I think that I know a lot about the disease influenza and the flu shot.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
16.	**I think that there are far more benefits of the flu shot than risks.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
17.	**I think that there is a lot of false information being spread about the flu shot.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
18.	**I am generally in favour of the flu shot.**	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Why is getting a flu shot important to you?

_____

_____

_____

_____

What convinced you to get a flu shot?

_____

_____

_____

_____

What do you think could be done to encourage more people to get the flu shot?

_____

_____

_____

_____

Thank-you for completing this questionnaire.

APPENDIX D: QUALITATIVE RESPONSES

Why is getting a flu shot important to you summary of responses from 75 participants:

- To protect the elderly (4), infants, children (4), my family (6), others (8), myself (5)
- To prevent the flu/decrease chance of obtaining flu (12)
- I don't want to get sick (11)
- I want to stay healthy (7)
- I don't want to miss time off work (6)
- I have serious underlying health issues (6)
- Don't want to spread the flu (2)
- It may lessen the symptoms/complications if one does contract the flu (2)
- It is an easy public health prevention tool
- It is reassuring
- To continue to be a care-provider
- Because it is. And I'm desperate to impress my girlfriend.
- Because I was told that it prevents the flu – except, I still get it anyway so, I don't know
- It is not important to me – more a preventative measure.
- I live alone and there is no one to take care of me if I get sick
- I don't like being sick. It is a waste of time and takes too much out of me. I also am a busy responsible adult and have to look after myself because there is no-one else who could do that
- It is not important to me, I wanted to see if it worked or not this time. Last year I got the shot and got the virus

What convinced you to get a flu shot summary of responses from 75 participants

- Doctor (11)
- History of previous flu shots working (8)
- Health of my family (6)
- History of illness with the flu (5)
- Wife (5)
- Workplace (4)
- Common sense (4)
- Underlying illness- self or family member (4)
- Exposed due to profession or working with children (4)
- I don't want to get the flu or sick (4)
- Myself (3)
- Habit (3)
- No convincing (3)
- Mom (2)

- Convenient clinic (2)
- General advertisements (2)
- Faith in medical research and development
- It is an easy positive health prevention tool
- Some of the flu viruses seem more virulent in recent years
- Avoid missing work
- Believe everyone should get it.
- Friend
- Best prevention available
- General concerns re pandemics
- Had nothing better to.

What do you think could be done to encourage more people to get the flu shot summary of responses from 75 participants

- Education - emphasis on potential severity of illness, risks and benefits, statistics, utilization of accurate information, have consistent messaging, dispel myths, have nurses into schools, use more detailed information (21)
- Clinics – have more clinics, free clinics, accessible clinics, use different types of locations (12)
- Advertising – use television, newspaper, radio, flyers, rap videos and TV. personalities (11)
- Promoting at schools/ have clinics at schools (7)
- Nothing more (5)
- Make more convenient at doctors' offices (3)
- Not sure (2)
- Make it mandatory
- Civil order
- Make sure that the vaccine protects against currently circulating virus.
- Giveaways (e.g., Free Raptors, Leafs, Jays tickets)