THE DEVELOPMENT OF A ONE DAY EDUCATIONAL WORKSHOP FOR REGISTERED NURSES AND LICENSED PRACTICAL NURSES: ENGAGING FLU CHAMPIONS

by

© Anne Blackmore

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Abstract

Every fall health care facilities across Canada initiate an in-depth influenza vaccine campaign. The World Health Organization and the Canadian National Advisory Committee recommends that 90% of all health care workers (HCW) get immunized against influenza. Research has shown that the vaccination of health care professionals decreases morbidity and mortality rates of patients. Despite this, the current immunization rates for health care workers in Canada range between 40-60% with some long term care facilities only achieving a 30% vaccination rate. To increase vaccination rates innovative strategies are needed. The following practicum report provides an overview, the background, rationale, review of the literature, and key stakeholder consultations which guided the development of the one day educational workshop for engaging flu champions. Morrison, Ross, Kalman and Kemp's (2013) instructional design model, along with Knowles Principles of Adult Learning (1984) was incorporated throughout the development of the workshop. The advanced nursing competencies: clinical practice, research, leadership, consultation and collaboration were achieved throughout the process.

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List of Figures

List of Appendices

Table of Contents

THE DEVELOPMENT OF A ONE DAY EDUCATIONAL WORKSHOP

The influenza virus can affect anyone, regardless of age. Rates of influenza are highest among children ages five to nine; serious illness and death is highest in those less than two years of age and those age 65 or older (National Advisory Committee for Immunizations, NACI, 2014). The World Health Organization (WHO) (2014), and the National Advisory Committee for Immunizations (NACI) (2014) recommends that 90% of all health care workers (HCW) get immunized against influenza (NACI, 2014). Health care workers who work with vulnerable populations must be vaccinated being that they have a very high risk of transmitting influenza to their patients, even if they are not clinically sick. As a clinical nurse educator at the Carmelite House, a long term care facility, I have experienced the negative consequences of an influenza outbreak on our residents. The elderly are a high risk, vulnerable population who typically cannot fight off influenza and often time die due to the virus. Despite this recommendation HCW do not get routinely immunized. The goal of this practicum was to craft and educational workshop to increase awareness and vaccination rates amongst health care workers.

Knowles Theory of Adult Learning (1984), along with Morrison, Ross, Kalman and Kemp's Instructional Design Model (2013) were utilized throughout the development of the one day workshop. Throughout the entirety of this project I developed and enhanced the Advanced Nursing Practice competencies of clinical practice, research, leadership, consultation and collaboration.

Background and Rationale for Practicum

Being vaccinated against influenza is the standard of care for all health care workers (HCW) (NACI, 2014). This is because HCW are at higher risk of spreading and transmitting the virus to their patients at their most vulnerable time (Corace et al., 2013). In some cases, influenza vaccination has been shown to decrease population morbidity and mortality rates up to 50%, especially in the elderly (Corace et. al, 2013; NACI, 2014). The World Health Organization (WHO) (2014) recommends that 75% of the elderly population should be vaccinated against influenza if we are to reduce morbidity and mortality rates in this high risk population. A key factor of protecting this vulnerable population is the vaccination of health care workers against influenza (Bentele, Bergsaker, Hauge, & Bjolmhilt, 2014).

Despite the large body of literature identifying the positive outcomes of being vaccinated against influenza, only 40-60% of HCW (e.g. nurses, physicians, physiotherapists) in Canada are vaccinated yearly (Quach, Pereira, Kwong et al., 2013). Furthermore, although methods to increase HCW influenza vaccination rates (e.g. mobile carts, declination forms, incentives,) are evident on a provincial, national (Corace et al., 2013; Quach, Periera, Hamid et al., 2013; Slaunwhite, Smith, Flemming, Strang & Lockheart, 2009), and international level (Fricke, Gastanaduy, Klos, & Begue, 2013; Raftopoulos, 2008; Rakita, Beverly, Hagar, Crome, & Lammert, 2010) vaccination rates

remain low. Barriers to vaccination threaded throughout the literature include a fear of adverse effects, disbelief in effectiveness of the vaccine, a fear of needles (Castilla et al., 2013; Corace et al., 2013; Dube et al., 2013; Eldestein & Pebody, 2014; Quach, Pereira, Heidebrecht et al., 2013), and personal attitudes toward vaccination (Hollmeyer, Hayden, Poland, & Buchholz, 2009; Heimberger et al., 1995; Osman, 2009; Raftopoulous, 2008; Hofmann, Ferracin, Marsh, & Dumas, 2006).

At Central Health, specifically Grand Falls-Windsor, the vaccination rates of HCW are similar to the rest of Canada at 56% in acute care setting and 40% at the long term care facility (Central Health Influenza Statistics Report, 2013) Currently, at Central Health there is one voluntary vaccination program run by a occupational health nurse and a infection control practitioner. These two individuals rotate between sites with mobile carts and will occasionally have declination forms signed. The current program appears to be lacking physical human resources. An educational day such as the one proposed for this practicum project would help promote consistent influenza vaccination amongst HCW in this region by providing nurses with the education to take on the role as a "flu champion"; a person advocating for the influenza vaccine and its importance for HCW.

The literature has shown that using a "flu champion" in conjunction with educational campaigns and peer led immunization can increase HCW vaccination rates (Quach, Pereira, Kwong et. al, 2013; Slaunwhite et al., 2009). I have experienced this peer-to-peer motivation at my workplace, a long-term care facility. In 2012, taking on the role of a "flu champion" I addressed co-workers concerns about the influenza vaccination

and reinforced the positive outcomes of being vaccinated. Being a nurse I had some basic knowledge of influenza however, I spent considerable time seeking out resources to inform my practice such as the occupational health and safety nurse. As a result of my efforts in 2012 the full time permanent employee vaccination rate in my workplace increased to almost 85%. The following year I was off work on maternity leave and not replaced thus, our vaccination rate was only 40% for 2013 influenza season. This personal experience supports my proposed practicum; a one- day educational workshop that would train flu champions to advocate for and deliver an influenza vaccination program to health care workers.

Goals and Objectives

The overall goal of this practicum was to develop a one day educational workshop for nurses to engage them as "flu champions": advocates for the influenza vaccine for health care workers at Central Health. The objectives for this practicum are:

1) To demonstrate an application of the following advanced nursing practice competencies by the end of my practicum process: clinical experience, research utilization, leadership, consultation and collaboration.

2) To do a comprehensive literature review to inform the development of the practicum project.

3) To complete consultations with key stakeholders to develop a one-day workshop for nurse flu vaccine champions

Overview of Methods

There were four methods employed in order to meet my goal and objectives. These included a comprehensive literature review, consultations with key stakeholders, a Theoretical Framework and a Conceptual Model of Instructional Design for the development of a one day workshop.

Summary of Literature Review

Every fall health care facilities across Canada initiate an in-depth influenza vaccination campaign. Influenza is a respiratory virus identified in 1933. It is a highly contagious, upper respiratory tract disease that can cause significant harm and even death in the vulnerable populations (Aziz, 2013). Worldwide, influenza causes approximately three to five million cases of severe illness in which 250,000 to 500,000 can result in death (WHO, 2014). Annually, in Canada, 4000 deaths and 20,000 hospitalizations are estimated to be related to influenza (NACI, 2014). In 2012/2013 Newfoundland had 723 confirmed cases of influenza resulting in 279 hospital admissions and 15 deaths (Department of Health and Community Services, 2013).

In order to gain a fuller understanding of the factors that impact the decision to get vaccinated or not for influenza a literature review was completed (see Appendix A). This literature review informed the development of a one-day educational workshop for Registered Nurses (RN) and Licensed Practical Nurses (LPN) on the promotion and administration of the influenza vaccine. A search was completed using the data

bases of CINAHL, Cochrane Library, and PubMed with the key words: “benefits of influenza vaccine”, “influenza vaccine”, “influenza vaccine and health care workers”, “mandatory influenza vaccine policy”, “influenza vaccination in HCW and reduction in costs”, and “educational programs and influenza vaccine”. The Public Health Agency of Canada’s critical appraisal tool kit was used to appraise a total of 21 studies, in which literature summary tables were created (see Appendix B). The resources available on the Memorial University Course D2L were used to critically appraise any qualitative studies.

There were four main bodies of literature identified that provide insights into the challenges with the influenza vaccine and HCW: (1) benefits of vaccination, (2) making the decision to be vaccinated or not (3) mandatory vaccination policies and, (4) impact of current programs and educational initiatives.

Benefits of Influenza Vaccination

The benefits of the influenza vaccine have been reported in the literature for the past 30 years. Vaccinating health care workers (HCW) is a recommendation of the WHO, the Center for Disease Control (CDC), the NACI, and the Advisory Committee on Immunization Practices (ACIP) (Edelstein & Pebody, 2014; Fricke, Gastanaduy, Klos, & Begue, 2013). Higher vaccination rates of HCW have been linked to a reduction of mortality rates in elderly residents (Ahmed, Lindley, Allred, Weinbeum, & Grohskopt, 2014; Beyer et al., 2013; Carmen et al., 2000; Ferroni & Jefferson, 2011; Lemaitre et al., 2009; Potter et al., 1997). The benefits of seasonal influenza vaccination of HCW is not only seen in reduced mortality rates but has also been associated with reduced

absenteeism and cost (Burls et al., 2006; Canning, Phillips, & Allsup, 2005; Festini, Biermann, Neri, Reali, & Martino, 2007; Lemaitre et al., 2009; Saxen & Virtanen, 1999).

Although there is evidence to support the positive health outcomes of influenza vaccination by HCW (e.g. decreased morbidity and mortality in the elderly) there is a small body of literature that does not support these findings. Jefferson et al.'s (2010) Cochrane review reported no significant correlation between health care workers being vaccinated and decreasing the incidence of influenza among individuals ages 60 or over in long term care facilities.

Making the Decision to be Vaccinated or Not

The most common barriers in the literature that contribute to the low influenza vaccination rates among HCW were related to concerns with perceived susceptibility to the influenza virus, harmful effects of the vaccine, and the effectiveness and accessibility of the vaccine.

A key reason noted in the literature as to why health care workers refuse to get the influenza vaccine is a lack of concern about contracting and getting ill as a result of influenza (Corace et al., 2013; Hollmeyer et al., 2009; Raftopoulos, 2008; Shahrabani, Benzion, & Din, 2009). Declined vaccination has also been linked to fear of having an adverse reaction, or they will get the "flu" from the vaccine (Corace et al., 2013; Heimberger et al., 1995; Hoffman et al., 2006; Hollmeyer et al., 2009; Quach, Pereira, Kwong et al., 2013; Shahrabani, Benzion, & Din, 2009). For example, Corace et al.'s

(2013) cross sectional survey of (n=3, 275 HCW) reported that the biggest barrier to vaccine uptake was the belief that the vaccine could cause the illness (72%).

The fear of adverse effects of the influenza vaccine is still very evident in the literature (CDC, 2012). Although the influenza vaccine has minor side effects (e.g., fever, muscle aches, soreness at the injection site) they subside within 48 hours (Corace et al., 2013).

Health care workers refusal of the influenza vaccine has been linked to a general disbelief of vaccinations, doubt in the effectiveness of the vaccination, inconvenience, not having the time to get the vaccination, and peer influence (Hollmeyer et. al., 2009; Quach, Pereira, Kwong et. al., 2013; Raftopoulos, 2008; Shahrabani, Benzion, & Din, 2009; Slaunwhite et al., 2009). Adding to this are concerns about accessibility to getting the vaccine (Edelstein & Pebody, 2014; Hollmeyer et al., 2009; Quan et al., 2012; Shahrabani, Benzion, & Din, 2009). Health care workers described a lack of time to leave a busy unit and go to the location where the vaccine was being administered (Edelstein & Pebody, 2014; Hollmeyer et al., 2009; Honda, Sato, Yamazaki, & Padival, 2013; Quan et al., 2012; Shahranbani, Benzion, & Din, 2009).

Other less common barriers to getting the influenza vaccine cited by HCW include; allergies to the product, religious beliefs, and other medical conditions that contraindicate getting the vaccine (Hollmeyer et al., 2009; Quach, Pereira, Kwong et. al, 2013).

Reasons cited in the literature as to why health care workers chose to receive the influenza vaccine included ones' attitudes, age, and past vaccine practices, (Castilla et al., 2013; Corace et al., 2013; Hollmeyer et al., 2009; Raftopoulos, 2008).

The older the HCW, the higher the vaccination rate. For example a study of primary HCW (n=1,965) trends in vaccination coverage in Spain found that older age groups (> 45 years) have more vaccine continuity (OR 0.72; 95% CI: 0.54-0.97) (Castilla et al., 2013). A HCW personal attitude was also noted to contribute to the decision to be vaccinated. If a HCW was concerned with self-protection and was in close proximity to a vulnerable population believed to be at risk they had higher vaccination rates (Castilla et al., 2013; Corace et al., 2013; Hollmeyer et al., 2009; Jaiyeoba, Villers, Soper, Korte, & Salgado, 2009; Osman, 2009; Raftopoulos, 2008; Shahrabani, Benzion, & Din, 2009).

Despite this the importance of getting vaccinated for the health of ones clients, it is not well addressed in the literature (Cortes-Penfield, 2014; Delden et al., 2008). The majority of literature has resulted in protection of oneself or their families as their main reason to be vaccinated.

Past vaccination practices have been linked to vaccination rates. That is HCW who have been vaccinated in the past against influenza tend to get the vaccination annually (Corace et al., 2013; Hollmeyer et al., 2009; Jaiyeoba et al., 2009). One study of HCW (n= 689) reported that the decision to be vaccinated in the past was related to the decision to get vaccinated in the future ($p < 0.0001$) (Jaiyeoba et al., 2014). Similar results were noted by Corace et al.'s (2013) study of HCW (n=3,301) ($p < 0.0001$).

This trend of getting vaccinated was not supported in a recent study that reported a decline in the numbers of HCW who were getting revaccinated, from 58.4% to 49.3% from 2008 to 2012 warranting further examination as to how vaccinations decisions are made (Castilla et al., 2013).

Mandatory Vaccination Policies

In efforts to increase the uptake of health care workers (HCW) getting vaccinated for influenza some institutions have introduced mandatory vaccination policies (Quach, Pereira, Kwong et al., 2013). A mandatory vaccination policy infers that any HCW working in an institution with a mandatory policy is expected to receive the influenza vaccine yearly. Mandatory influenza vaccination policies are more common in the United States than Canada.

Arguments against mandatory influenza vaccination policies are evident in the literature. Most notable have been its infringement on a person's freedom of choice, it's potential hidden costs, and that employers must ensure alternatives have been exhausted prior to implementing such a policy (Quach, Periera, Kwong et al., 2013; Delden et al., 2008; Rakita, Hagar, Crome, & Lammert, 2010).

For example Winston, Wagner and Chan (2014) found that 31.7% of (n=202) nurses felt that a mandated policy was an infringement on their human rights and 43.7% stated that termination of employment based on refusal to be vaccinated was unfair (Winston et al., 2014).

Despite arguments against mandatory vaccination of influenza there have been studies providing positive support in favour of mandatory vaccination policies. Mandatory vaccination policies have been associated with a consistent vaccination rate of greater than 90% in HCW (Delden et al., 2008, Rakita et al., 2010; Winston et al., 2014).

In fact one study found that the initiation of a mandatory policy resulted in an increase of health care worker vaccination rates from 58.3% in 2008/2009, to 86.7% in 2009/2010 and 91.9% in 2010/2011 (Quan et al., 2012). Higher vaccination rates of HCW have also been shown to decrease mortality up to 40% in the elderly (Carmen et al., 2000; Lam, Chambers, MacDougall, & McCarthy, 2010; Lemaitre et al., 2009; Potter et al., 1997).

The implementation of mandatory vaccination policies can be challenging. In order to increase influenza vaccination rates diverse education programs and initiatives have been employed.

Impact of Current Programs and Educational Initiatives

Organizations with influenza vaccination programs for health care workers (HCW) have higher rates of vaccination compared to those without a program (Bentele et al., 2008; Edelstein & Pebody, 2014; Fricke, Gastanaduy, & Bengue, 2013). Such programs include the use of declination forms, combinations of traditional (mobile carts, educational campaigns), and non-traditional approaches (e.g. social media), and flu champions.

The use of declination forms has been noted to increase vaccination rates of HCW

(Jaiyeoba et al., 2014; Quach et al., 2013). Jaiyeoba et al. (2014) reported an increase in HCW vaccination rates from 73% to 94%, with the initiation of a mandatory declination form. Reasons cited for vaccine uptake was the requirement of declination (33%), followed by protecting themselves (28%), and concerns for their patients (26%) (Jaiyeoba et al., 2014). Despite these positive gains from declination forms, tracking of declination forms is a time-consuming and laborious process and is often times not complete despite institutional policies (Edelstein & Pebody, 2014; Quach, Heidebrecht et al., 2013).

A combination of educational interventions have been proposed to address the diverse challenges of implementing vaccination programs and increasing vaccination rates. One study in England (n=345,619 HCW) found that areas using innovative methods in their vaccination campaigns (e.g. mobile carts, leaflets, peer to peer vaccination, videos, posters, twitter feeds and facebook posts) had an increase in vaccination rates (Eldestein & Pebody, 2014). For example, the increase usage of peer-to-peer vaccination yielded an increase uptake in rates from 3.8% to 38.8%, educational DVDs yielded an increase in rates from 3.8% to 22.5% and social media, twitter, and facebook, yielded an increase in rates from 2.5%-12.5% and 1.3%-6.3% respectively (Edelstein & Pebody, 2014).

Another solution to increase HCW vaccination rates suggested in the literature is the use of flu champions. Slaunwhite et al.'s (2009) randomized control trial (RCT) in Nova Scotia, examined if a program consisting of promotion and administration of the influenza vaccine between peers (flu champions) would increase vaccination rates among

health care workers (HCW) (n=46). The champions were trained in basic facts and information surrounding the influenza vaccine. The units with a vaccine champion present had an increase in HCW vaccination rates from 44% in the past to 54% ($p<0.03$). In comparison, the units with no vaccine champion only had a slight increase in vaccination rates from 38% to 41%, ($p=0.25$) (Slaunwhite et al., 2009).

Evidence suggests that using multiple interventions within vaccination programs can increase HCW influenza vaccination rates however, the number, the types, (Lam et al., 2010) and the location and timing of interventions needed for a successful voluntary vaccination campaign is unknown and needs further explorations. What is clear is that the use of flu vaccine champions improves vaccination rates.

Gaps in the Literature

The review of the literature has highlighted some key gaps that informed the development of this practicum project. First, there appears to have been many missed opportunities to increase vaccination rates among health care workers (HCW) prior to initiating a mandatory vaccination policy such as, the use of flu champions, with peer-to-peer immunizations (Quan et al., 2012). Second, there is a lack of research that has examined the impact of HCW attitudes and beliefs on vaccination choices (Corace et al., 2013; Quach, Periera, Kwong et al., 2013). Third, there is a small amount of literature on the impact of HCW being vaccinated and absenteeism but very little literature examining if there is a cost savings associated with the vaccination. Fourth, although there is an abundance of research measuring the impact of existing educational and vaccination

programs on HCW vaccination rates there is no research investigating what specific types of interventions and in what combination will have a positive effect on increasing vaccination rates. Finally, there is a lack of literature that examines how a HCW sense of altruism- to protect others, influences the decision to be vaccinated. This practicum will address these gaps in the literature.

Drawing on existing evidence in the literature the development of an educational workshop to educate and engage "flu champions" will be one step closer to increasing the vaccination rates of HCW at Central Health, while still allowing them the "informed choice" to be vaccinated.

Summary of Consultations

Consultations took place with key stakeholders in which the questions and content were guided by the literature review. A consultation report (see Appendix C) was completed. I consulted with seven nurses at Central Health to obtain their input and ideas surrounding the vaccine in general and to identify perceived benefits and or challenges to the proposed program. These employees consisted of an Occupational Health and Safety Registered Nurse, an Infection Prevention and Control Registered Nurse, a Clinical Nurse Educator, two frontline Licensed Practical Nurses (LPN) and two frontline Registered Nurses (RN). Participants were randomly approached. The sample consisted of six female and one male, ranging in age from 28-54 years. Their experience working ranged from less than five years to greater than 20 years in a variety of areas of nursing. All staff approached agreed to participate in the interviews.

The objectives for the consultations were:

1) To identify factors that may impact the decision to be vaccinated or not within the Central Health Region.
2) To gather information about existing policies and initiatives used at Central Health to promote and increase vaccination uptake.
3) To examine nurses attitudes and knowledge about the influenza vaccine in the Central Health Region.

4) To gather information that will inform the content and delivery of the one-day influenza vaccination workshop.

Data Collection

Prior to the start of the discussion participants were informed of the rationale and objectives of the study. Confidentiality was discussed. Their willingness to participate in the discussion inferred informed consent. A series of questions were asked to the participants either face to face in a private office, or over the telephone. This project is not a research project and did not require the ethics approval as per the Health Research Ethics Authority assessment tool. Notes during the interview were transcribed directly into a password-protected computer only accessible by me. The interview lengths were approximately 30 minutes.

Data Analysis

Responses to the interview questions were reread and common themes were grouped together and compared to the findings in the literature.

Theme One: Making the Decision to be Vaccinated or Not.

The first theme highlighted the reasons for vaccination or not. Reasons cited were self protection and protection of family, all similar to the findings in the literature. A notable gap was that only two consultants stated vaccination was for the protection of vulnerable clients. It was emphasized that the educational day should include information about the benefits that the vaccine can provide in protecting vulnerable clients

The most common reason identified related to the refusal of the vaccine was the misconception that the influenza vaccine can cause influenza. The fear of adverse effects was noted as the number one reason for refusal in some key literature (Hollmeyer et al., 2009). This finding provides evidence supporting the significance of including a good background as to the etiology of influenza, the vaccine, its use, and side effects in the workshop.

Theme Two: Appropriate Administration of the Vaccine

The importance of knowing how to properly administer the influenza vaccination was threaded throughout the narrative of five individuals. During the interviews five participants thought it would be important to include how to properly administer the influenza vaccine as part of the educational day. Currently Central Health has a self-learning package on the administration of the vaccine. This component could be taken and used as part of the educational workshop.

Theme Three: Mixed Feelings About the Vaccine

Some staff interviewed said that they believe in general health care workers do have mixed feelings about the influenza vaccine. That is, while some workers believed in the vaccine this is not always the case as several spoke of colleagues who were skeptical as to the benefits of the vaccine and the true efficacy of the vaccine. They spoke of colleagues that wanted to support the vaccine but were worried of the potential side effects that they may experience.

Gaps Noted in the Interview Findings

One major discrepancy was noted when four out of the seven staff I interviewed believed that most health care workers (HCW) supported and received the influenza vaccine. This is concerning because last year only 56% in acute care and 40% in long term care of HCW were vaccinated at Central Health. This shows that staff who support the vaccine may be unaware of the actual low vaccination rates at Central Health and the subsequent implications. This would be a good starting point for my educational day to discuss the potential implications of low vaccinations rates in relation to the most vulnerable patients such as children and the elderly. The benefits associated with the vaccination of HCW has been widely reported on in the literature and will be the opening foundation of the educational day.

Another issue noted in the interview findings is that people who chose to be vaccinated to protect their families and kids all had small children or grandchildren. The one participant who did not state this was young and had no children. Knowing this would be important during the educational session to ensure that the content addresses the benefits of vaccination for all populations (eg. elderly and children).

During the interview, one participant suggested that the modes of transmission of influenza should also be included in the educational day. It would be beneficial to discuss other methods of influenza prevention, not just the vaccine itself, including proper hand washing, isolation techniques, and appropriate personal protective equipment usage.

Informal Consultation Findings

After reviewing influenza vaccine similarities on each site, the benefits, myths, and side effects of the vaccine were evident. The most notable topic was myths related to the vaccine and its side effects. During the educational workshop myths related to the influenza vaccine should be discussed. This includes providing accurate information about the vaccine, potential side effects of the vaccine and their severity. The inclusion of such content in my educational day will allow influenza vaccine "champions" the knowledge and tools to disseminated the proper information about the influenza vaccine to their co-workers.

Conclusion

The results from these consultations, along with the knowledge gained from my literature review, informed the content and delivery of the one day educational workshop. This day would include a discussion of the benefits of the influenza vaccine, the modes of transmission of influenza, methods of preventing the spread of influenza, common myths about the vaccination, safe administration of the vaccine including the potential side effects associated with the vaccine.

Theoretical Framework

The literature review and consultations guided the content for the project but a theoretical framework was needed to guide how the workshop would be developed to meet the needs of the targeted audience. A theoretical framework should be used as a foundation for any planned learning activity. The theoretical framework that informed the one day educational workshop was Knowles's Theory of Andragogy (1984). This framework is suited to this project being that the learners are adults and the focus is related to educating nurses on the benefits and importance of the influenza vaccine and the vaccination of health care workers (HCW).

Knowles proposed a theory for adult learning called andragogy, which means "the art and science of helping adults learn" (Knowles, p.43, 1984). Knowles's theory of andragogy was an attempt to create a theory to differentiate learning in childhood from learning in adulthood. Andragogy is a "model of assumptions" (Knowles, p. 43, 1984) about the characteristics of adult learners that are different from the traditional pedagogical assumptions about child learners rather than an actual theory of adult learning. Based on humanistic psychology, Knowles's concept of andragogy recognizes the adult learner as one who is autonomous, free, and growth-oriented (Knowles, 1984). Knowles identified six principles of adult learning including: 1) the need for information, 2) adults have a self-concept of being responsible for their own decisions, 3) the importance of past experiences, 4) the readiness to learn, 5) orientation to learning, and 6) motivation.

The first principle, need for information, takes into consideration the benefits and significance of the information. It was evident in the literature review and through the formal consultations that knowledge about the influenza vaccine was of importance to health care providers being that it can impact their day-to-day work, their families, and themselves negatively if an outbreak of influenza occurred. Thus, this population are internally motivated to learn about information pertaining to influenza vaccination (Knowles, 1984).

The second principle self-concept acknowledges that adult learners are self-directed and able to critically appraise evidence and make the decision as to whether the findings are relevant and useful to their current practice (Knowles, 1984). Adult learners can develop skills, which allow them to independently investigate, and assimilate each experience, both in formal classroom settings and in their everyday lives (Jones, 2005).

The third principle of adult learning recognizes the importance of one's past experiences on one's future learning (Knowles, 1984). In this project, the nurses can draw on their past experiences with the influenza vaccination when engaging in activities making the learner build on their own experience while using their past as a catalyst.

The fourth principle captures adult's readiness to learn. One's readiness to learn is enhanced when they can apply the information to help them cope and function in their daily lives (Knowles, 1984). Adult learners are practical and want to learn what they can use in the present. While using their past as a catalyst for change. Thus, basing

information on future initiatives will be less effective than making the information more pertinent to their current practice (Knowles, Swanson, & Holton, 2005). Given the high annual incidence of influenza, it is a 'real time' problem hence, the proposed program has immediate relevancy for practice. That is, it can reduce morbidity and mortality in vulnerable populations such as the elderly, where most of the practitioners are employed.

Knowles's fifth principle involves the adult's orientation to learning. An adult views education as a process that they go through to improve their current situation in life or work (Knowles, 1984). To promote an effective learning environment, a performance-based approach to teaching, rather than a subject based approach, will be more beneficial with the adult learner (Knowles, 1984). Hence, in this workshop there are activities that actively engage the participants. The workshop has a session on concept mapping which allows the participants to facilitate and build their own learning through working together to discuss their own personal challenges and then create potential solutions they believe will correct the identified challenges.

The final principle is motivation. The adult learner needs to be motivated internally and externally. Motivation to learn will likely be activated for the adult learner once the first five principles have been met (Knowles, 1984). Nurses are more apt to learn and absorb information when they feel internally motivated to do so. Nurses that want to succeed in their job and want to know their profession to the best of their ability will be more motivated to learn. If motivation to learn is not present, due to negative past

experiences, or the seemingly lack of importance of the information, then effective learning will not occur (Knowles, 1984). The proposed target group should possess this motivation to learn, as influenza creates challenges presently in their everyday work life with outbreaks, ill patients and sometimes death.

Model of Instructional Design

Morrison, Ross, Kalman, and Kemp's (2013) Model of Instructional Design was the instructional design model selected to guide the development of the one day workshop on influenza. This instructional design approach considers "instruction from the perspective of the learner rather than from the perspective of the content "(Morrison, Ross, Kalman, & Kemp, p.7, 2013). The overall goal of instructional design is to make learning more effective and efficient in order to meet the needs of the learner (Morrison et al., 2013). Tailoring instructional strategies to coincide with the learner needs can facilitate the learning process for participants. This is applicable in health care education. Time is very valuable to nurses so the more efficient and less difficult a learning process is the more it will be accepted and embraced amongst the staff.

Morrison et al.'s (2013) instructional design contains nine elements that are represented in a circular model (see figure 1). These include; instructional problems, learner characteristics, task analysis, instructional objectives, content sequencing, instructional strategies, designing the message, development of instruction and evaluation instruments.

This model also contains two outer circles that are an ongoing process throughout the life of the instructional design. These include; planning, implementation, project management, support services, revision, summative evaluation, formative evaluation, and confirmative evaluation. This circular model is unique to this specific instructional

design. The nine elements within this model do not need to be followed in a linear fashion rather this model allows for flexibility in the design and evaluation process (Morrison et al., 2013).

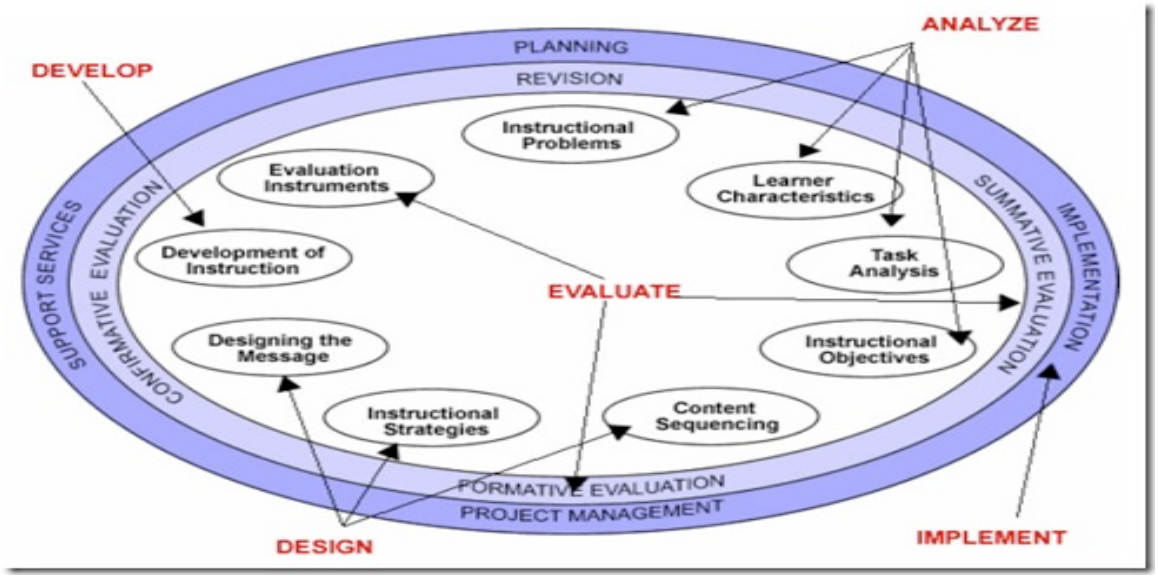

Figure 1

Instructional Problem

The identification of the problem is the first step in effective instructional design. That is the gap between existing knowledge and the desired outcome. The problem that is highlighted with this practicum is the lack of knowledge and resources available to promote and administer the influenza vaccine at Central Health. Once the problem is identified the need must be examined in order to find the most effective solution. A "need is the gap between what is expected and the existing situation" (Morrison et al., p.31,

2013). There are three types of needs assessed in this practicum: 1) a normative need, 2) a comparative need, and 3) a felt need.

A normative need is identified by comparing the rates of your targeted audience against the national standards. In my literature review I compared the vaccination rates of health care worker in my region to those of health care workers (HCW) provincially, nationally, and internationally. I found that the vaccination rates within my organization were very similar to the rest of the province and the country.

Comparative needs are similar to normative needs in that they are a comparison. For a comparative need one would compare their desired target audience to that of a similar peer group. Comparative needs were assessed by comparing rates of influenza vaccination rates of my organization against other organizations and other units. What was evident is that Central Health had lower rates in long term care than acute care, and that when a strong leader is present promoting the vaccine, these rates can and will increase. This comparison was evident the year that I spent promoting the vaccine at my place of work and then comparing our rate to that of a similar floor at the hospital.

A felt need is a gap between current performance and desired level. This was identified through my interviews when it was noted that all participants were in full support of the vaccination of HCW but currently felt that they did not have the knowledge or skills to promote the vaccine effectively to their peers. Two nurses interviewed stated that they always received the influenza vaccine and would embrace having a stronger

knowledge base about the vaccine so they can help improve health care workers vaccination rates at Central Health.

All those consulted were all in favour of the influenza vaccine. Based on the above needs it was very clear that the issue with recruiting heath care workers to have the influenza vaccine was two-fold. First, the degree of knowledge about the vaccine varied. Second, health care workers felt that they lacked the training to be able to convince their co-workers to be vaccinated. The literature review and the interviews allowed me to have a comprehensive understanding of the particular learning needs around this topic. Therefore, the information that will be involved in the design will meet the needs of all the staff, starting off with building a strong knowledge base about influenza and the vaccine.

Learner Characteristics

An examination of the learner's characteristics is very important when using this instructional design model. The target audience for my workshop is Registered Nurses and Licensed Practical Nurses. It was important that I examined the unique characteristics of each profession type, including their ages, past experience, educational level and working environment when developing my instruction. This was important to enable the sessions to appeal to each learner in some way. The educational background and preparation of the potential participants for this workshop will vary however they all have the same perquisite skills. They all have a nursing background with knowledge of

pharmacology and administering injections. This includes completion of an on-site vaccination module where applicable. Also, given their background in nursing they should be comfortable engaging in group work and psychomotor skills. Being that the unit manager was asked to recruit participants that exhibited certain personal attributes such as leadership, motivation, and respected by peers I anticipate an easily motivated group of nurses.

Task Analysis

This element is considered one of the most important components in the instructional design process. Task analysis helps determine the knowledge, content, concepts, personal skills and procedures that are needed for the learner to complete the desired task (Morrison et al., 2013). Topic analysis and procedural analysis were used to develop the influenza workshop.

Topic analysis is used to analyze cognitive knowledge and to develop content facts, concepts, and principles associated with influenza and the influenza vaccine throughout the workshop. The topic analysis revealed the content focus and the structure of how the components will be presented (Morrison et al., 2013). The content of my one day workshop was guided by an in depth literature review, information from my consultations with key stakeholders, and from my own personal experiences and insights. For example the stakeholders suggested that the workshop should include a good knowledge base of influenza and the vaccine, and also deal with personal experiences

with the vaccine to help explore what does and does not motivate people to be vaccinated. The workshop will begin with basic knowledge and necessary information about influenza and the influenza vaccine so that the learner can have a solid foundation and understanding of the topic. There is no longer a required vaccination module for nurse at Central Health unless you did not have the content included in your schooling. Vaccination and proper technique and knowledge about vaccines is now considered a core competency in both the Licensed Practical Nurse (LPN) and the Baccalaureate (BN) programs. To help achieve this desired outcome I did review the module that is available at Central Health prior to devising the content for the day to ensure that the content will build on this foundation, whether learned in school or after the fact. This outcome will focus on if the participants fully grasp the importance of HCW being vaccinated against influenza.

Procedural analysis identifies the steps or essential tasks need to master a psychomotor task. Similar to topic analysis it considers content structure. The sequencing of how to wash your hands properly, or don appropriate personal protective equipment will be two small procedures that will be built upon during the day. This is a skill they learn in school so it should be familiar but it is quite often performed incorrectly or inadequately once working independently. This became very clear this past season when proper personal protective equipment procedures were reviewed throughout the hospital

for Ebola training. The inadequacies were so evident that the sessions surrounding proper hand washing and personal protective equipment are still ongoing.

Instructional Objectives

Instructional objectives must provide the learner with what they are expected to know and perform after the program is completed (Morrison et al., 2013). The objectives are a guiding tool to help the instructor design our strategies and assessments correctly. The objectives are all measurable, realistic and achievable. Morrison et al (2013) define three objective domains; cognitive, psychomotor, and affective (Morrison et al., 2013). Depending on the design of one's program one or all of the domains may be used to formulate objectives. My educational workshop includes objectives from the cognitive, psychomotor and affective domains. Each learning activity starts off with learning objectives and then instructional strategies are designed to meet the objectives.

The cognitive domain includes a taxonomy of objectives including knowledge, comprehension, application, analysis, synthesis, and evaluation (Morrison et al., 2013). The workshop will showcase this domain by teaching a solid knowledge base on the background of influenza and the benefits. The workshop will allow time for application, analysis, and synthesis through a concept mapping session wherein we discuss challenges and methods on how to address these on the units. Evaluations of the participants learning are threaded throughout the day through electronic polling that are similar to pre and post-tests and reflective questions.

The psychomotor domain encompasses skills to complete physical activities (Morrison et al., 2013). The workshop will include a session using the psychomotor domain. The session on proper technique for hand washing allows the participants to re-learn the proper steps to hand washing and visually see the effects of improper hand washing through the use of the black light and "germ" lotion.

The affective domain involves objectives concerning attitudes, appreciations, values and emotions (Morrison et al., 2013). The affective domain consists of five levels; 1) receiving, 2) responding, 3) valuing, 4) organizing, and 5) characterizing by a value complex. The workshop will address the five main levels of this domain. The first level of receiving includes the willingness to give attention to and event or activity (Morrison et al., 2013). This will be experienced through drawing the attention of the participants in the beginning through the interactive electronic polling and then proceeding into the information power point session on influenza and the vaccine. The second level of responding will be ongoing throughout the workshop. Responding includes the participants answering, or following along with the different sessions.

The last three levels will be achieved through the afternoon sessions of defining a flu champion and concept mapping. The third level of valuing will be reached by the participants through the process of creating their own definition of a flu champion. Throughout this session the participants will support, participate and grow into their own definition of what a flu champion means to them. The final levels of organizing and

characterizing by a value complex will be achieved through the final session of concept mapping. Throughout this session the participants will have a chance to discuss specific challenges they may be faced with and create their own solutions together. This will allow them to organize, identify with and develop a plan going forward (Morrison et al., 2013). Through this workshop I hope the participants will then reach the fifth and final level, which will mean the participant, will believe, and practice what they have learned. The newly learned role of flu champion should become part of their day to day work lives (Morrison et al., 2013).

Content Sequencing

The sequence in which information is presented plays a pivotal role in the effect it will have on the learner. The content has to flow in a logical and effective manner to allow the learner to achieve the desired objectives. Morrison et al.'s (2013) discuss the use of three sequencing schemes; learning-related, world- related, and concept-related sequencing. To begin any content sequencing of instruction the learning-related strategy should be used. This sequencing scheme allows the designer to start with pre-requisites of the program that are needed prior to building towards more complex cognitive concepts (Morrison et al., 2013). My workshop was designed based on the learner characteristics discovered through my learner analysis. Each session of my workshop was designed with the educational level of a Registered Nurse (RN) or a Licensed Practical Nurse (LPN) in mind.

The content sequencing of my workshop was also guided by world-related sequencing. This type of sequencing involves content that represents objects, people and events consistent with the real world (Morrison et al., 2013). There are three types of sequencing within world- related sequencing; 1) spatial, 2) temporal, and 3) physical. For my workshop I used temporal sequencing to structure my workshop. The workshop flowed in an orderly sequence, starting with the facts, background and history about influenza and building on it throughout the day, ending with the most difficult content at the end, which was creating solutions to overcome challenges to HCW refusing the influenza vaccine.

Instructional Strategies

The strategies used to guide the instruction is a creative process that requires a variety of approaches to ensure that all learners are engaged and that strong relationships are forged between the learners new knowledge and their existing knowledge through instruction (Morrison et al., 2013). The strategies I have used throughout my educational day are stimulating, unique, and plentiful to ensure all learners effectively absorb the presented content. Some examples of the day include small group discussions, video clips, hand washing stations, guest speakers and interactive brain storming sessions. The workshop beings with an interactive electronic polling session to stimulate the interest of the participants through interactive technology. The day then develops using a power point session developed with strong visuals and proper slide orientation with very few

words per slide as to not overwhelm the participants. The session on vaccine and side effects is also another interactive session to keep the interest of the participant and to allow them to actively be involved with their own learning. The day will end with a concept mapping session, which will allow the participants an outlet to develop their own solutions to their own personal challenges experienced. The day overall is a very engaging and fosters a good learning environment.

Designing the Instructional Message

When designing the instructional message the focus must be on translating the plan into an effective information session that will engage the learner by highlighting and signalling the important points (Morrison et al., 2013). There are three areas of designing the instructional message that were followed. First, the strategy of pre-instruction was used. This included the use of a preface, which outlined the specific tasks that must be completed prior to the workshop being able to begin. Also, a pre-test was included at the beginning of the day, along with clear objectives discussed at each session of the workshop. The second strategy of signalling the structure of the text through word and typography was followed when key terms and words were bolded and italicized to stand out in each session's instruction. Lastly the use of real life videos to provide some comic relief while highlighting the extreme importance and benefits of the influenza vaccine around the world was used to help the learner grasp and retain the information.

Development of the Instruction

The development of the instruction involves bringing the designed instructional message to fruition. The instructional designer has to decide how he or she will communicate the information and materials created to the learner in an effective manner (Morrison et al., 2013). The workshop was designed to be instructed by a clinical nurse educator or similar type role. The manual was designed to be easily followed with bolded and italicized font to draw the attention of the instructor to key information to emphasize. The actual instruction for my workshop was developed with my specific learner, Registered Nurse (RN) and Licensed Practical Nurse (LPN) in mind. Each session used language and information at a level that an RN or LPN educated participant could grasp and understand, such as medical terms and abbreviations. The workshop content was given back to a few key stakeholders for review, such as the occupational heath and safety nurse, the infection control practitioner and one frontline nurse. All three people consulted felt that the content was appropriate for the targeted learner. The frontline nurse felt that the interactive sessions were excellent and she thought it would help keep the participants engaged since they would be actively involved in coming up with their own solutions to the identified challenges.

Morrison et al. (2013) discusses several instructional methods. The method most applicable to my educational workshop is group presentations and small-group learning formats. The workshop incorporated technology and innovative ways of involving the

learner to assess the effectiveness of the program. The workshop will have electronic polling to create two-way dialogues between teacher and learner, creating an open, active learning environment rather than a passive learning environment.

The basis of an instructional design is to ensure the instruction is developed to best meet the specific learning needs of the participants. Clear learning objectives start off each session, with clearly laid out strategies. My workshop includes a power point session, that is visually appealing and the content designed efficiently at acceptable time frames to ensure full attention of the learners (for example, no slide over loaded with words, or topic too long). The small groups include a hands on session with tactile and visual stimulation to make the participants aware of the benefits of hand washing and personal protective equipment (PPE) in the prevention of influenza. Also, the workshop consists of a concept mapping / brainstorming session which will allow the participants to discuss their own challenges experienced at work with regards to the vaccination of HCW, along with the development of their own solutions. These small group, interactive sessions will help learners assimilate the new knowledge by allowing individuals to discuss materials, share ideas and problem solve with others (Morrison et al., 2013).

Development of Evaluation Tools

The final step when creating an instructional design is crafting the evaluation tools that will be used to assess the outcome of the designed program. The overall goal of any educational or training program is to have successful learning by the learner (Morrison et

al., 2013). Evaluating the effect of the designed instruction will allow the instructor to improve the program. This is why evaluation and revision is an ongoing process that is not linear or sequential but can happen during any moment of the instruction.

There are different types of evaluation in Morrison et al.'s (2013) model for instructional design. The most useful form of evaluation depends on the stage of the instruction (Morrison et al., 2013). Formative evaluation should be used early in the instruction process to help revise any issues or problems before the program is completed. For example, threaded throughout the workshop are reflective questions stimulating the learner to reflect and discuss personal thoughts and ideas in relation to the topic learned. Also, I consulted with key stakeholders. I obtained feedback from them on the content chosen and how it is to be delivered prior to having the workshop formally implemented.

Summative evaluation is used to assess and evaluate the effectiveness of the final material once it is presented as planned (Morrison et al., 2013). A pre-test post-test design was used for summative evaluation methods to assess changes in knowledge. My educational workshop will have examples of summative evaluation that can be used once the workshop is executed such as pre-test to start the workshop, assessing current knowledge, and a post tests at the end of the workshop to assess what was learned. And last, a survey will be administered to compile feedback from participants on what aspects of the workshop were positive and what aspects needed improvements. The survey will be confidential and delivered anonymously. All the information obtained from the final

survey will be for the facilitator's information only to help improve the work shop for future participants.

An Ongoing Processes

The instructional design model chosen has two outer circles that contain elements that are part of an ongoing process throughout the life of the instruction (Morrison et al., 2013). The elements include; planning, implementation, project management, support services, revision, formative evaluation, summative evaluation and confirmative evaluation. Formative and summative evaluations have been discussed. All elements are meant to be continuous and as the instruction changes and evolves you will navigate your way through them. Project management and support services depend on the size and complexity of the instruction. My proposed educational workshop will not be for a large group of people, and it will have some costs, most notably coverage for staff from work to attend. Thus, implementation must begin almost at the beginning of the instructional design process. Planning for proper implementation can help to make your instruction run smoothly when presented (Morrison et al., 2013). Implementation will not be the focus for this practicum however, the feedback from key stakeholders and the information from my literature review has allowed me to consider potential revisions.

Summary of the Educational One Day Workshop Manual

The one-day workshop entitled "Engaging Flu Champions" (see Appendix D) was created for Central Health with the purpose of motivating nurses to promote and administer the influenza vaccine to their co-workers, in turn helping increase the vaccination rates. This resource manual provides nurse educators with the elements needed to implement the "One Day Workshop: Engaging Flu Champions". It is comprised of an Agenda of nine sessions: 1) an introduction, 2) an ice breaker activity: electronic polling, 3) a background: what is influenza?, 4) influenza vaccine: what are the side effects?, 5) influenza: prevention of transmission, 6) creating flu champions, 7) the challenges of being a flu champion, 8) reflection; where do we go from here?, 9) evaluation.

The introduction is brief and consists of housekeeping items such as locations of exits, bathrooms and introductions of instructor and participants. The second session an ice breaker activity is an electronic polling session where participants will see questions about influenza and the vaccine up on a screen and will press an electronic "clicker" to answer. The answers will then be polled and bar graphs will appear to show the percentages of who answered what. The third session is a power point presentation with video clip that build a background on influenza and the vaccine. The fourth session is a interactive session in which the participants will gain a more in-depth knowledge of the vaccine and its side effects. The fifth session is a psychomotor session in which the

participants will actually practice washing their hands with a “germ” lotion and black light to assess if it was done properly. The sixth session is a brainstorming session in small groups. This session will see the group together define what a flu champion is to them. The seventh session is a concept mapping session in which the participants together discuss and identify challenges to promoting the vaccine and then together map solutions that they could implement. The eight session is a reflective session in which the participants can reflect upon what was learned and how they will use this new knowledge post workshop. And the last session is an evaluation of what was learned. Again, an electronic polling session will take place, assessing the new knowledge learned. At this point a questionnaire will also be handed out to assess the effectiveness of the workshop and any ideas or suggestions for improvement.

This manual is intended to be delivered by a clinical nurse educator or a member of the professional development department at Central Health. A partnership with the Employee Wellness Health and Safety Department must be established. The Employee Wellness Health and Safety Department will need to be asked to be a guest speaker and then to act as an optional resource between the participants upon completion of the workshop. It must be confirmed that the Employee Wellness Health and Safety Department are agreeable to acting as an information resource between the flu champions. Approval from senior administration is needed to grant the necessary educational leave from work and or payment for time for participants.

THE DEVELOPMENT OF A ONE DAY EDUCATIONAL WORKSHOP

The workshop is developed for nurses who work in areas that have primarily an elderly population, as the elderly are a very high risk, vulnerable group who experience severe consequences related to influenza infections. The course will be designed to have 20-25 participants. The staff selected must meet the required pre-requisites, and must also have strong leadership and interpersonal skills amongst fellow staff members.

The content of this manual was developed from the literature review and the consultations. The actual sessions and instruction of the workshop was completed using Knowles's Six Principle of Adult Learning (1984) and Morrison, Ross, Kalman & Kemp's (2013) Instructional Design Model.

Advanced Nursing Practice Competencies

Completing this practicum helped me demonstrate multiple Advanced Nursing Practice Competencies (ANP). Advanced Nursing Practice competencies were created to ensure the RN meets the specific knowledge, theory, personal attributes and clinical skills to work in their role safely, ethically and competently (Canadian Nurses Association, CAN, 2008). An objective of this practicum was to demonstrate the advanced nursing competencies as outlined by the Canadian Nurses Association in the 2008 Advanced Nursing Practice: A National Framework document. This practicum has allowed me to build on and strengthen the skills needed to demonstrate the following core competencies: 1) Clinical 2) Research, 3) Leadership, and 4) Consultation and 5) Collaboration.

Clinical

Advanced nursing practice is portrayed through an expertise in a specialized area of nursing (CNA, 2008). An advanced practice nurse integrates clinical expertise with theory and research to improve their current profession.

The skills that reflect reaching this competency include: planning, coordinating and conducting educational programs based on needs and priorities, engaging clients, staff and families in solving issues at an individual, organizational and health care system levels.

To achieve this competency I developed a one day educational workshop. Using my clinical expertise and experience about the influenza vaccine I developed this program to help engage other nurses awareness about the importance of the influenza vaccine. This

program will hopefully help resolve the long-standing problem of low vaccination rates among health care workers.

Research

Advanced practice nurses read, use, apply and emulate knowledge, evidence and information that is critical in advancing the nursing profession (CNA, 2008). These competencies involve the ability to evaluate the current practices used at my health authority and then compare our current information against similar evidenced based findings. The findings will be appropriately disseminated amongst all staff through formal and informal sessions at both the local, regional and provincial levels.

I achieved this competency through my literature search and then critical appraisal and synthesis of the literature.

Leadership

Advanced practice nurses are leaders within their workplace, community and organization. They are consistently seeking to improve the delivery of care in innovative ways. They work to shape their organization in a positive manner as change agents (CNA, 2008).

These skills involve identifying the learning needs of nurses and finding or developing programs and resources to meet those needs. Leadership entails being a mentor to other nurses and health care staff. As a leader, one must advocate for continuous learning of all staff through an organizational culture that supports and promotes continuous learning as a goal for all staff (CNA, 2008).

Leadership is an advanced nursing competency that I believe to be instrumental in elevating your clinical practice. Elevating your clinical practice through leadership entails you to display a level of professionalism and forward thinking beyond the entry level nurse. Through the development of this program I have demonstrated how to develop partnerships with other health care workers, as well as, facilitating a program that can help create change that will not only benefit the health of employees but have the potential to improve the health outcomes of clients and their families.

Consultation

Advanced practice nurses should effectively communicate and collaborate with clients and all multidisciplinary team members representing the nursing profession. (CNA, 2008). This ANP competency is reflected by consulting with members of the health-care team to develop programs that represent improvements in health outcomes for health care staff and clients.

To achieve this competency I consulted with members of the multidisciplinary team to identify gaps in existing services and the needs of nurses who are making the decision to have the flu vaccination or not. This information was then used to craft the one-day workshop on flu vaccinations. I hope to improve health outcomes of clients and of staff through this workshop.

Collaboration

To meet this competency one needs to practice collaboratively and effectively to work for changes in healthy public policies as well as participating in collaborative group projects with academic institutions (CNA, 2008).

This competency was achieved through collaborating with key stakeholders to develop the content for the workshop. Also collaboration was acquired through going back to the key stakeholders during the revision process of the workshop. And notably I utilized this competency through collaborating with Dr. Manuel, my practicum supervisor, throughout the entirety of this project.

Limitations and Next Steps

This practicum project is not without its limitations. This project did not go through the process of implementation and therefore after completion of this report I hope to begin the implementation planning.

Prior to exploring implementation possibilities, the support of senior administration is required. Senior administration are responsible for making the decision of approving the required leave for nurses to attend my proposed workshop. The workshop being a full day may be a notable limitation for some. At Central Health the issue of staff availability for educational purposes is a constant struggle. If there is no coverage, willingness of staff to come in on their days off or willingness to pay for staff on their days off the workshop cannot be implemented. One other limitation tied into the full day aspect of this workshop is the availability of staff to travel in from rural sites to attend this workshop. I believe this limitation can be resolved through the use of online webinars and video conferencing. Another possible solution would be a "train the trainer" type session for the all the clinical educators for all sites, including rural. Once these crucial elements are addressed with senior management I hope to actively begin planning implementation for the following influenza season, fall 2016.

As previously mentioned a strong partnership with the Employee Wellness Health and Safety Department must be established. This department is the current driving force behind the influenza vaccination program of Central Health employees. Their support

and guidance from past years of experience with this initiative will be very valuable. After approval for implementation is confirmed an evaluation plan of the workshop must be created. The workshops impact needs to be evaluated as well as the impact the workshop had on the vaccination rate of Central Health employees.

Conclusion

This practicum project has highlighted some key things that need to be explored going forwards. The implications this project has unveiled for nursing research are plentiful. There needs to be more research on the gaps noted in the literature, specifically surrounding health care workers sense of altruism, to protect their patients and its effect on vaccination choice. Also, there were noted inconsistencies in the effectiveness of educational vaccination programs, such as the specific interventions used and in what combinations. This is important to be evaluated as well as evaluating my developed workshop once implemented to see its impact.

Going forward a succession plan is needed to sustain the workshop. This manual should be able to be utilized by any clinical educator type position but a clear partnership must be established with the Employee Wellness Health and Safety Department to help transition and foster the flu champions post workshop.

This workshop will directly affect nursing practice by decreasing morbidity and mortality rates in the elderly. The completion of this project allowed me to work as an advanced practice nurse while developing a workshop to engage nurses at a grass roots approach.

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Appendix A: Literature Review

A Review of Relevant Literature: Influenza Vaccinations and Health Care Workers

N6660 Practicum I

Anne Blackmore

#200265510

Table of Contents

A Review of Relevant Literature: Influenza Vaccinations and Health Care Workers

Every fall health care facilities across Canada initiate an in-depth influenza vaccination campaign. Influenza is a respiratory virus identified in 1933. It is a highly contagious, upper respiratory tract disease that can cause significant harm and even death in the vulnerable populations (Aziz, 2013). Worldwide, influenza causes approximately three to five million cases of severe illness in which 250,000 to 500,000 can result in death (World Health Organization, WHO, 2014). Annually, in Canada, 4000 deaths and 20,000 hospitalizations are estimated to be related to influenza (National Advisory Committee on Immunizations, NACI, 2014). In 2012/2013 Newfoundland had 723 confirmed cases of influenza resulting in 279 hospital admissions and 15 deaths (Department of Health and Community Services, 2013). Rates of influenza are highest among children ages five to nine; serious illness and death is highest in those less than two years of age and those age 65 or older (NACI, 2014). The WHO and the Canadian National Advisory Committee (NACI) recommends that 90% of all health care workers (HCW) get immunized against influenza (NACI, 2014). Despite this recommendation HCW do not get routinely immunized.

In order to gain a fuller understanding of the factors that impact the decision to get vaccinated or not for influenza a literature review was completed. This literature review will inform the development of a one-day educational workshop for Registered Nurses

(RN) and Licensed Practical Nurses (LPN) on the promotion and administration of the influenza vaccine.

A search was completed using the data bases of CINAHL, Cochrane Library, and PubMed with the key words; “benefits of influenza vaccine”, “influenza vaccine”, “influenza vaccine and health care workers”, “mandatory influenza vaccine policy”, “influenza vaccination in HCW and reduction in costs”, and “educational programs and influenza vaccine”. The Public Health Agency of Canada’s critical appraisal tool kit was used to appraise a total of 23 quantitative studies, in which literature summary tables were created (see appendix B). Not all studies were included in the literature summary tables; only studies found under the main bodies of literature were appraised. The information on the Memorial University D2L was used to appraise qualitative studies. There were four main bodies of literature identified that provide insights into the challenges with the influenza vaccine and HCW: (1) benefits of vaccination, (2) reasons for refusal or acceptance of the vaccine (3) mandatory vaccination policies (5) existing Vaccination Programs and Initiatives; additional components for voluntary vaccination programs.

Background and Rationale

Being vaccinated against influenza is the standard of care for all health care workers (NACI, 2014). This is because HCW are at higher risk of spreading and transmitting the virus to their patients at their most vulnerable time (Corace et al., 2013). In some cases, influenza vaccination has been shown to decrease population morbidity and mortality rates up to 50%, especially in the elderly (Corace et al., 2013; NACI, 2014).

The WHO (2014) recommends that 75% of the elderly population should be vaccinated against influenza if we are to reduce morbidity and mortality rates in this high risk population. A key factor of protecting this vulnerable population is the vaccination of health care workers against influenza (Bentele, Bergsaker, Hauge, & Bjolmhilt, 2014). Despite the large body of literature identifying the positive outcomes of being vaccinated against influenza, only 40-60% of health care workers (e.g. nurses, physicians, physiotherapists) in Canada are vaccinated yearly (Quach, Pereira, Kwong et al., 2013). Furthermore, although methods to increase HCW influenza vaccination rates (e.g. mobile carts, declination forms, incentives,) are evident on a provincial (Kean, Borstein, & MacKenzie, 2013), national (Corace et al., 2013; Quach, Periera, Hamid et al., 2013; Slaunwhite, Smith, Flemming, Strang, & Lockhart, 2009), and international level (Fricke, Gastanaduy, Klos, & Begue, 2013; Raftopoulos, 2008; Rakita, Beverly, Hagar, Crome, & Lammert, 2010; Seale, Kaur, & MacIntyre, 2012) vaccination rates remain low.

Barriers to vaccination threaded throughout the literature include a fear of adverse effects, disbelief in effectiveness of the vaccine, a fear of needles (Castilla et al., 2013; Corace et al., 2013; Dube et al., 2013; Eldestein & Pebody, 2014; Quach, Pereira, Heidebrecht et al., 2013), and personal attitudes toward vaccination (Hollmeyer, Hayden, Poland, & Buchholz, 2009; Heimberger et al., 1995; Osman, 2009; Raftopoulous, 2008; Hofmann, Ferracin, Marsh, & Dumas, 2006).

At Central Health the vaccination rates of HCW are similar to the rest of Canada at 56% in acute care setting and 40% at the long term care facility (Central Health Influenza Statistics Report, 2013) Currently, at Central Health there is one voluntary vaccination program run by a occupational health nurse and a infection control practitioner. These two individuals rotate between sites with mobile carts and will occasionally have declination forms signed. The current program appears to be lacking physical human resources. An educational day such as the one proposed for this practicum project would help promote consistent influenza vaccination amongst HCW in this region by providing nurses with the education to take on the role as a "flu champion": a person advocating for the influenza vaccine.

The literature has shown that using a "flu champion" in conjunction with educational campaigns and peer led immunization can increase HCW vaccination rates (Quach, Pereira, Kwong et al., 2013; Slaunwhite et al., 2009). I have experienced this peer-to-peer motivation at my workplace, a long-term care facility. In 2012, taking on the role of a "flu champion" I addressed co-workers concerns about the influenza vaccination and reinforced the positive outcomes of being vaccinated. Being a nurse I had some basic knowledge of influenza however, I spent considerable time seeking out resources to inform my practice such as the occupational health and safety nurse. As a result of my efforts in 2012 the full time permanent employee vaccination rate in my workplace increased to almost 85%. The following year I was off work on maternity leave and not replaced thus, our vaccination rate was only 40% for 2013 influenza season. This

personal experience supports my proposed practicum; a one- day education program that would train flu champions to advocate for and deliver an influenza vaccination program to health care workers.

Benefits of Influenza Vaccination

The benefits of the influenza vaccine (e.g, reducing mortality rates, effectiveness, and decrease sick time) have been reported in the literature for the past 30 years. Vaccinating health care workers is a recommendation of the WHO, the Center for Disease Control (CDC), the NACI, and the Advisory Committee on Immunization Practices (ACIP) (Edelstein & Pebody, 2014; Fricke et al., 2013). The influenza vaccine has the potential to protect HCW against influenza and to help prevent the spread of the infection to vulnerable populations (Carmen et al., 2000). For example, higher vaccination rates of HCW have been linked to a reduction of mortality rates in elderly residents (Ahmed, Lindley, Allred, Weinbeum, & Grohskopt, 2014; Beyer et al., 2013; Ferroni & Jefferson, 2011; Carmen et al., 2000; Lemaitre et al., 2009; Potter et al., 1997).

One study of 12 geriatric medical and long term care sites (n=1059 HCW) reported a 7% reduction in mortality rates ($p<.01$) during the seasonal influenza outbreak where there were higher numbers of HCW vaccinated (Potter et al., 1997). Two other studies reported similar findings to Potter et al.'s (Carmen et al., 2000; Lemaitre et al., 2009). Lemaitre et al.'s (2009) randomized trial study of nursing homes in Paris also found significant differences in the mortality rates of individuals whose HCW had

received the influenza vaccination. In that study an increase in HCW vaccination rates was linked to a promotional campaign based on the benefits of influenza vaccinations.

One systematic review showed a strong correlation between HCW vaccination rates and reduction in mortality of elderly patients (n= 4 Randomized Control Trials, N=4 cohort studies) (Ahmed et al., 2014). When HCW were vaccinated there was a 29% reduction in mortality rates and a 42% relative risk reduction in influenza like illness (Ahmed et al., 2014). The authors used a critical appraisal tool (GRADE) for rating the quality of the data used in the review.

The benefits of seasonal influenza vaccination of HCW is not only seen in reduced mortality rates but has also been associated with reduced absenteeism and cost (Burls, Jordan, Barton, Olowkure, Wake, Albon, & Hawker, 2006; Canning, Phillips, & Allsup, 2005; Festini, Biermann, Neri, Reali, & Martino, 2007; Lemaitre et al., 2009; Saxen & Virtanen, 1999). One study (n=3,483 nursing home residents) showed a significant decrease in HCW sick leave (42%) in the nursing home with higher HCW vaccination rates (69.9%) versus the nursing home with lower HCW vaccination rates (31.8%) (Lemaitre et al., 2009). Saxen & Virtanen (1999) double-blinded randomized control trial (RCT) found that vaccination of HCW (n= 427) reduced absenteeism due to respiratory infection by 28% (p=0.02).

There is insufficient literature connecting reduction of costs to the vaccination of HCW. One systematic review found a cost savings of $39,000 dollars per 1467 vaccinations of HCW. This amount could be further broken down to a cost saving of

roughly $16 per vaccine. It is important to note that the calculations for this amount was done assuming employees were replaced when off sick (Burls et al., 2006).

Reasons for Refusal of Vaccine

The most common barriers in the literature that contribute to the low influenza vaccination rates among HCW were related to concerns with perceived susceptibility to the influenza virus, harmful effects of the vaccine, and the effectiveness and accessibility of the vaccine.

Perceived Susceptibility and Perceived Harmful Effects

A key reason noted in the literature as to why health care workers refuse to get the influenza vaccine is a lack of concern about contracting and getting ill as a result of influenza (Corace et al., 2013; Hollmeyer et al., 2009; Raftopoulos, 2008; Shahrabani, Benzion, & Din, 2009). A Canadian study, reported a statistically significant correlation ($p<.05$) between health care workers perceived susceptibility to contracting influenza and the decision to be vaccinated (Corace et al., 2013). Similarly, one systematic review (n=21 studies) found that in 48% of studies, HCW low perceived susceptibility for influenza was a barrier to getting the influenza vaccination (Hollmeyer et al., 2009). Both of these studies were based on self-reported data and thus have the potential for bias data. Validity and reliability in Hollmeyer's study was confirmed by comparing participants' actual records of vaccination. Another strength to Hollmeyer et al.'s study was the fact that the sample was comprised of all frontline nursing staff, which is the sample for this

practicum. Although the sample in Corace et al.'s (2013) study was larger, the results contained responses from non medical personnel.

Another barrier to health care workers receiving the influenza vaccine is fear of having an adverse reaction, or they will get the "flu" from the vaccine (Corace et al., 2013; Heimberger et al., 1995; Hoffman et al., 2006; Hollmeyer et al., 2009; Quach, Pereira, Kwong et al., 2013; Shahrabani, Benzion, & Din, 2009). Corace et al.'s (2013) cross sectional survey of (n=3,275 HCW) reported that the biggest barrier to vaccine uptake was the belief that the vaccine could cause the illness (72%).

Quach, Pereira, Kwong et al.'s (2013) Canadian study comprised of 23 telephone interviews from 21 health authorities supported Corace et al.'s (2013) findings that fear of adverse events, such as "getting the flu" from the vaccine is a deterrent to vaccination (Quach, Pereira, Kwong et al., 2013). Other reasons for not being immunized identified in this study included the belief that the influenza vaccine is not effective, the vaccine is not safe, and a negative personal experience with the influenza immunization (Quach, Pereira, Kwong et al., 2013). This study had strong results but notable limitations. It was small in sample size and participation was voluntary participation, which may have skewed the results because of social desirability bias. In comparison to the above studies Jaiyeoba et al.'s (2014) survey of HCW (n=689) found that 88% of physicians and 67% of nurses agreed the influenza vaccine was unlikely to cause a severe reaction ($p < 0.0001$); 84% of physicians and 70% of nurses agreed that they were unlikely to contract influenza after vaccination ($p < 0.0025$).

The fear of adverse effects of the influenza vaccine is still very evident in the literature despite The Vaccine Adverse Event Reporting System evidence of the vaccine safety. Although the influenza vaccine has minor side effects (e.g., fever, muscle aches, soreness at the injection site they subside within 48 hours (Corace et al., 2013). The main adverse reaction that health care workers fear is Guilliene Barre syndrome. This syndrome has been linked to the influenza vaccine for many years but the chances of getting it are reported to be close to one in two million (Ottenberg et al., 2011). Guilliene Barre has been more likely to occur following an influenza infection versus an influenza vaccination (CDC, 2012).

Effectiveness and Access

Health care workers refusal of the influenza vaccine has been linked to a general disbelief of vaccinations, doubt in the effectiveness of the vaccination, inconvenience, not having the time to get the vaccination, and peer influence (Hollmeyer et al., 2009; Quach, Pereira, Kwong et. al., 2013; Raftopoulos, 2008; Shahrabani et al., 2009; Slaunwhite et al., 2009). Even small numbers of HCW who oppose the vaccine can negatively influence the views of their indifferent co-workers (Quach, Pereira, Kwong et al., 2013). A study done by Quach, Pereira, Kwong et al.'s (2013), (n=23) found that perceived vaccine effectiveness was the most notable barrier. One study of HCW (n=172) in an Italian hospital equated knowledge of the vaccines safety and usefulness (effectiveness) to be a strong predictor in vaccine uptake (Bonfiglioli, Vignoli, Guglielmi,

Depolo, & Violante, 2013). This study predicted the probability of vaccination increased by 63.3% when the participant was more informed regarding vaccine safety and effectiveness. Therefore, it can be inferred that HCW who doubt the effectiveness or lack the knowledge pertaining to effectiveness of the vaccine would be less likely to be vaccinated. In addition to this study Hollmeyer et al. (2009) systematic review reported that distrust in vaccine effectiveness was a notable barrier in vaccine acceptance in half of the studies reviewed.

Accessibility has been widely reported by HCW as another key reason for not getting the vaccine (Edelstein & Pebody, 2014; Hollmeyer et al., 2009; Quan et al., 2012; Shahrabani, Benzion, & Din, 2009). HCW described a lack of time to leave a busy unit and go to the location where the vaccine was being administered (Edelstein & Pebody, 2014; Hollmeyer et al., 2009; Honda, Sato, Yamazaki, & Padival, 2013; Quan et al., 2012; Shahranbani, Benzion, & Din, 2009). One successful solution noted was the use of mobile vaccine carts that will go to the health care workers place of employment to administer the vaccine (Edelstein & Pebody, 2014; Quan et al., 2012; Shahrabani, Benzion, & Din 2009). A five-year review of the vaccination campaigns (n=6,414) at a California based hospital noted a significant increase ($p<0.001$) of HCW vaccination rates with the addition of mobile vaccination carts and mandatory declination forms from 44% in 2006 to 2007 to 62.9% in 2007-2008 (Quan et al., 2012). Noteworthy is the fact that in Quan et al.'s (2012) study if HCW had to wait more than 10 minutes 23% stated they did not care

whether they received the vaccine. Therefore, it is important to make access to the vaccine readily available.

Other less common barriers to getting the influenza vaccine cited by HCW include; allergies to the product, religious beliefs, and other medical conditions that contraindicate getting the vaccine (Hollmeyer et al., 2009; Quach, Pereira, Kwong et al., 2013).

Reasons for Acceptance of Vaccine

Reasons cited in the literature as to why (HCW) health care workers chose to receive the influenza vaccine included ones' attitudes, age, and past vaccine practices, (Castilla et al., 2013; Corace et al., 2013; Hollmeyer et al., 2009; Raftopoulos, 2008). In order to develop a resource manual that builds on the factors that increases vaccination rates it is imperative to examine the internal and external factors influencing vaccination rates amongst health care workers (Castilla et al., 2013; Corace et al., 2013; Hollmeyer et al., 2009; Jaiyeoba et al., 2014; Raftopoulos, 2008;Winston, Wagner, & Chan, 2014).

Attitudes and Age

Age of the HCW has been found to play a role the decision to be vaccinated or not (Bonfiglioli et al., 2013; Castilla et al., 2013; Shahrabani et al., 2009; Hollmeyer et al., 2009). That is the older the HCW, the higher the vaccination rate. A study of primary HCW (n=1,965) trends in vaccination coverage in Spain found that older age groups (> 45 years) have more vaccine continuity (OR 0.72; 95% CI: 0.54-0.97) (Castilla et al., 2013). This study used a psychometric tool with proven reliability and validity to collect

the data. It had a large sample size. A notable limitation of this study was the self-reporting data. This limitation may have been reduced
yielding more accurate data since the surveys were filled out online anonymously. Bonfiglioli et al. (2013) study of HCW (n=172) in an Italian hospital found that with each additional year of age the probability of being vaccinated would increase by 6% (Bonfiglioli et al., 2013).

A HCW personal attitude was also noted to contribute to the decision to be vaccinated. If a HCW was concerned with self-protection and was in close proximity with patients, family, and children they had higher vaccination rates (Castilla et al., 2013; Corace et. al, 2013; Hollmeyer et al., 2009; Jaiyeoba et al., 2009; Osman, 2009; Raftopoulos, 2008; Shahrabani, Benzion, & Din, 2009).

In Castilla et al.'s (2013) study (n= 1,965 HCW) the two main reasons cited for continuity in vaccination were being worried about infection at work (OR: 2.57, 95% CI: 1.84-3.59), and becoming ill (OR 2.04: 95% CI:1.45-2.86) . Similarly, 58.7% of vaccinated HCW working in an Australian emergency department (n=60) reported that protecting oneself against influenza was the number one reason for receiving the vaccination (Osman, 2009). Osman (2009) study is weaker than Castilla et al.'s (2013) because of its small sample size and use of paper surveys. These surveys were administered and completed by the sample group all at the same time. In some circumstances this may have affected independent answers.

It is worth mentioning that some HCW acknowledge the importance of getting vaccinated for the health of their clients, but it is not well addressed in the literature (Cortes-Penfield, 2014; Delden et al., 2008;). The majority of literature identified protection of oneself or their families as their main reason to be vaccinated. The benefits of vaccinating for the protection of the patients that they care for should be further promoted as an important reason to be vaccinated.

Past Vaccine Practices

Health care workers (HCW) who have been vaccinated in the past against influenza tend to get the vaccination annually (Corace et al., 2013; Hollmeyer et al., 2009; Jaiyeoba et al., 2009). These health care workers appear to have no fear of injections and routinely recommend the influenza vaccine to other colleagues, family, and friends (Hollmeyer et al., 2009). One study of HCW (n= 689) reported that the decision to be vaccinated in the past was related to the decision to get vaccinated in the future ($p < 0.0001$) (Jaiyeoba et al., 2014). Similar results were noted by Corace et al.'s (2013) study of HCW (n=3,301) ($p < 0.0001$). Another systematic review of 21 studies reported that a past history of vaccination was amongst the top three factors with the strongest association with vaccination, the others being, belief in the effectiveness of the vaccine, and older age (Hollmeyer et al., 2009). However, this trend of getting vaccinated was not supported in a recent study that reported a decline in the numbers of HCW who were getting revaccinated, from 58.4% to 49.3% from 2008 to 2012 (Castilla et al., 2013). A

similar decline was noted amongst HCW in Spain in 2012 (Castilla et al., 2013). It is suggested that this decline reflects a rebounding effect post 2009 pandemic season. That is, there was such a surge of vaccinations during the pandemic season due to the heightened severity of the H1N1 that the subsequent regular seasons vaccinations declined. In part this can be attributed to the decrease of exposure and decreased fear tactics from the media (Castilla et al., 2013).

Mandatory Vaccination Policies

In efforts to increase the uptake of health care workers (HCW) getting vaccinated for the influenza virus some institutions have introduced mandatory vaccination policies (Quach, Pereira, Kwong et al., 2013). A mandatory vaccination policy infers that any HCW working in an institution with a mandatory policy is expected to receive the influenza vaccine yearly. Mandatory vaccination policies differ between organizations. In some organizations a mandatory vaccination policy requires employees to get vaccinated, otherwise they would have to don the appropriate personal protective equipment for the duration of the influenza season (Cortes-Penfield, 2014; Delden et al., 2008; Kwong et al., 2013; Rakita et al., 2010), be reassigned to another unit, or in the event that one was unwilling to adhere to the recommended solutions some facilities terminated their employment (Cortes-Penfield, 2014; Delden et al., 2008; Rakita et al., 2010).

There have been multiple heath care institutions in the United States that have initiated mandatory influenza vaccination policies, and as a result, increased vaccination

rates (Cortes-Penfield, 2014; Delden et al., 2008; Rakita et al., 2010). Only 20% of the 669 health care institutions within Canada have a mandatory vaccination policy (Quach, Hamid et al., 2013), however they are not fully enforced because of resistance from unions (Quach, Hamid et al., 2013). There are many arguments to be made for and against a mandatory vaccination policy.

Arguments Against Mandatory Vaccinations

Many arguments against mandatory influenza vaccination policies are evident in the literature. Most notable have been its infringement on a person's freedom of choice, it's potential hidden costs, and that employers must ensure alternatives have been exhausted prior to implementing such a policy (Quach, Periera, Kwong et al., 2013; Delden et al., 2008; Rakita et al., 2010).

The main objection to mandatory policies is that it is an infringement of a person's freedom of choice and human rights (Delden et al., 2008; Quach, Pereira, Kwong et al., 2013; Rakita et al., 2010; Steckel, 2007; Winston et al., 2013). Quach, Pereira, Heidebrecht et al.'s (2013) qualitative study revealed that HCW (n= 23) felt that mandatory vaccination contributes to a sense of loss of personal autonomy and freedom to make decisions. The main limitation to this study was that the sample made up of primarily occupational health nurses, which may not represent the same feelings as frontline nursing. Similarly, Winston, Wagner, and Chan (2014) found that 31.7% of (n=202) nurses felt that a mandated policy was an infringement on their human rights and 43.7% stated that termination of employment based on refusal to be vaccinated was unfair

(Winston et al., 2013). Nurses were amongst the highest group of HCW who opposed the mandatory vaccination in comparison to physicians and residents (p-value 0.04) (Winston et al., 2013). A five-year study (2005-2010) at a Virginia Medical Center (n= 5,000/yr) examined the impact of a mandatory vaccination program on the vaccination rates of HCW. This study found an increase to 98.9% vaccination rate at the end of the five year period (Rakita et al., 2010). In this study there was a notable resistance to the mandatory policy from the Washington State Nurses Union. The union opposed a mandatory vaccination policy to the point that any nurses from this union were exempt from the policy with no penalties. Despite this allowed exemption in 2005-2006, the vaccination rate of unionized employees was 85.9%, at the end of the five year study the vaccination rate of unionized nurses was 95.8% (Rakita et al., 2010). This could be attributed to the fact that people feel conflicted when there is a mandatory policy, however because of peer pressure form their coworkers elect to get vaccinated.

There is a dearth of literature that explores the costs related to mandatory vaccination. It has been noted that the resources required for tracking vaccination rates of HCW is a factor impacting the institution of mandatory policies (Delden et al., 2008; Rakita et al., 2010; Winston et al., 2013) A key requirement for a mandatory vaccination program is strong leadership and infrastructure that enables efficient delivery, and tracking ability for large quantities of employees (Rakita et al., 2010). However, this can lead to many more hours of work needed to accurately track and administer the vaccination status, thus potentially leading to increasing costs.

Arguments in Favour of Mandatory Vaccinations

Despite arguments against mandatory vaccination of influenza there have been studies providing positive support in favour of mandatory vaccination policies. Mandatory vaccination policies have been associated with a consistent vaccination rate of greater than 90% in HCW (Delden et al., 2008, Rakita et al., 2010; Winston et al., 2013). One study found that the initiation of a mandatory policy saw an increase of health care worker vaccination rates from 58.3% in 2008/2009, to 86.7% in 2009/2010 and 91.9% in 2010/2011 (Quan et al., 2012). In some cases higher vaccination rates of HCW has decreased mortality up to 40% in the elderly (Carmen et al., 2000; Lam, Chambers, MacDougall, & McCarthy, 2010; Lemaitre et al., 2009; Potter et al., 1997). One randomized control trial (RCT) found that in hospitals where the vaccine was offered the uptake of HCW was 50% in comparison to 4.9% when it was not offered. As well, the mortality rate was 13.9% in the vaccinated hospitals versus 22.4% in the non vaccinated hospitals during the same time period (OR = 0.58; 95% CI 0.40- 0.84) (Carmen et al., 2000). At necropsy influenza was not positive in any of the 17 patients from the vaccinated hospitals but in six of the 30 from the non-vaccinated hospitals (20%) (p=0.055) (Carmen et al., 2000). Although this is an older study the findings are reliable and valid. This study strengthens the argument for mandatory vaccination for HCW and it provides evidence as to the benefit of the vaccine in reducing mortality rates in the elderly.

Although there is evidence to support the positive health care outcomes of

mandatory influenza vaccination by HCW (e.g. decreased morbidity and mortality in the elderly) there is a small body of literature that does not support these findings. Jefferson et al.'s (2010) Cochrane review reported no significant correlation between health care workers being vaccinated and decreasing the incidence of influenza among individuals ages 60 or over in long term care facilities. Noteworthy is the fact that the Cochrane review stated that the majority of the literature reviewed was not reliable or valid (Jefferson et al., 2010). It is evident from this body of literature that further research is needed to evaluate the effectiveness of mandatory vaccinations policies. Furthermore, being that the implementation of mandatory vaccination policies can be challenging, in order to increase influenza vaccination rates diverse education programs and initiatives have been employed.

Impact of Current Programs and Educational Initiatives

Organizations with influenza vaccination programs for HCW have higher rates of vaccination compared to those without a program (Bentele et al., 2008; Edelstein & Pebody, 2014; Fricke, Gastanaduy, & Bengue, 2013). Such programs include the use of declination forms, combinations of traditional (mobile carts, educational campaigns) and non-traditional approaches (e.g. social media), and flu champions.

Declination Forms

The use of declination forms has been noted to increase vaccination rates of HCW (Jaiyeoba et al., 2014; Quach et al., 2013) Jaiyeoba et al. (2014) reported an increase in

HCW vaccination rates from 73% to 94%, with the initiation of a mandatory declination form. Reasons cited for vaccine uptake was the requirement of declination (33%), followed by protecting themselves (28%), and concerns for their patients (26%) (Jaiyeoba et al., 2014). Similarly to Jaiyeoba (2014), Quan et al. (2012) also found a statistical significant increase in vaccination rates ($p<0.001$) from the 2006/2007influenza season at 44%, to 62.9% in the 2008/2009 season when the mandatory declination form was introduced (Quan et al., 2012). The majority of declination forms cited fear of adverse effects of the vaccine as a key reason for refusal (Quan et al., 2012).

Despite these positive gains from declination forms, tracking of declination forms is a time-consuming and laborious process (Edelstein & Pebody, 2014; Quach, Heidebrecht et al., 2013). Quach, Periera, Heidebrecht et al.'s (2013) study reported that less than half the respondents completed the declination forms because of the extra workload associated with this task despite having a policy at their place of employment (Quach, Periera, Heidebrecht et al., 2013).

Combination of Interventions

One study in England (n=345,619 HCW) found that areas using innovative methods in their vaccination campaigns (e.g. mobile carts, leaflets, peer to peer vaccination, videos, posters, twitter feeds and facebook posts) had an increase in vaccination rates (Eldestein & Pebody, 2014). For example, the increase usage of peer-to-peer vaccination yielded an increase uptake in rates from 3.8% to 38.8%, educational DVDs yielded an increase in rates from 3.8% to 22.5% and social media, twitter and

facebook, yielded an increase in rates from 2.5%-12.5% and 1.3%-6.3% respectively (Edelstein & Pebody, 2014). Using a nurse or a physician as an influenza vaccine champion increased the vaccination rates of nurses by 8.4% and 10% respectively (Edelstein & Pebody, 2014). This study had two limitations: the introduction of interventions were sporadic and some areas did not employ all approaches consistently. Also, it was not clear as to who received what interventions, which may have lead to a potential misclassification bias by the participants. Despite these limitations the data should be accepted as it was such a large sample size of HCW with the majority responding being frontline nurses in over 50% of the respondents.

Flu Champions

Another solution to increase HCW vaccination rates has been positive peer lead promotion and administration of the vaccine entitled, "peer to peer programs". Recommendations from other peers (e.g., occupational health and safety nurses, and infection control nurses) have been shown to increased influenza vaccination rates among HCW (Hollmeyer et al., 2009). A formal form of peer-to-peer influence to increase vaccination rates suggested in the literature is the use of flu champions. A "flu champion" is a HCW who receives formal education and provides positive and accurate information about the influenza vaccine in the workplace. In some cases the champion will also administer the vaccine to their co-workers (Slaunwhite et al., 2009). Slaunwhite et al.'s (2009) randomized control trial (RCT) in Nova Scotia, examined if a program consisting of promotion and administration of the influenza vaccine between peers would increase

vaccination rates among HCW (n=46). The champions were trained in basic facts and information surrounding the influenza vaccine .The units with a vaccine champion present had an increase in HCW vaccination rates from 44% in the past to 54% ($p<0.03$) Whereas, the units with no vaccine champion only had a slight increase in vaccination rates from 38% to 41%, ($p=0.25$) (Slaunwhite et al., 2009). A limitation of this study is that there were no controls in place for information bias.

Of the studies that examined vaccination rates it was found that voluntary vaccination campaigns are not as effective as increasing the vaccination rates of HCW as a mandatory campaign (Fricke et al., 2013; Rakita et al., 2010). Evidence suggests that using multiple interventions within vaccination programs can increase HCW influenza vaccination rates however, the number, the types (Lam et al., 2010), and the location and timing of interventions needed for a successful voluntary vaccination campaign is unknown and needs further explorations. What is clear is that the use of flu vaccine champions improves vaccination rates.

Gaps in the Literature

The review of the literature has highlighted some key gaps that informs the development of this practicum project. First, there appears to have been many missed opportunities to increase vaccination rates among health care workers (HCW) prior to initiating a mandatory vaccination policy such as, the use of flu champions, with peer-to-peer immunizations (Quan et al., 2012). Second, there is a lack of research that has examined the impact of HCW attitudes and beliefs on vaccination choices (Corace et al.,

2013; Quach, Periera, Kwong et al., 2013). Third, there is a small amount of literature on the impact of HCW being vaccinated and absenteeism but very little literature examining if there is a cost savings associated with the vaccination. Fourth, although there is an abundance of research measuring the impact of existing educational and vaccination programs on HCW vaccination rates there is no research investigating what specific types of interventions and in what combination will have a positive effect on increasing vaccination rates. Finally, there is a lack of literature that examines how a HCW sense of altruism- to protect others, influences the decision to be vaccinated. This practicum will address these gaps in the literature.

There were some randomized control trial studies reviewed but there seemed to be far more studies found that were cross sectional, and used self reported surveys, which has the potential to skew results. The primary limitation of the cross-sectional design is that it is only a snap shot in time, therefor it is difficult to infer a temporal relationship between exposure and outcome. There is generally no evidence of a temporal relationship between exposure and outcome. That is, although the researcher may determine that there is an association between an exposure (vaccine) and an outcome (no influenza infection), the results may be context dependent. Self-reporting data allows for the potential for bias as they only collect data based on the participants understanding and interpretation of events.

There are over four decades of data supporting the efficacy and safety of the influenza vaccine. Despite a large volume of this research being of ‘weaker’ study design,

it is hard to ignore such a consistent trend noted in the majority of these studies. Drawing on existing evidence in the literature an educational campaign led by trained "flu champions" will be created for Central Health. The development of an educational day to train these "flu champions" is one step closer to increasing the vaccination rates of the HCW at Central Health while still allowing them the "informed choice" to be vaccinated.

Summary

Getting vaccinated against the influenza virus is a key step in preventing its transmission. Despite this the rate of vaccination among HCW remains remarkable low worldwide. HCW refuse the influenza vaccine for a variety of reasons, most notably the fear of adverse side effects, disbelief in the efficacy of the vaccine, lack of concern of severity of disease, and accessibility. Reasons for choosing to be vaccinated have been linked to the HCW attitudes and beliefs about the vaccine, protection of oneself and others, and the efficacy of the vaccine (Castilla et al., 2013; Corace et al., 2013; Hollmeyer et al., 2009; Jaiyeoba et al., 2014; Raftopoulos, 2008;Winston, Wagner, & Chan, 2014).

Mandatory vaccination policies are gaining popularity as it seems educational campaigns alone are not as effective in increasing vaccination rates (Quach, Pereira, Kwong et al., 2013). Mandatory policies have seen HCW vaccination rates reach 99% and stay there for multiple years (Delden et al., 2008; Quach, Periera, Kwong et al., 2013; Rakita et al., 2010). Despite this mandatory vaccination policies have been met with much controversy amongst HCW. These policies are seen as infringing on ones' freedom

of choice (Corace et al., 2013; Delden et al., 2008; Quach, Periera, Kwong et al., 2013; Rakita et al., 2010).

The use of diverse educational approaches to increase vaccination rates has been suggested in the literature including mobile carts, declination forms, social media and peer immunizers. One other successful approach identified is the use of "flu champions" (Edelstein & Pebody, 2014; Quach, Pereira, Kwong et al., 2013; Slaunwhite et al., 2009).

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Appendix B: Literature Summary Tables

LITERATURE SUMMARY TABLES

Title #1	Ahmed, F., Lindly, M., Alfred, N., Weinbaum, C., Grohskopt, L (2014). Effect of influenza vaccination of healthcare personnel on morbidity…..
Setting & Objective	Objective: to evaluate the effect of HCP influenza vaccination on mortality, hospitalization, and influenza cases in patients of healthcare facilities
Sample, Method & Analysis	• n= 4 RCT's n= 4 cohort studies • Systematic review of randomized control trials, cohort studies and case-controlled studies. • Used studies from 1948 through to June 2012
Results	1) 29% reduction in all cause mortalities when HCW vaccinated in RCT's 2) 42% relative risk reduction in influenza like illness when HCW vaccinated versus control group not vaccinated. 3) GRADE used to assess quality of evidence
Limitations & Strengths	Limitations • Small number of studies used for synthesis (8), although not a large volume to choose from Strengths: • The use of GRADE to rank the quality of their evidence
Comments	
Rating	Strong design / High quality

Title: #2	Bentele, et. al (2014). Vaccination coverage for seasonal influenza among residents….
Setting & Objective	Cross-sectional study Objective: to estimate the vaccination coverage for seasonal influenza vaccine among both residents and health care workers in nursing homes in Norway
Sample, Methods & Analysis	Completed in 2011 N=910 surveys, response rate 354 nursing homes (38.9%) • electronic 10 item questionnaire to nursing homes in Norway • questionnaire to examine vaccination coverage of nursing home residents and health care workers • P- value of < or = 0.05 considered significant • general information was also collected such as age, gender, location, number of personnel and residents, and whether the vaccine was free of charge.

Results	• p- value = 0.006 two tailed therefore significant • Mann-Whitney U test and spearmen rank test • Positive correlation in higher vaccination of HCW in NH with annual campaigns versus no campaigns.
Limitations & Strengths	Limitations; 1. low response rate may have caused some response bias. 2. first study of this kind done in Norway, thus no comparative group 3. low response rate thus results would not be generalizable at present. Strengths: 1. Clear focus with relevant topic of study 2. Broad selection of samples, representation from all 19 counties 3. Questback used to develop questionnaire to collect aggregate data 4. Information bias low due to online questionnaire
Comments	It was noted that 316 (89.3%) nursing homes out of the 354 had annual vaccination campaigns. Another 38 (10%) did not promote annual campaigns or the respondents were unaware. This study highlights that there is a great need for a stronger focus on vaccinating both residents and health care workers in nursing homes in Norway. Annual flu vaccination campaigns do have a positive impact on HCW vaccination rates, thus setting up a future plan for improving the rates overall in Norway. This study was beneficial in adding to the obvious value of educational campaigns for increasing vaccination coverage in health care workers.
Rating	Moderate study design / Moderate Quality (based on analytic CAT)

Title #3	Bonfiglioli, R., Vignoli, M., Guglielmi, D., & Violante, F. (2013). Getting vaccinated or not getting vaccinated? Different reasons…
Setting & Objective	Dec 2010- Jan 2011- Italian hospital Objective: To find out the reasons people get vaccinated against seasonal influenza or pandemic influenza. And is there any influence from other variable such as age and gender.
Sample, Method & Analysis	• N= 172 HCW's (response rate 89.1%) • Each participant answered two questionnaires • Questionnaires developed specifically for this project based on literature and reviewed by independent judges in public health

	field • SPSS used to analyze hypothesis
Results	• Main reasons for vaccination • 'public health' included: • to guarantee functionality of health services due to sense of civic, ethical and professional responsibility • 'personal family' included; • because I belong to a category high at risk • because I live with/ and or I am close to family members in a category at high risk • 'awareness of vaccine safety and side effects' included; • because I think the vaccination is safe • I have received sufficient information regarding the usefulness of the vaccine HCW's who took both vaccines were • Older • Showed higher values regarding reasons of public health • Showed higher values in reference to personal/family
Limitations & Strengths	Limitations: • Small sample size • Scales had limited number of items to choose from • Convenience sample vs. random Strengths: • Clear purpose and need • Appropriate statistical methods for analysis • Valid measurement tool
Comments	With each additional year of age the probability of vaccination increases by 6%. Also in this study the probability of vaccination increased by 63.3% if the participant scored one point higher in the category of awareness of vaccine safety and side effects.
Rating	Strong study design / Moderate quality

Title #4	Canning, S., Phillips, J., Allsup, S. (2005) Health care worker beliefs

	about influenza vaccine and reasons for non-vaccination- a cross sectional survey…
Setting & Objective	Cross-sectional survey two Liverpool hospitals in 2003 Objective: to identify reasons for poor uptake of influenza vaccine in health care workers
Sample, Methods & Analysis	N= 144 nurses (76.2% female, mean age 36) • Self-completed questionnaires • Sociademographic information also obtained • Questions asked surrounding reasons for vaccination and non-vaccination • Microsoft access and SPSS used to analyze • Informed consent obtained
Results	• 61.8% response rate • 7.6% reported being vaccinated in previous year (verified by OH & S stats) • no significant difference in vaccination status between gender, age, having children, different jobs ($p<0.05$, chi-squared test) Reasons for non vaccination • did not think it was needed 28.9% • not aware of the vaccine 18% • no reason 14% • fear of side effects 10.9% Benefits of vaccination • decreased sick leave 43.8% • personal protection 27.6% • no benefits of vaccinating HCW 18.1%
Limitations & Strengths	Limitations; • Self-reported survey-potential for bias • No mention of blinding; paper survey question social desirable answers • Question reliability of questionnaire Strengths; • Appropriate purpose • Appropriate sample (all nurses)
Comments	This study showed an unbelievably low vaccination rate for HCW.
Rating	Moderate design / Moderate quality (based on analytical CAT)

Title #5	Carmen et al. (2000) Effects of influenza vaccination of health-care workers on mortality of elderly people in long-term care: a randomised controlled trial…
Setting &	Parallel group design with a cluster randomisation based on 20 UK long

Objective	term care sites 1996 Objective: to determine if vaccination of HCW lowers mortality and the frequency of virologically proven influence in the elderly
Sample, Methods & Analysis	N=10 vaccinated hospitals 10 non-vaccinated N= 620 vaccinated HCW (50.9%) compared 4.8% uptake in non vaccinated hospitals • Hospitals were randomly selected to be offered vaccination of HCW or not to be vaccinated • Written informed consent obtained • Priori summary analysis completed • Power calculations for mortality completed based on past study • Mann-Whitney test to compare mortality rates between groups
Results	• Mortality rates in vaccinated 13.6% • Mortality rates in non-vaccinated 22.4% • P=0.014 • No difference in proportions of positive influenza infections
Limitations & Strengths	Limitation; • Older study Strengths: • Random selection for vaccination sites • Large sample size • Appropriate purpose
Comments	
Rating	Moderate design / High quality (based on analytical CAT)

Title #6	Castilla, J. et. al (2013). Trends in influenza vaccine coverage among primary health care workers in Spain, 2008-2011…
Setting & Objective	Hospitals in Spain 2012 Objective: to evaluate trends in seasonal influenza vaccination coverage in primary health care workers (PHCW) between 2008-2011
Sample, Methods & Analysis	N= 1965 PHCW Random sample from primary health care centers • included general practitioners, paediatricians and nurses • web based- anonymous self-administered surveys Included three sets of questions; 1) influenza vaccination status 2) attitudes and perceptions about influenza vaccination 3) sociodemographic and professional information • x^2 test used to compare proportions • bivariate analysis and multivariate logistic regression

Results	36.2% response rate for entire survey Sociodemographic data and professional information: • 67.9%- >45 years • 74.4% female • 47% general practitioners • 10.3% paediatricians • 42.7% nurses • reduction in proportion of vaccinated subjects in successive seasons Multivariate analysis showed: • vaccination continuity in: • older age groups and less common in females (aOR 0.72; 95% CI: 0.54-0.97) • major chronic conditions in the workers (aOR: 2.12; 95% CI 1.39-3.25) or in a cohabitant (aOR: 2.57, 95% CI: 1.84-3.59) Attitudes and perceptions: • greater vaccination continuity in workers: • worried about infection in the workplace (aOR: 4.35: 95% CI 3.19-5.93) • becoming ill (aOR 2.04: 95% CI: 1.45-2.86 • infecting patients (aOR: 1.82; 95% CI: 1.28-2.60) • regarding influenza vaccination as effective was a significant independent predictor of vaccination continuity (aOR: 3.03: 95% CI: 1.94-4.73) First time vaccination: • 5.2% first time vaccinated in 2011-2012 season • proportion higher for those <35 (12.2%) • higher in PHCWs concerned about being infected in the workplace
Limitations & Strengths	Limitations: • low response rate • self reporting data may lead to inaccurate responses bias Strengths: • appropriate sample type • appropriate data collecting tool (used in prior studies and then edited from pilot testing prior to use)
Comments	This study reveals a potential alarming issue of a trend of declining vaccination rates from previous years. It also merits further

	investigation as to why the most common predictor of future vaccination was past vaccination is now changing in this particular study.
Rating	Moderate study / Strong quality (based on the analytical CAT)

Title #7	Corace, et. al (2013). Predicting influenza vaccination uptake among healthcare workers…
Setting & Objective	A cross sectional survey Objective: to identify the motivators and barriers to pH1N1 vaccine uptake among health care workers at a bilingual hospital in Ontario, Canada.
Sample, Methods & Analysis	Completed 2010 N= 3,301 (31.5% response rate) HCW • a self-reported questionnaire was mailed out to 10,464 HCW • HCW completed measures of (1) sociodemographics, (2) influenza infection risk factors, (3) influenza vaccine history, (4) pH1N1 vaccine attitudes. • SPSS/PASW used for analysis • x^2 analysis and independent t-test used to examine differences between vaccinated and nonvacinated HCW in terms of sociodemographics, vaccine history, and influenza risk factors. • univariate analysis used for differences between vaccinated and nonvaccinated HCW in their responses to pH1N1 Vaccine Attitude Scale items, and odds ratio (with 95% CI). • multivariate regression analysis based on systematic review of HCW pH1N1 vaccine uptake literature, as well as univariate predictors of pH1N1 vaccination ($p<.1$) • pH1N1 vaccine attitude scale used based on health belief model constructs. Adapted from questionnaires developed to measure behavioural discriminants associated with influenza vaccine uptake among HCW.
Results	1. Predictors of pH1N1 vaccine uptake among HCW; A. P<.05 in HCW living with children at time of vaccination B. P<0.001 HCW who received vaccination in the past C. P<0.001 HCW worked in a full time clinical position D. P<0.05 HCW who reported more frequent contact with elderly, loved ones and children 2. Perceived susceptibility:

	A. perceived susceptibility significantly associated with vaccine uptake P<0.05 • base model of factors in combination with the Vaccine Attitudes Scale correctly predicted 95% of HCW pH1N1 vaccination behaviour.
Limitations & Strengths	Limitations; • question the validity of the tool used to measure attitudes • single center study (one facility) therefore question the generalizability • uneven distribution of occupational subgroups (more administrative compared to frontline) therefore potential for selection bias Strengths: • sufficient sample size to provide significant results • accurate data as to who was actually vaccinated versus not vaccinated because self-reported data was compared to hospital kept records.
Comments	The response to explore alternative options to mandatory vaccinations is once again being promoted. The voluntary vaccination programs need to continue to be looked at in combination with HCW attitudes and behaviours influencing the choice to be vaccinated.
Rating	Weak study / Moderate quality (as per analytic CAT)

Title #8:	Dube, E., et. al (2014). Seasonal influenza vaccination uptake in Quebec, Canada, 2 years after the influenza A (H1N1) pandemic.
Setting & Objective	2011-2012 Quebec Canada Cross-sectional random telephone survey Objective: to assess seasonal influenza vaccine uptake in 2011-2012, 2 years after the influenza A (H1N1) pandemic mass immunization campaign to identify the main reasons for having or not having received the vaccine.
Sample, Methods & Analysis	N= 5,559 Made up of : • people > 60 years old • chronic medical conditions age 18-59 • health care workers age 18-59 1) Random digit dialing telephone survey completed

	2) Validated questions used from preceding studies 3) Professional research and polling firm hired to perform data collection 4) Expansion weights assigned to ensure results were representative of target population 5) Descriptive statistics generated for all variables 6) x^2 and Fishers exact test used 7) Unirvariate analysis $p < .05$ was significant 8) SAS version 9.3 for statistical analysis
Results	Response rate 48% • 56.6% age > 60 had the vaccine (95% CI 54-59%) Vaccine uptake higher in >65 than 60-64 (P< .0001) • 43.5% of health care workers received vaccine (95% CI 37.4-49.6) Type of health care provider receiving vaccine: • 89.2% Physicians • 32.4% management, administrative personnel, and support staff • 61.6% nurses • 50.5% patient care attendents8 • 39.8% other health care personnel Vaccine uptake significantly higher among health care workers with frequent patient contact • 53% vs. 32% P=.0019
Limitations & Strengths	Limitations; • no central immunization registry (no concrete comparison), therefor only self- report data on vaccination rates, (potential for recall bias, social desirable responses) • broad sample types (not just focused on health care workers) • only one province (not as generalizable) Strengths: • random sampling • large sample size • case-weights used t combat nonresponse bias
Comments	This study provided good quality data with regards to influenza vaccination in general. It did not focus on the one targeted group of health care workers but on multiple groups. This is beneficial to review

	reasons for non health care workers choice or refusal of vaccine for comparison.
Rating	Strong study / Moderate results (based on analytical CAT)

Title #9:	Edelstein, M., and Pebody, R.(2013). Can we achieve high uptakes of influenza vaccination of health care workers in hospitals? A cross-sectional survey of acute NHS trusts in England…
Setting & Objective	Cross-sectional survey of data from 2008/2009 and 2011/2012 England acute care hospitals Objective: to ascertain what strategies acute NHS trusts in England have used to increase influenza vaccine uptake in health care workers
Sample, Methods & Analysis	N=345, 619 health care workers (80/166 acute care trusts) Selectsurvey- online questionnaire building tool Sample groups • frontline health care staff included (doctors, nurses), • other HCW Stata version 12 used Binomial regressions
Results	Vaccine uptake was; • 50.5% doctors • 43.4% nurses • 53.9% other HCW's Interventions used universally by 2011/2012 • trolly services 96.3% of trusts • posters 95% of trusts • leaflets 95% of trusts Increase intervention usage seen from 2008/2009 to 2011/2012 • peer vaccination from 3.8%-38.8% (2008/2009 and 2011/2012) • educational DVD's and videos 3.8%-22.5% • twitter promotion 2.5% to 12.5% • facebook promotion 1.3% to 6.3% Interventions that increase vaccine uptakes by nurses; • talks and lectures 8.1% • educational DVD's 12.4% • senior doctor as a champion 10% • senior nurse as a champion 8.4%

Limitations & Strengths	Limitations; • low number of trusts implementing all interventions may have made study underpowered • potential bias results towards the larger trusts due to use of binomial regression model • potential for misclassification bias. Not clear as to who received what or all interventions based on vaccination rates Strengths: • relevant purpose • large sample size
Comments	This study highlights that different groups of HCW respond differently to interventions.
Rating	Moderate study / Moderate quality

Title #10:	Fricke, K., Gastanaduy, M., Klos, R., Begue, E.(2013). Correlates of improved influenza vaccination of healthcare personnel: A survey…
Setting & Objective	A cross-sectional self-reported survey in Louisiana July-September 2012 Objective: To describes practices for influenza vaccination of healthcare personnel with emphasis on correlates of increased vaccination rate
Sample, Method & Analysis	N= 124 respondents (HCW; • 17-item self-reported questionnaire • Microsoft Office Excel 2007- frequency tables for reported vaccination rate along with the presence or absence of a specific variable • Nonparametric Mann-Whitney U test for comparisons • SPSS multiple regression used for independent effect of multiple variables
Results	153 out of 254 hospitals responded (60% response rate) Median range for vaccination rate 67% Vaccination rate significantly higher (P<.05) in hospitals: • accredited by Joint commission (70%) • provided acute care (71%) • served children (70%) • oncology patients (75%) • pregnant women (73%) • intensive care units (72%)

	• required signed declination forms (72%) • imposed consequences (85%) Vaccination rates significantly lower in hospitals that provided: Psychiatric care (50%) Rehabilitation care (48%) Exclusively voluntary vaccination program (50%) No consequences (60%)
Limitations & Strengths	Limitations: • not generalizable as only one state studied • self-reported data- may be skewed high as only 60% response rate and those who did not respond were those with lowest vaccination rates Strengths: • reliable tool for data collection • appropriate statistical analysis for desired results • appropriate purpose and sample type (health care personnel)
Comments	Hospitals that only implement portions of vaccination program interventions saw vaccination rates close to 50%. As more interventions were used concurrently, the vaccination rates increased toe 64%, and then to 74% with signed declination forms. Thus highlighting the need for multiple interventions for program effectiveness.
Rating	Moderate study / Moderate quality (based on analytical CAT)

Title #11:	Heimberger et al. (1995). Knowledge and attitudes of health care workers about influenza: why are we not getting vaccinated?...
Setting & Objective	Psychiatric facility in New York State post influenza outbreak Objective: to determine the low rate of vaccine acceptance
Sample, Methods & Analysis	N=922 employees of a Psychiatric facility (62% female, 47% HCW) • anonymous questionnaire • Epi-info version 5 used • Multivariate logistic regression used to determine which factors best predicted employee acceptance of vaccine
Results	• 71.3% response rate Reasons for non acceptance • #1 fear of adverse effect Predictor for acceptance • over age of 50 years

	• received influenza vaccine in the past
Limitations & Strengths	Limitations: • Sample not limited to nurses • Old study • Not generalizable due to specialty unit • Self reported questionnaire- question validity of tool Strengths • Large sample size • Relevant purpose
Comments	The study is beneficial to point out that 20 years ago people are still afraid of adverse reactions of the vaccine. Why this remains the main reason for refusal is important despite the decades of proof of little to no harmful side effects.
Rating	Moderate design / Moderate quality (based on analytical CAT)

Title #12:	Hollmeyer et. al (2009). Influenza vaccination of health care workers in hospitals-A Review……..
Setting & Objective	A systematic review of the literature Objective1: to identify self-reported reasons among HCW for vaccine acceptance and non-acceptance Objective 2: to predict the factors that are statistically associated with influenza vaccine acceptance
Sample, Methods & Analysis	A literature search was completed consisting from 1980-2008 N= 21 studies chosen from 9 different countries Selection criteria: • HCW included nurses, physicians, or both, (NOT support staff para/non medical personnel) from hospitals • publication in English, French or German • HCW self reported reasons for vaccination acceptance or non acceptance; must have given 6 self reported reasons for non acceptance, and 3 self reported reasons of acceptance Descriptive statistics used to illustrate heterogeneity of the studies
Results	The top five categories for refusal were; 1) fear of adverse reactions 2) lack of concern 3) inconvenient delivery 4) lack of perception of own risk 5) doubts about vaccines efficacy

	• Category #1 was mentioned in all studies as a reason for refusal • Categories #1-#5 were mentioned in 48% of all studies The top 5 reasons for acceptance; 1) self-protection 2) protection of patients 3) protection of family members and colleagues 4) convenient access 5) work ethic 19 out of 21 studies reported self-protection as a reason for acceptance of the vaccine Factors with strongest association with vaccination; • older age • belief in effectiveness of vaccine • pervious receipt of vaccine
Limitations & Strengths	Limitations; • data only from acute care hospitals not long term care therefore not generalizable • self-reported data may have some social bias Strengths; • clear purpose and need for study • accurate sample group selection of just frontline health care workers
Comments	This review noted that nurses were less likely to convert from non-vaccine recipients to vaccine recipients compared to physicians. It also states that the effective of knowledge and attitudes is more pronounced among nurses (compared to physicians) suggesting the importance of education with nurses.
Ratings	Moderate study / Moderate quality (based on analytical CAT)

Table #13:	Honda, H., Sato, Y., Yamazaki, A., Padival, S (2013) A successful strategy for increasing the influenza vaccination rate of health …..
Setting & Objective	2012-2013 Japanese Tertiary Care Center; Before and after trial Objective: to measure the improvement in the influenza vaccination rate from a multifaceted intervention at a Japanese tertiary care center where implementing a mandatory vaccination program is difficult.

Sample, Method & Analysis	• Included all HCWs at Teine Keijinkai Medical Center (nurses, physicians, residents administrative personnel, etc) • Before the intervention between 1,186-1,489 people included in study • After the intervention total was 1,581 recommended The intervention included: • Free vaccination • Declination statements required • Audit and telephone feedback as to why declined • Mandatory submission of vaccination documentation from other institutions
Results	• HCW vaccination rate increased to 96.9% post intervention year (1,532/1,581) • P<.001 • 48 HCW declined with declination forms • 14 HCW had interviews with VP of hospital due to no declination form but no vaccination
Limitations & Strengths	Limitation: • Single centered study decreases generalizability of interventions used • Exclusion criteria only used in interventions year not previous- potential for overestimated increase Strengths: • Large sample size • Clear purpose
Comments	Interesting results as most similar studies with voluntary programs have not reached near the vaccination rate as this institution. Can be attributed to cultural differences and beliefs.
Rating	Moderate study design / High quality data (as per the analytical CAT)

Title #14:	Jaiyeoba, et. al (2014). Association between health care workers' knowledge of influenza…
Setting & Objective	A cross-sectional, self-administered survey. Objective: to determine the knowledge and opinion about the influenza vaccine among various health care workers at a University facility in South Carolina

Sample, Methods & Analysis	Completed 2010-2011 N=689 (21% response rate) • large facility in South Carolina. • surveys completed by nursing staff (71%), physicians (15%) and medical students (14%) • X^2 or Fishers exact test used to compare categorical data • SAS version 9.3
Results	• $p<0.0001$ statistical significant for vaccination rates for 2010-2011 vs. 2009-2010 (94% vaccinated vs. 74%) • $p<0.0001$ for those who received vaccine in 2009/2010 and were vaccinated again in 2010-2011 • reasons cited for vaccination 2010-2011 were: 1)requirement for declination forms (33%) 2)protecting personal health (28%) 3)concerns for patients (26%) • Vaccine knowledge: 1) 88% Physicians vs. 67% nurses agreed vaccine was unlikely to cause a severe reaction ($p<0.0001$) 2) 69% physicians vs. 42% nurses agreed that the vaccine was effective in preventing influenza ($p<0.0001$) 3) 84% physicians vs. 70% nurses agreed that they were unlikely to contract influenza after vaccination ($p<0.0025$)
Limitations & Strengths	Limitations: • potential for selection bias due to self reporting and information bias (influence of peers on medical students) • low response rate (21%) • questionable generalizability (University based facility) Strengths: • statistically significant sample results • appropriate professionals sampled • appropriate purpose for study

Comments	It is important to note that this study year (2010-2011) was first year of a required declination form signed. This may have inflated the vaccination rates for this year. It would be interesting to complete follow up studies in the future to see if the new policy seems to remain as effective.
Rating	Weak study / Moderate quality (based on analytical CAT)

Title #15:	Lemaitre et al. (2009). Effect of influenza vaccination of Nursing home staff on mortality of residents: A cluster-randomized trial
Setting & Objective	40 nursing homes in the Paris area 2006 Objective: to evaluate the effect of staff influenza vaccination on all-cause mortality in nursing home residents
Sample, Methods & Analysis	• Randomized selection by computer of which homes to receive influenza promotional campaign on benefits of influenza vaccination • Control arm received just basic information on influenza vaccination • Univariate estimate of the effectiveness of the intervention • Spearman correlation coefficient • SAS software
Results	HCW vaccination rate in intervention sites = 69.9% Control arm HCW vaccination rate 31.8% Incidence of influenza like illness was significantly lower in vaccination sites No significant difference in all-cause mortality in raw data Multivariate adjusted analysis identified significant difference in all-cause mortality in vaccinated versus control (OR=0.80, 95% CI=0.66-0.96)
Limitations & Strengths	Limitations; • Mortality not able to be confirmed to be caused by influenza (validity of results) Strengths; • Large sample size • Randomized control trial • Appropriate analysis
Comments	This study yielded similar results as earlier ones. Further research needed on the potential correlation on reduction of other respiratory illnesses with the influenza vaccine
Rating	Moderate design / Moderate quality

Title #16:	Llupia, A., Guillermo, M., Olive, V., Quesada, S., Aldea, M., Sequera, V., Rios, J., Garcia-Basterio, A., Varela, P., Bayas, J., Trilla, A. (2013).

	Evaluating influenza vaccination campaigns beyond coverage…
Setting & Objective	A before-after descriptive study Objective 1: to describe the influenza campaign that took place in a Barcelona hospital and assess the attainment of the strategic objectives used to increase the knowledge of influenza in health care workers. Objective 2: to describe the reach of the different campaign activities among HCW, their opinions on the activities, and the coverage achieved.
Sample, Methods & Analysis	September 2010/ November 2010 N= 287 health care workers stratified by professional categories at a 700 bed university hospital in Barcelona. • study was part of the professionals and influenza vaccination project (PIVAC) 3 Data Sources; • 1) self-administered PIVAC survey • 2) vaccination history, including event and date each season • 3) demographic variables (sex, date of birth, years worked) • descriptive statistics was used to characterize the study population. • Wilcoxon test for matched pairs was used for the attainment of the before and after comparisons. All statistical tests were 2-tailed, p values < or = .05 were considered statistically significant. • Analysis performed with SPSS v.15
Results	The before-after surveys showed a rise in; • the perception of HCW as promoters of vaccination • influenza risk perception • awareness of the key messages of the campaign Respondents were asked after the campaign if they were aware of the various campaign activities; • overall satisfaction of campaign was 7.9 (SD, 2.3) out of 10 • 74.1% reported knowing about the brochure sent home • global vaccination coverage was 34% (95% CI: 33.8-36.4), 50.7% physicians, 26.6% nurses, 28% auxiliary nurses and 31.4% other HCW.
Limitations & Strengths	Limitations; • small sample size • short time frame between before and after- may skew results and cause information bias between employees • potential for selection bias with low representation from specific health care professionals

	Strengths: • clear purpose for study • valid tools used for data collection and analysis
Comments	Future studies repeating this intervention needs to be evaluated to get a true picture as to whether this campaign was effective. A before and after study within 3 months will not generate an accurate overall picture. Especially since the vaccination rates are being compared to 2009, the H1N1 pandemic flu season.
Rating	Weak study / Weak quality (as per analytical CAT)

Title #17	Osman, Abdi (2008) Reasons for and barriers to influenza vaccination among health care workers in an Australian…..
Setting & Objective	Cross-sectional self-reported survey in an Emergency Department in an urban teaching hospital in Australia Objective: To examine attitudes and beliefs to influenza vaccination among HCW and to assess vaccine uptake for 2007 and intentions for 2008.
Sample, Methods & Analysis	N= 63 doctors, nurses and administration (66.7% female, 33% over age 45, 33% age 26-35, rest 18-25 or 36-45) • self-reported questionnaire • administered to on site doctors, nurses and administration • SPSS used to analyse data
Results	• 90% response rate • 62% nurses, 19% medical and administrative • 58% vaccination rate reported for 2007 Reasons for vaccination: 1. self protection main reason cited 2. prevent cross-infection 3. routine 4. required Reasons for refusal • vaccine causes influenza • not concerned about influenza • trust in/ wish to challenge natural immunity • not all strains covered incidence of influenza among respondents 2007 • 11.5% in vaccinated • 13.5% in non vaccinated
Limitations &	Limitations

Strengths	• self-reported data • small sample size • specific area of work not generalizable Strengths • high response rate for potential respondents • appropriate target group (doctors and nurses)
Comments	This study was a very small study in a very specific area of health care. The report highlights that misconceptions and myths about the vaccine still exist as the number one reason for refusal was that the vaccine caused influenza.
Rating	Weaker study design / Fair quality (based on analytical CAT)

Title #18	Potter et al. (1997) Influenza vaccination of health care workers in long term care hospitals reduces the mortality of elderly patients..
Setting & Objective	12 Geriatric medical long term care sites in Glascow Objective: to determine if vaccination of HCW working in long term care reduces the incidence of influenza, lower respiratory infections and death
Sample, Methods & Analysis	N= 653 HCW • 4 groups SVPV, SVP0, S0PV, S0P0 • SV- staff vaccinated, S0- staff not vaccinated • PV-patients vaccinated, P0- patients not vaccinated • random sample of which settings would have vaccination of HCW promoted • chi-square and t-test (2 tailed used)
Results	• no significant differences in men vs women in 4 groups • no significant differences in ages • significant difference in mortality rates between 4 groups ($p<.01$) • mortality decreased from 17% to 10% in facility with SVPV and SVP0 • residents developing respiratory like illness was significantly reduced in setting where HCW vaccinated (SV)
Limitations & Strengths	Limitations; • older study • deaths not confirmed influenza hard to 100% connect to HCW vaccination

	Strengths; • large sample size • appropriate sample type • appropriate analysis and data collection • appropriate purpose
Comments	This study highlights the potential benefits of staff vaccination as well as highlighting the fact that patient vaccination in the elderly population may not be as important as HCW due to their immune system and fragility.
Rating	Moderate design / Moderate quality (based on analytical CAT)

Title #19:	Quasch,S., Pereira, J., Hamid, J., Crowe, L., Heidebrecht, L., Kwong, J., Guay, M., Crowcroft, N., McGreer, A., Chambers, Qun, S., Bettinger, J. (2013). Measuring influenza immunization coverage among health care workers…..
Setting & Objective	A web-based survey Objective: to describe the ability of Canadian health care organizations to measure influenza immunization coverage of health care workers.
Sample, Methods & Analysis	Completed in 2010-2011 N= 669 (59% response rate) • immunization campaign planners were selected as sample; 1) Occupational health and safety personnel, infection control representatives and senior administrators made up 88% of sample • questionnaire was pilot tested prior to use • calculated the proportion of organizations that could measure coverage for all applicable health care worker groups, stratified by organization type • STATA version 10.0 used for analysis • variables with $p<.25$ used in multivariate model, this controlled for organization size and type
Results	Coverage measurement of those vaccinated: • coverage of personnel on payroll (92%) and casual (75%) • less than 50% measured volunteers, physicians, nonpayroll personnel, and personnel on extended leave. • acute care hospitals measured coverage in nonpayroll physicians (56%) versus 15% measured in continuing care facilities • higher proportions of acute care hospitals (56%) measured volunteers versus 41% in continuing care.

	Influenza immunization program practices and policies; • written implementation plan for immunization campaign was 45% • worked with interprofessional teams was 42% • mandatory immunization policies was 20% (most were continuing care) • documentation or policy for declination was 32% of organizations Organizations reporting having an implementation plan or policy or procedure describing how to report and or calculate rates were more likely to comprehensively measure rather than those without these characteristics: • Odds ratio 2.0; 95% CI, 1.1-3.5 and odds ratio, 2.1; 95% CI, 1.2-3.9)
Limitations & Strengths	Limitations: • potential response bias as respondents in charge of multiple facilities responded only once Strengths: • good generalizability due to a good variety of geographical responses • reliable and valid questionnaire created based on high quality information and knowledge from reputable sources (CHIIN) • low information bias with web based survey • sample groups appropriate for purpose of study
Comments	This study highlights the need for organizations to separate reporting based on subgroups of professionals to identify the areas needing better immunizations. Further research could be done to help develop a standardized way of reporting to ensure a more comprehensive list for all organizations across Canada.
Rating	Strong study / High quality (based on analytical CAT)

Title #20:	Quach,S., Pereira,J., Heidebrecht,L., Kwong, J., Guay, M., Crowe, L., Quan, S., Bettinger, J.,(2013). Health care worker influenza immunization rates: The missing pieces of the puzzle……
Setting & Objective	Qualitative study with telephone interviews 2012 across Canada Objective: to learn about the purpose and process of for collecting immunization data, including the challenges and barriers that exist for measuring and reporting rates.
Sample, Methods &	N= 23 immunization planners interviewed in acute care and continuing care, and regional public health

Analysis	• structured interview guide that included questions about each institutions influenza immunization campaign, data collection process and methods for measuring rates • content analysis used for the interviews • transcripts co-coded by two researchers • QSR NVivo used to organize coded data
Results	Themes that emerged; <u>Data collection systems;</u> • paper based versus electronic Advantages to paper based; • ease of use, ability to identify unvaccinated HCW during outbreaks • ability to analyze data by departments/groups Disadvantages; • inability to determine immunization rates conveniently • time and resources to complete Advantages of electronic • inexpensive • efficient for determining immunization rates by groups <u>Data Collection process</u> • most all sites complete this process the same way, with consent forms, containing demographic information and screening for eligibility <u>Tracking immunization by outside immunization providers;</u> • all organizations stated that employees were to notify the employer with written immunization proof from an outside source • some accepted verbal notification <u>Declination tracking;</u> • less than half the organizations recorded when a HCW declined the vaccine • many large institutions did not seek declination forms due to the time-consuming and laborious process • some benefits noted to were that it provided a second opportunity to educate staff and to potentially change their mind on vaccination <u>Influenza immunization rate measurement;</u> • majority measured only payroll employees • some small organizations measured non payroll Reasons for not measuring non payroll included;

	• thought it was not their responsibility • believed public health did no require it • did not have accurate denominator • laborious and time-consuming
Limitations & Strengths	Limitations; • small sample group not representative of all of Canada • potential for selection bias with only immunization planners opinions and thoughts Strengths; • member checking provided to ensure accuracy of coding and themes • saturation reached by 15th interview, data is reliable based on specific sample
Comments	This study highlighted the key challenges to measuring and obtaining immunization rates from HCW. It has reaffirmed the labour intensive and time-consuming process of tracking immunization rates accurately. It also proves the need for a more nation wide standardized approach.
Rating	N/A

Title #21:	Quach,S., Pereira,J., Kwong,J ., Quan, S., Crow,L., Guay, M., Bettinger, J,(2013). Immunizing health care workers against influenza…
Setting & Objective	Semi-structured interviews. Objective: to gather data from immunization planners across Canada about immunization program strategies, immunization policies and procedures, and processes for collecting immunization data, including barriers and facilitating factors.
Sample, Methods & Analysis	Completed in 2012 N= 23 participants representing 21 health care organizations. • 15 participants from 7 provinces: Alberta (1), Saskatchewan (1), Manitoba (1), Ontario (5), Quebec (1), New Brunswick (1) and Nova Scotia (3) • interviews were approximately 1 hour • content analysis used to interpret interview data • co-coded by two researchers • QSR NVivo used to organize coded data

Results	Themes:1. Barriers to achieving high influenza immunization coverage of HCW; A. antivaccination/ vaccine-hesitant HCW B. negative personal experiences perceived to be associated with influenza immunizations C. misconceptions of influenza immunization D. influence of H1N1 pandemic on subsequent immunization programs 2. Mandatory influenza immunization practices; A. reasons to support a mandatory influenza immunization policy B. challenges associated with a mandatory policy
Limitations & Strengths	Limitations: 1. voluntary participation, may have self reported bias 2. 10 of the participants worked in occupational health and safety thus themes may not be generalizable to all HCW 3. not all provinces represented Strengths: 1. Clear purpose and background for proposed study 2. Interview data collected with electronic recorder- accuracy in verbatim data for themes 3. Privacy and confidentiality of answers explicitly explained
Comments	Low HCW immunization coverage is a longstanding issue among all health care organizations. It is important to note that not all evidenced-based strategies have been tried or explored. There is still room for improvement with vaccination programs if additional strategies are tried before deciding on a mandatory policy.
Rating	Moderate study design / Medium quality (based on analytic CAT)

Title #22:	Quan et. al (2012). Voluntary to mandatory evolution of strategies and attitudes toward influenza vaccination of healthcare personnel..
Setting & Objective	Retrospective cohort study 2006-2011 California Objective: to evaluate serial campaigns that include a mandatory health care personnel vaccination policy and to describe health care personnel attitudes toward vaccination and reasons for declination.
Sample, Methods &	Impact of influenza campaigns on the proportions of health care personnel who are vaccinated from fall of 2006 to spring of 2011.

Analysis	• Used analysis from an anonymous convenience survey completed in 2007-2008. Cumulative vaccine strategies used until 2007-2009 influenza season; • mobile vans • mobile carts • mandatory declination Mandatory vaccination policy 2009-2010 included; • mandatory declination form signing and wearing of mask at all times during influenza season • 2-way contingency x^2 test- to compare proportions of vaccinated versus nonvaccinated • comparisons also made between proportions vaccinated and the seasons with new campaigns versus prior seasons
Results	2006-2007 influenza season • 44% of HCP vaccinated 2007-2008 influenza season • 62.9% of HCP vaccinated (significant increase ($p<.001$) with initiation of mandatory declination and mobile carts 2008-2009 influenza season • 58.3% HCP vaccinated (decrease due to decreased availability of peer to peer vaccination) 2009-2010 influenza season • 86.7% HCP vaccinated (start of mandatory vaccination policy) 2010-2011 influenza season • 91.9% HCP vaccinated (increase attributed to increase in physicians from 77.5% to 93.7%) ($P<.001$) 2007-2008 Survey • 43.2% of respondents were willing to wait 20 minutes for vaccine • 27.2% were unwilling to wait 10 minutes
Limitations & Strengths	Limitations: • information bias for 2007-2008 survey as they were asked while in line for vaccination • unsure of generalizability due to university based teaching hospital in one state Strengths: • large volume of data collected and assessed using reliable and

	valid analytical tools • clear purpose and appropriate for my usage
Comments	It is important to note that mandatory campaigns are proven to increase vaccination rates, but some hospitals may be less willing to implement a mandatory influenza policy if all other strategies have not been tried.
Rating	Moderate study / Moderate quality (based on analytical CAT)

Title #23:	Raftopoulos, V (2008) Attitudes of nurses in Greece towards influenza vaccination
Setting & Objective	Qualitative focus groups of nurses in a health care setting in Greece Objective: to explore the knowledge, attitudes and beliefs of nurses in Greece towards influenza
Sample, Methods & Analysis	N= 42 nurses (77% female; mean age 30.6 +/- 4.26 years) • Four focus groups of questions and discussions 1. inclusion criteria was • willing to participate • able to read and speak Greek • Registered nurses • Working in a health care setting 2. Prior to focus groups questionnaire administered for sociodemographic info 3. Continuous feedback provided to ensure reliability of data 4. Groups transcribed and recorded verbatim
Results	Knowledge of influenza • varied with public health representatives having a more in-depth understanding Perceived susceptibility • large portion did not consider themselves susceptible Barriers to acceptance • most common was they believed they were not belong to a high risk group needing it • adverse affects • lack of efficacy in vaccine Cues to action • question “what kind of programs would you suggest?” • answers: • “ health education programs especially speeches from experts in influenza prevention……” • “health education programs for small groups must be interactive and should also include demonstration of flu injection techniques”

Limitations & Strengths	Limitations • group setting may have caused socially desirable answers • small sample • no analytical tool used Strengths • appropriate target population (registered nurses) • open ended questions with verbatim recording
Comments	This qualitative study reaffirmed some common reasons for acceptance and refusal for the influenza vaccine among nurses.
Rating	Moderate study design / moderate qualitative results

Title # 24:	Rakita et al. (2010) Mandatory influenza vaccination of health care workers: A 5-Year study…
Setting & Objective	5 year study from (2005-2010) at Virginia Medical Center Objective: to increase influenza vaccination rates by instituting the first mandatory influenza vaccination program
Sample, Methods & Analysis	N= 5 year fluctuating total of HCW at facility approximately 5000 • Campaign began spring 2005 with multiple interventions including information sharing, influenza "champions", fun quizzes, prizes • No declination forms • Mandatory vaccination • Accommodation requests due to medical or religious reasons were filed on a standard form and reviewed by a HR employee, employee wellness health nurse and or a physician • HCW granted accommodation had to don a surgical mask for the influenza season
Results	2005-2006: n= 4,703= 97.6% 2006-2007: n= 4,815= 98.5% 2007-2008: n= 4,720 = 98.7% 2008-2009: n= 4,808 = 98.9% 2009-2010: n= 5,024 = 98.9% Unionized employees with the Washington State Nurses Association were exempt from this mandatory policy • 2005-2006 85.9% unionized vaccinated • 2009-2010 95.8% unionized vaccinated
Limitations &	Limitation;

Strengths	• Site specific: generalizability weakened • Included all HCW (including non medical personnel) • Never deciphered age, gender of employees Strengths: • Long study period for accuracy • Large sample sizes • Appropriate purpose
Comments	This mandatory policy and institution achieved very high vaccination rates of HCW with little resistance. A key requirement noted for this program was strong support from the leadership of the institution. A very important note is that the nurses union at this hospital were all exempt from having to follow this mandatory policy but still "chose" to be 85.9% vaccinated in 2005-2006 and 95.8% vaccinated in 2009-2010. Very promising for increasing vaccination rates in traditionally they are low and they are exempt from the policy but because their "peers" are all being vaccinated they choose to be.
Rating	Moderate / strong quality (based on analytical CAT)

Title #25:	Shahrabani,S., Benzion,U., Din, G(2009). Factors affecting nurses' decision to get the flu vaccine. *Eur J Health Econ.* (10). 227-231
Setting & Objective	November 2005 to January 2006 Empirical study in Israel Objective: to assess nurses beliefs according to the health belief model that might affect their decisions to get flu shots
Sample, Methods & Analysis	N= 299 nursing students/trainees • two part questionnaires with a 5-point likert-scale • items requesting sociodemographic information • items measuring the health belief model variables • probit regression models used
Results	Demographic information; • 90.6% women • 75% Jewish • 61% married • average age of 32 Health Belief Model measures; • vaccinated nurses perceived influenza as a more serious illness than non-vaccinated • vaccinated nurses perceived themselves as more susceptible to illness, perceived more benefits to the vaccine and had less barriers compared to non-vaccinated.

	Benefits and cues to action explain acceptance of the flu vaccine • alpha coefficients of 0.73 and 0.63 Older age and being married have a positive effect on decision to take the vaccine.
Limitations & Strengths	Limitations; • potential source of information bias due to surveys and no noted blinding in place • self-reporting of influenza acceptance could impact accuracy Strengths; • clear purpose relevant to my purpose • valid questionnaire as stated used in past similar study • appropriate sample type (nurses only)
Comments	
Rating	Moderate study / Moderate quality (based on analytical CAT)

Title #26:	Slaunwhite, J., Smith, S., Flemming, M.(2009). Increasing vaccination rates among health care workers using unit "champions"……..
Setting & Objective	A random control trial was completed in a Halifax hospital in 2005. Objective: to compare the vaccination rates of health care workers on units with a flu vaccine champion versus those without.
Sample, Methods & Analysis	N= 46 work groups (23 pairs) • Matching units were chosen to ensure equal representations of champions throughout the hospital. • Each unit randomly assigned a unit champion or not • Post intervention analysis used two-tailed independent sample t-tests • SPSS v 15.0
Results	• statistically significant difference between championed and non-championed • ($t(22)=2.86$, $p<.03$) • championed staff vaccination rate was 52% vs. non-championed was 41% (CI 95% fro increase 2.9%-18.2%) • championed groups rates increased from 44% (in the past) to 54% ($t(21) = 4.38$, $p<.001$) or 105 increase (95% CI for 4.8%-13.6%) • non-championed groups vaccination rates increased from 38% (in the past) to 41%, but was not significant ($t(21)=1.16$, $p=.25$)
Limitations &	Limitations:

Strengths	• not all assigned champions completed training program causing smaller sample size for comparison • no strong controls for information bias • potential for selection bias based on support from manager in selection process Strengths: • used valid and reliable tools for measurement and analysis • good comparable groups
Comments	Very positive findings from this study with regards to the use of vaccine champions. Future work should be elaborated to include training for the champions on how to persuade, non compliers. This is another study highlighting that a multipronged approach is needed with voluntary vaccination campaigns.
Rating	Strong study/ High quality (based on analytical CAT)

Title #27:	Winston, L., Wagner, S., Chan, S.(2014). Healthcare workers under a mandated H1N1 vaccination policy with employment termination..
Setting and Objective	Feb 2010- April 2010 Prospective voluntary survey at an urban community teaching hospital in Chicago, IL. Objective: To examine HCW perceptions of the H1N1 virus, the vaccine, and the strict mandated vaccination policy.
Sample, Methods & Analysis	N= 202 respondents of frontline "high risk" area health care workers • paper survey; 16 questions, self-completed • response rate 100% as surveys were administered and collected on site • descriptive statistics used for patient demographics • pearson Chi-square used for differences comparisons • SPSS 11.5.1 used with statistical significance set at 0.05
Results	Nurse represented 48% of respondents General results; • 66.3% of respondents claimed they typically received seasonal influenza vaccinations • 96.1% took the 2009 H1N1 vaccine (54.6% of these prior to the mandate, the remaining 45.4% after) • 68.4% respondents felt vaccination was safe Mandated vaccine; • 43.7% felt the consequences of employment termination for

	refusal was unfair • 31.7% felt mandate was an infringement on their rights • 3.5% would electively seek employment elsewhere • nurses, clerks and technicians were significantly more opposed to the mandate (p= 0.04)
Limitations & Strengths	Limitations; • voluntary survey- question misclassification bias (self-reported vaccination) • skewed results because of 2009 H1N1 pandemic year • questions of tool not previously validated • small sample size • information bias – due to paper surveys in close proximity to one another Strengths: • study purpose clear and appropriate (study for mandated policies done in a hospital with a clear mandated policy)
Comments	This study attempted to examine how HCW perceived mandatory vaccination policies with termination of employment as consequence for refusal. I would take these results with extreme caution because of the very informal nature of sample selection and high chance of bias reporting due to short time frame of allowance of completion of survey.
Rating	Weak / Weak quality

Appendix C: Final Report for Consultations with Colleagues

Final Report for Consultations with Colleagues

"Preparing and Promoting Influenza Vaccine Champions at Central Health: A One Day Educational Workshop"

Anne Blackmore

#200265510

CONSULTATIONS WITH COLLEGUES

Worldwide approximately three to five million cases of severe illness caused by influenza occur accounting for 250,000- 500,000 deaths (World Health Organization, 2014). Annually, in Canada, 4000 deaths and 20,000 hospitalizations are estimated to be related to influenza (National Advisory Committee for Immunizations, 2014). In 2012/2013 Newfoundland had 723 confirmed cases of influenza, 279 hospital admissions, and 15 deaths (Department of Health and Community Services, 2013). Rates of influenza are highest among children ages five to nine; serious illness and death is highest in those less than two years of age and those age 65 or older (NACI, 2014). The World Health Organization (WHO) and the Canadian National Advisory Committee (NACI) recommends that 90% of all health care workers (HCW) get immunized against influenza (CHIIN, 2009).

Being vaccinated against influenza is an essential component of the standard of care for all HCW (NACI, 2014). This is because HCW are at higher risk of spreading and transmitting the virus to their patients at their most vulnerable time (Corace et al., 2013). Influenza vaccination has been shown to decrease morbidity and mortality rates up to 50% in some cases, especially in the elderly (Corace et al., 2013; NACI, 2014).

The project I am proposing is a one day educational workshop for Registered Nurses (RN) and Licensed Practical Nurses (LPN) on the promotion and administration of the influenza vaccine at Central Health. There is an obvious need for a different approach towards the current voluntary vaccination program here a Central

Health. This need is evident from the vaccination rates of health care workers (HCW) last season (2013) at 56% in acute care and 40% in long term care.

Objectives for the Consultation

3) To identify factors that may impact the decision to be vaccinated or not within the Central Health Region.
4) To gather information about existing policies and initiatives used at Central Health to promote and increase health care workers vaccination uptake.
3) To examine nurses attitudes and knowledge about the influenza vaccine in the Central Health Region.
5) To gather information that will inform the content and delivery of the one-day influenza vaccination workshop.

Methods

Setting and Sample

Consultations were guided by the literature review. An in-depth consultation plan was developed and executed. I consulted with four registered nurses (RN) (eg. Occupational Health and Safety Nurse, Infection Prevention and Control Nurse, Nurse Educator and Float RN) and three licensed practical nurses (LPN). Participants were randomly approached. The sample consisted of six female and one male, ranging in age from 28-54 years. Their experience working ranged from less than five years to greater

than 20 years in a variety of areas of nursing. All staff approached agreed to participate in the interviews.

Data Collection

Prior to the start of the discussion participants were informed of the rationale and objectives of the study. Confidentiality was discussed. Their willingness to participate in the discussion inferred informed consent. A series of questions (see appendix A) were asked to the participants either face to face in a private office, or over the telephone. Not all questions were asked to all participants, the flow and type of question was based on the participants' nursing experience and role. This project is not a research project and did not require the ethics approval as per the Health Research Ethics Authority assessment tool (see Appendix B). Notes during the interview were transcribed directly into a password protected computer only accessible by me. The interview length varied between 10- 30 minutes. The participants were made aware that only Dr. Manuel and I would have access to any identifying information. I ensured that I have adhered to the ethical standards outlined in the consultation proposal. All identifying information was removed and participants were assigned codes.

I also researched the internet informally accessing websites to see what information existed pertinent to my practicum project.

This consultation final report will highlight and explain the key findings of my formal and informal consultations for my practicum project as well as identify any gaps in the information.

Data Analysis

Responses to the interview questions were reread and common themes were grouped together and compared to the findings in the literature.

Formal Interview Findings

Heading	Number of participants identified theme
1. I am vaccinated to protect my family	6 out of 7
2. I am vaccinated to protect myself	5 out of 7
3. I am vaccinated to protect my clients	1 out of 7
4. Generally, HCW are in favour of the influenza vaccine	4 out of 7
5. HCW have mixed feelings about the influenza vaccine	3 out of 7
6. Proper techniques for administration should be part of influenza champion training	5 out of 7
7. Receiving correct information about the benefits or risks pertaining to the influenza vaccination are important.	4 out of 7
8. HCW refuse vaccine because they are afraid of getting the "flu" from the vaccine	6 out of 7
9. I would like to hear a guest speaker at the educational day	4 out of 7

Theme One: Making the Decision to be Vaccinated or Not.

The first theme identified was the reasons participants were vaccinated or not vaccinated. There were six out of seven of those interviewed who were vaccinated to p

protect their family, whether it was children or grandchildren. In addition to protection of family, self-protection was also a reason for deciding to be vaccinated. All participants who stated they were vaccinated to protect their family also stated they were vaccinated to protect themselves.

Two of the participants stated that protecting themselves was important but they also emphasized protection for their patients. These reasons for vaccination from the consultations are also highlighted in the literature. It is interesting to note that only two participants stated that their decision to be vaccinated was based on their desire to protect their most vulnerable patients. The infection prevention and control practitioner emphasized that the educational day should include information about the benefits that the vaccine can provide in protecting vulnerable clients.

The most common reason identified related to the refusal of the vaccine was the misperception that the influenza vaccine can cause influenza. The fear of adverse effects was noted as the number one reason for refusal in some key literature (Hollmeyer et al., 2009). This finding provides evidence supporting the significance of including a good background as to the etiology of the influenza vaccination, its use, and side effects. Mechanisms and tips on how to help provide accurate information and eliminate the myths associated with the influenza vaccine is a key area to be addressed in the educational day.

Theme Two: Appropriate Administration of the Vaccine

Another important theme identified in the formal consultations was the importance of knowing how to properly administer the influenza vaccine injection. During the interviews five participants thought it would be important to include how to properly administer the influenza vaccine as part of the educational day. For example, the appropriate land marking, handling of the vaccination, storage and how to monitor post administration for adverse effect. Currently Central Health has a self- learning package on the administration of the vaccine. This component could be taken and used as part of the educational material.

Theme Three: Mixed Feelings About the Vaccine

Three of the seven people interviewed said that they believe in general health care workers do have mixed feelings about the influenza vaccine. That is, while some workers believed in the vaccine this is not always the case as several spoke of colleagues who were skeptical as to the benefits of the vaccine and the true efficacy of the vaccine. They spoke of colleagues that wanted to support the vaccine but were worried of the potential side effects that they may experience.

While discussing what components should be included in the educational day, four of the seven respondents said they would like to see a guest speaker who would discuss some of the pertinent information about influenza and the benefits of the vaccine. One participant stated that a physician might seem more convincing to some participants,

while the other participants didn't elaborate on their reasoning for wanting a guest speaker other then that it would give more diversity in the ways the information would be delivered during the educational day.

Gaps Noted in the Interview Findings

One major discrepancy was noted when four out of the seven staff I interviewed believed that most health care workers (HCW) supported and received the influenza vaccine. This is concerning because last year only 56% in acute care and 40% in long term care of HCW were vaccinated at Central Health. This shows that staff who support the vaccine may be unaware of the actual low vaccination rates at Central Health and the subsequent implications. This would be a good starting point for my educational day to discuss the potential implications of low vaccinations rates in relation to the most vulnerable patients such as children and the elderly. The benefits associated with the vaccination of HCW has been widely reported on in the literature and will be the opening foundation of the educational day. Multiple studies have linked the vaccination of HCW's against influenza to a reduction in mortality in the elderly by up to 50% in some cases (Ahmed, Lindley, Allred, Weinbeum, & Grohskopt, 2014; Beyer et al., 2013; Carmen et al., 2000; Lemaitre et al., 2009; Potter et al., 1997)

Another issue noted in the interview findings is that people who chose to be vaccinated to protect their families and kids all had small children or grandchildren. The one participant who did not state this was young and had no children. Knowing this

would be important during the educational session to ensure that the content addresses the benefits of vaccination for all populations (eg. elderly and children).

During the interview, one participant suggested that the modes of transmission of influenza should also be included in the educational day. Being that the vaccine does not always guarantee protection from influenza it would be beneficial to discuss other methods of influenza prevention, not just the vaccine itself, including proper hand washing, isolation techniques, and appropriate personal protective equipment usage.

Informal Consultation Findings

After reviewing influenza vaccine similarities on each site discussing the benefits, myths, and side effects of the vaccine were evident. A large amount of material was presented discussing the side effects of the vaccine and the myth that the vaccine can "cause" influenza. During the educational workshop myths related to the influenza vaccine should be discussed. This includes providing accurate information about the vaccine, potential side effects of the vaccine and their severity. The inclusion of such content in my educational day will allow influenza vaccine "champions" the knowledge and tools to disseminated the proper information about the influenza vaccine to their co-workers.

Conclusion

The results from these consultations, along with the knowledge gained from my literature review, will guide the development of the proposed educational day. This day

would include a discussion of the benefits of the influenza vaccine, the modes of transmission of influenza, methods of preventing the spread of influenza, common myths about the vaccination, safe administration of the vaccine including the potential side effects associated with the vaccine.

Once I have developed the one-day workshop I will ask some of the key stakeholders to review the content and offer any further suggestions. Recommendations from the key stakeholders will help me revise the workshop in order to produce the most beneficial and effective educational day possible.

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CONSULTATIONS WITH COLLEGUES

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Appendix A
Questions

1) Can you tell me about your decision to get vaccinated or not?

2) What were some of the deciding factors that impacted your decision?

3) What do you see as some of the concerns of nurses who are making the decision to be vaccinated or not?

4) Do you feel that you are knowledgeable about the vaccine?

5) Who currently administers the influenza vaccine to HCW at Central Health?

6) Could you tell me about any concerns you might have related to educational opportunities about influenza vaccination?

7) Is there any information that you feel would be important for nurses to have in order to make an informed decision about being vaccinated?

8) Are there high numbers of HCW's off sick with influenza during the influenza season?

9) Are there any statistics from Central Health recorded on HCW and influenza vaccination and sick leave?

10) Has there been any correlation between vaccinated HCW and influenza outbreaks within Central Health?

11) What are some of the challenges that you have noticed impacts vaccination rates?

12) Would you attend a one day work shop about the flu vaccine?

13) What kind of information do you envision as being important in a one day work shop that trains influenza vaccine "champions"?

Appendix B: Health Research Ethics Authority Screening Tool

	Questions	Yes	No
1.	Is the project funded by, or being submitted to, a research funding agency for a research grant or award that requires research ethics review		X
2.	Are there any local policies, which require this project to undergo review by a Research Ethics Board?		X
	IF YES to either of the above, the project should be submitted to a Research Ethics Board. IF NO to both questions, continue and complete checklist		
3.	Is the primary purpose of the project to contribute to the growing body of knowledge regarding health/and or health systems that are generally accessible through the literature?	X	
4.	Is the project designed to answer a specific research question or to test an explicit hypothesis?		X
5.	Does this project involve a comparison of multiple sites, control sites, and/or control groups?		X
6.	Is the project design and methodology adequate to support generalizations that go beyond the particular population the sample is being drawn from?		X
7.	Does the project impose any additional burdens on participants beyond what would be expected through a typically expected course of care or role expectations?		X
	LINE A SUBTOTAL Questions 3-7 = 1 (count # of Yes responses)		
8.	Are many of the participants in the project also likely to be among those who might potentially benefit from the result of the project as it proceeds?	X	
9.	Is the project intended to define a best practice within your organization or practice?		X
10.	Would the project still be done at your site, even if there were no opportunity to publish the results or the results might not be applicable anywhere else?	X	
11.	Does the statement of purpose of the project refer explicitly to the features of a particular program, organization, or region rather than using more general terminology such as rural vs urban populations?	X	
12.	Is the current project part of a continuous process of gathering, monitoring data within an organization?		X
	LINE B SUBTOTAL Questions 8-12 = 3 (count # YES)		
	SUMMARY Line B total is greater than line A total therefor the most probable purpose is quality/evaluation. I will proceed with my project without having to involve a Research Ethics Board based on the guidelines used at Memorial University of Newfoundland which were adapted from the Alberta research ethics community consensus initiative (ARECCI)		

Appendix D: The Workshop Manual

Engaging Flu Champions:

A One-Day Educational Workshop

Table of Contents

Introduction

Every fall health care facilities across Canada initiate an in-depth influenza vaccination campaign. Influenza is a respiratory virus identified in 1933. It is a highly contagious, upper respiratory tract disease that can cause significant harm and even death in the vulnerable populations (Aziz, 2013). Worldwide, influenza causes approximately three to five million cases of severe illness in which 250,000 to 500,000 can result in death (World Health Organization, WHO, 2014). Annually, in Canada, 4000 deaths and 20,000 hospitalizations are estimated to be related to influenza (National Advisory Committee on Immunizations, NACI, 2014). In 2012/2013 Newfoundland had 723 confirmed cases of influenza resulting in 279 hospital admissions and 15 deaths (Department of Health and Community Services, 2013). Rates of influenza are highest among children ages five to nine; serious illness and death is highest in those less than two years of age and those age 65 or older (NACI, 2014). The World Health Organization and the Canadian National Advisory Committee recommends that 90% of all health care workers get immunized against influenza (NACI, 2014). Despite this recommendation health care workers do not get routinely immunized.

The one day workshop "Engaging Flu Champions" was created for Central Health with the purpose of motivating nurses to promote and administer the influenza vaccine to their co-workers, in turn helping increase the vaccination rates. This resource manual will provide you with the elements needed to implement the "One Day Workshop: Engaging Flu Champions". This manual consists of nine sessions; an introduction, an ice breaker

activity: electronic polling, a background: what is influenza?, influenza vaccine: what are the side effects?, influenza: prevention of transmission, creating flu champions, the challenges of being a flu champion, reflection; where do we go from here?, evaluation.

This manual is intended to be delivered by a clinical nurse educator or a member of the professional development department at Central Health. A partnership with the Employee Wellness Health and Safety Department must be established. The Employee Wellness Health and Safety Department will need to be asked to be a guest speaker and then to act as an optional resource between the participants upon completion of the workshop. It need to be confirmed that the Employee Wellness Health and Safety Department are agreeable to acting as an information resource, if needed, between the flu champions. Approval from senior administration is needed to grant the necessary educational leave from work and or payment for time for participants.

The workshop is developed for nurses who work in areas that have primarily an elderly population, as the elderly are a very high risk, vulnerable group who experience severe consequences related to influenza infections. Prior to attending this workshop it is an expectation of any nurse to: be competent and proficient in administering a deltoid immunization injection, have completed the required immunization module from Central Health, and have read the required readings. The workshop should be offered in early to mid September. Therefore, staff will be recruited through a letter emailed out to all clinical managers and facilitators during the month of August. The Manager will be expected to identify and nominate two to four staff members from their floor to partake in

the course. The course will be designed to have 20-25 participants. The staff selected must meet the required pre-requisites, and must also have strong leadership and interpersonal skills amongst fellow staff members.

WORKSHOP GOAL AND OBJECTIVES

Goal:

To increase a nurses awareness of the significance of being vaccinated for influenza.

Objectives:

By the completion of this workshop, the participants will;

1) Have an increased knowledge about the influenza vaccination.

2) Become motivated nurses to take on the role of a "flu champion".

3) Have discussed strategies that promote influenza vaccination.

4) Be able to identify challenges related to influenza vaccination uptake.

PREFACE

Prior to beginning this workshop, the facilitator must:

- ✓ Book a room and necessary equipment (data projector, lap top, speakers, wi-fi connectivity) for the one day workshop.
- ✓ Ensure the appropriate materials are available for use (specific materials for each session will be listed under each specific session).
- ✓ Request approval from senior administration for educational leave and / or payment for time owed for the participants from their current jobs.
- ✓ Establish a partnership with Employee Wellness Health and Safety Department prior to workshop to ensure utilization of "Flu Champions", and for attendance for workshop as a guest speaker (see session 7 for specific information).
- ✓ Request funds from senior administration to provide a coffee break for the workshop.

- ✓ Create an agenda for the one day work shop and distribute required readings to participants (see sample below).

- ✓ Set up your room prior to the start of the workshop. Have the tables in a square so everyone can see each other with the far end only have the facilitator and the white board behind the facilitator.

When reading this manual it is important to make note of the following key triggers throughout the manual.

- ❖ Read through each session in the order in which they are presented.

- ❖ Each session begins with a detailed text box including the objective(s) for the session, the strategy/strategies for the session, and any required materials for the session.

- ❖ Each session will highlight key points to be emphasized by the facilitator by being ***bolded and italicised***.

- ❖ Each session will end with either; a reflective question highlighted in green making it stand out to the presenter, or a post test and electronic polling.

Agenda

0900-0915 Introduction

0915-0945 Ice Breaker Activity: Electronic Polling

0945-1030 Background: What is Influenza?

1030-1100 Coffee Break (provided)

1100-1120 Influenza Vaccine: What are the Side effects?

1120-1145 Influenza: Prevent it, Don't Spread it!

1145-1200 Q & A

1200-1300 Lunch (not provided)

1300:1345 Creating Flu Champions

1345-1430 The Challenges of Being a Flu Champion

1430-1500 Reflection: Where do we go From Here?

1500-1530 Evaluation

Agenda Items

Session 1: Introduction

Learning Objective(s):

- To provide an overview of the one day "Engaging Flu Champions" workshops activities.
- To discuss necessary "housekeeping" items for the day.

Strategy:

- Power point presentation.

Materials Required:

- Data projector, laptop, pens, sign in sheet.
- Introduction Power Point (**see *Appendix C)*** (digital version available on jump drive)

In this activity the facilitator will need to do the following;

Step 1: Hook up data projector and laptop and ensure display screen is visible on blank wall in the room, visible by all participants.

Step 2: Pass around the sign in sheet with a pen

Step 3: Begin the power point

Session 2: Ice Breaker Activity: Electronic Polling

Learning Objective(s):

- To assess the participants' current knowledge about the influenza vaccination.
- To discuss factors that influence the decision to be vaccinated or not.

Strategies:

- Electronic polling (option1) / manual laminated letters (option 2).
- Group sharing of personal experiences.

Materials Required:

- Questions and answers with notes (***see Appendix E)***
- Data projector, laptop, handheld keypad (option 1***- see Appendix G).***
- Laminated letters (A, B,C, T & F ***see Appendix F***), white board, dry erase markers (option 2).

In this activity the ice breaker questions will be carried out through the use of 1) electronic polling or 2) manually. Electronic polling is a process in which the participants will read a question on the screen and answer the question with option A, B, C or True (T) or False (F) by clicking the answer of choice on their handheld device. This device will then send their answer to a program which tabulates the rooms response and produces and chart with the percentages of who answered what answer. Prior to starting this session make contact with the IT department to ensure this technology will work. Give these questions to your IT department in charge of the polling and have them incorporated into the electronic polling system. Ensure that each participant has a

handheld answering device. If there is no ability to perform electronic polling please have laminated letters (A, B, C, T, F), size of one regular sheet of paper, available for each participant.

Option 1: Electronic Polling

Step 1: Give questions and answers to your information technology department prior to the workshop to ensure the technology will work. If technology not available or will not work proceed to option 2.

Step 2: Once IT capabilities confirmed begin session by handing out handheld answering devices. Each participant will receive their own device.

Step 3: Explain to the participants how the devices work.

A question or statement will appear on the screen and will be read out loud. There will be multiple-choice options for answers or true and false. You will choose the answer you think is correct by clicking the corresponding button on your handheld. For example first button equals A, second B, third C, fourth T and fifth F.

Step 4: Begin electronic polling of individual questions.

Step 5: Once everyone has answered show the percentages of who selected which option (through the electronic polling).

Step 6: Show correct answer and read out answers attached.

Step 7: Repeat steps 4-6 for each question until all questions completed.

Step 8: End session with question 9.

Reflective Question: Why do you think people are vaccinated? Why not?

Step 9: Brainstorm reasons together to answer question. Write ideas down on white board and have participants share personal experiences and or reasons for vaccination. (10-15 minutes).

Option 2: Manual Laminated Letters

Step 1: Prior to starting workshop it was discovered that electronic polling was unavailable or not working. You will now need enough laminated letters of A, B, C ,T and F for each participant. (for example 10 participants you will need 10 A's, 10 B's, 10 C's ….) .

Step 2: Explain activity to participants.

There will be a question or statement read out loud and posted on the screen via the data projector. Options for answers are either A, B or C or T or F for true or false. Please hold up the laminated letter you feel is the correct answer.

Step 3: Read out question and show options for answers.

Step 4: Once everyone has answered you will tally the number of each answer given and mark on white board (for example; count how many participants held up letter A and mark it on the white board, then do the same for each other letter and tabulate percentages; 10 participants out of 20 held up A, therefore 50% voted for A).

Step 5: Read out correct answer and discuss.

Step 6: Repeat steps 3-5 until all questions complete.

Step 7: End session with Question 9.

Reflective Question: Why do you think people are vaccinated? Why not?

Step 8: Brainstorm reasons together to answer question 9.
Write ideas down on white board and have participants share personal experiences and or reasons for vaccination. (10-15 minutes).

Session 3: Background: What is Influenza?

Learning Objective(s):

- To provide an overview of the benefits of receiving the influenza vaccination.

Strategy:

- Power point presentation with video clip.

Required Materials:

- Data projector, Laptop.
- Power Point: The Influenza Vaccine & Health Care Workers ***(see Appendix H)*** (digital copy available on jump drive)

This activity will expose the participants to the history and background information pertaining to influenza and the vaccine. It will then build upon this knowledge to discuss the benefits of the vaccine as well as discussing reasons for and against vaccination both in the literature and personally amongst the staff.

In this activity the facilitator will need to do the following;

Step 1: Project power point onto screen.

Step 2: Make sure all participants can see the screen.

Step 3: Begin power point presentation reading the notes with the appropriate slides.

Session 4: Influenza Vaccine: What are the side effects?

Learning Objective(s):

- To identify common side effects of the influenza vaccine and their management.

Strategy:

- Word game.

Required Materials:

- Laminated cut outs of the "answers" (***see Appendix I).***
- White board. Dry erase markers, (write "clues" on white board- see list below), tape.

This session provides an opportunity to assess your learner and then build upon it. In this section break up into two teams and then provide them they will be given laminated cut outs of various words related to the influenza vaccine and side effects. Write the clues on the board. The teams as a group will have to decide where each laminated word fits on the board at the front of the room. As they figure out the answers they must bring the word up and stick it on the board. Wait until both teams have completed the activity and then proceed to verify if the answers are correct.

In this activity the facilitator will have to do the following;

Step 1: The facilitator will write the "clues" up on the white board, leaving enough space for two laminated answers to fit under each.

Step 2: Give each team a set of laminated answers.

Step 3: Explain the activity

Instructions-***"In this activity each group will work together to read the "clues" written up on the whiteboard and then bring the correct answer up and stick it underneath the clue. When all teams have completed we will discuss the answers".***

Step 4: When all words are handed out provide each team with and a roll of tape each team starts the activity at the same time.

Step 5: Once completed explain the clues and answers as provided

After completion of the activity the facilitator will then go through the correct answer giving brief descriptions and explanations of each and answer any further questions the group may have (see under clarification, explanations and question section).

Session 5: Influenza: Prevent it, Don't Spread it!

Learning Objective(s):

- To learn techniques in addition to the vaccine for prevention of transmission of influenza.

Strategies:

- Video as introduction.
- Stations.

Required Materials:

- Start with video clip https://www.youtube.com/watch?v=GkSx5AXRCIU
- Data projector & Laptop.
- Signage ***(see Appendix K).***
- Two rectangular tables (set up).
- Box of gloves (size S, M, L).
- Hand sanitizer, Box of face masks with eye shields.
- "Germ" lotion & black light (obtain from Infection Prevention Department).
- Bag of isolation gowns

In this activity we will use visual and tactile sensation to help the learner assimilate the knowledge. This activity will allow the participants to see the other measures that must be taken as a health care worker to prevent the transmission of influenza. There will be two stations set up in the room with posters. Split the class into two groups again. One group head to station #1 with the facilitator and the rest head to station #2 to review poster on personal protective equipment and have opportunity to don personal protective equipment if they wish.

In this activity the facilitator will do the following;

Step 1: Begin this activity by playing a short video clip from this link:

https://www.youtube.com/watch?v=GkSx5AXRCIU

Step 2: Station set up.

Station 1: Black light / hand-washing

Materials: Black light, "germ" lotion, signage for proper hand washing steps and hand sanitizing steps behind station.
The facilitator will be present at this station applying the "germ lotion".

Station 2: Lay out the boxes of gloves, gowns, face masks with eye shields, and provincial isolation signage behind station.

Step 3: Explain each station to the entire group

In this activity we will be divided into two groups. From there one group will go to station 1 and the other to station 2.

Station 1 is the black light station. Here I (the facilitator) will apply some "germ" lotion to your hand and you will rub it in for 5 minutes. Read the above signage of how to properly wash your hands, then proceed to the washroom and wash your hands. Then return to the station and a black light will be held over your hands to see if you cleaned all of the germs off. The germs represent influenza germs.

Station 2 is the personal protective equipment station which has the correct equipment that should be used when dealing with a confirmed or suspected case of influenza. Take your time and try on the equipment and read the new provincial signage.

Step 4: Divide the class into two groups.

Step 5: Proceed to the stations and switch station when everyone completed.

Reflective Question: How will you help reinforce proper hand washing?

After this activity allow for any time remaining until lunch for any questions or clarifications from the morning session. Then break for lunch as per the time you a lot on the agenda.

Session 6: Creating a Flu Champion

Learning Objective(s):

- To explore the characteristics of a flu champion.
- To examine the role of a flu champion.

Strategy:

- Small groups
- Brainstorming

Materials Required:

- White board, dry erase markers, pens/pencils, blank paper (enough for 3-4 small groups)

This activity will introduce the group to what a flu champion means to them and how it has been defined in the literature. In this activity the class is broken groups will be broken up into 3-4 smaller groups for a brainstorming session. Each group is provided with pens or pencils and blank paper. The groups will be first tasked with writing down what is a flu champion to them? Then the facilitator will have one person from each group read out some of their answers and write them down on a white board. The facilitator will then discuss what is a flu champion; as defined in the literature.

In this activity the facilitator will do the following;

Step 1: Break the participants up at random into 3-4 small groups of 4 people.

Step 2: Give each group blank sheets of paper and pens/pencils

Step 3: Ask the groups to write down what they think a flu champion is? (allow 5 minutes).

Step 4: Go around to each group and ask one member to read out some of their ideas and write them down on a white board. **(*do not write duplicate ideas down if the groups come up with very similar answers).***

If the participants are quiet and not coming up with ideas proceed to next step and read out flu champion information.

Step 5: The facilitator will then read out the following facts about flu champions from the literature;

Another solution to increase HCW vaccination rates has been positive peer lead promotion and administration of the vaccine entitled, "peer to peer programs". A formal form of peer-to-peer influence to increase vaccination rates suggested in the literature is the use of flu champions. A "flu champion" is a health care worker who receives formal education and provides positive and accurate information about the influenza vaccine in the workplace. In some cases the champion will also administer the vaccine to their co-workers.

One study in Halifax , Nova Scotia found that the units with a vaccine champion present had an increase in HCW vaccination rates from 44% in the past to 54%, after one year of implementation.

Step 6: Now ask the groups to write down what characteristics a flu champion should Possess?

Step 7: Have one member form each group read out their answers. The facilitator writing them down on the white board **(*do not write duplicate ideas down if the groups come up with very similar answers*)**.

Step 8: Now based on the information shared the group should come up with and write a definition as to what a flu champion will represent.

Sample definition:

Flu Champion:

"A person promoting positive change with influenza vaccination rates of health care workers."

Reflective Question: How do you envision yourself as a Flu Champion?

Session 7: The Challenges of Being a Flu Champion

Learning Objective(s):

- To identify potential challenges facing a flu champion.
- To discuss current and future influenza vaccine initiatives that the "flu champion" could promote

Strategies:

- Guest speaker
- Concept mapping ***(see Appendix L)***

Materials Required:

- White board, dry erase markers

In the first part of this activity the Employee Wellness Health and Safety Department will allow the occupational health and safety nurse, or designate, can come and give a brief overview of the current influenza vaccine promotional initiatives that exist.

In this activity the facilitator will do the following;

Step 1: Contact OH & S nurse in advance of workshop requesting their presence at the workshop. ***Explain to the guest speaker that you would like them to give a brief overview of the current influenza vaccine promotional initiatives for HCW used at the organization. Ask the speaker to be a maximum of 10 minutes, and leave 5 minutes for questions.***

Step 2: Introduce the guest speaker, giving their current job at the organization.

Step 3: After guest speaker is finished and questions answered thank them for their time and see them out.

In the second half of this activity the group will do some concept mapping with the facilitator. The facilitator will start with the broad question of "How can we increase HCW vaccination rates?" or "what are the challenges to vaccinating health care workers for influenza?". From this point the facilitator will draw this question in the middle of the white board in a circle, from here the facilitator with the group will brain storm the rest of the concept map covering barriers, challenges, current initiatives and future solutions, increased health care worker vaccination rates. The facilitator will give a brief overview of what concept mapping is for any participants who are unfamiliar.

Step 4: Explain what a concept map entails.

Concept mapping is;

> *Used as a learning and teaching technique, concept mapping visually illustrates the relationships between concepts and ideas. Often represented in circles or boxes, concepts are linked by words and phrases that explain the connection between the ideas, helping students organize and structure their thoughts to further understand information and discover new relationships.*

Concept mapping serves several purposes for learners:

a) Helping students brainstorm and generate new ideas.

b) Encouraging students to discover new concepts and the propositions that connect them.

c) *Allowing students to more clearly communicate ideas, thoughts and information.*

d) *Helping students integrate new concepts with older concepts.*

e) *Enabling students to gain enhanced knowledge of any topic and evaluate the information.*

The final product of a concept map will be different depending on the specific answers given by the participants. A guide concept map illustration is included to help aide the process if the participants are uninvolved.

Step 5: Ask participants to break back into same small groups as previous exercise

Step 6: Start the concept map off with "Challenges to vaccinating HCW against influenza" or reverse "how can we increase HCW vaccination rates against influenza?". *(draw in big circle on top of board or in centre (see illustration)*

Start with a main idea, topic, or issue to focus on.

A helpful way to determine the context of your concept map is to choose a focus question—something that needs to be solved or a conclusion that needs to be reached. Once a topic or question is decided on, that will help with the hierarchical structure of the concept map.

Then determine the key concepts

Find the key concepts that connect and relate to your main idea and rank them; most general, inclusive concepts come first, then link to smaller, more specific concepts.

Finish by connecting concepts--creating linking phrases and words

Once the basic links between the concepts are created, add cross-links, which connect concepts in different areas of the map, to further illustrate the relationships and strengthen student's understanding and knowledge on the topic.

Step 7: Write down ideas for the above mentioned steps and together with the group build the concept map.

Step 8: Once you have discussed all the noted challenges, and as a group have come up with solutions, you will have to decide how the solutions can be put into play at your organization.

If you have a group of participants that are not coming up with ideas or are silent see the below list of samples for the concept map and star them off with one.

Example 1:

Challenges
↓
Access
↓
Too busy on unit to go get flu shot
↓
Solution
↓
Mobile cart or
Peer vaccinator
↓
Utilize at Central Health by Flu Champions administering vaccine therefore vaccine can be administered to co-workers anytime day/night when unit not as busy.

Example 2:

Challenges
↓
Fear about side effects
↓
Afraid of getting Guillain Barre
↓
Solution
↓
Flu Champion dispel myth; specifically "higher chance of getting Guillain Barre from the influenza virus than the vaccine" or
↓
Offer support and information on other common side effects of vaccine and what to expect.

Session 8: Reflection: Where do we go from Here?

Learning Objective(s):

- To wrap up the day and answer any further questions, or clarifications of the material covered.

Strategy:

- Open Floor discussions

Materials Required:

- None

This activity will allow participants to have an open floor for discussion about the day. It will provide an opportunity to clarify any questions and to deice where this newly trained group of Flu Champions will go from here.

In this activity the facilitator will do the following;

Step 1: The facilitator asks one participant at a time to go around table and have each person speak to one point of the day that benefited them and if there are any other questions.

Here allow the participant to ask a question for clarification if needed. If the question doesn't come up; Ask the

Reflective question: "What will this new group do from here?"

Step 2: Facilitator to ensure all email addresses from sign in are correct.

Step 3: inform class that a group email will be sent within a week with a future meeting date for all flu champions.

Step 4: Inform class that the OH & S nurse will be the liaison between you but you will work autonomously and use each other as resources to problem solve on ago forward basis, with the OH&S nurse as a resource as well.

Step 5: The facilitator will add the OH&S nurse to the email and ask them to continue to be a liason with the newly trained flu champions as needed.

Session 9: Evaluation

Learning Objective(s):

- To evaluate the assess the knowledge gained from the day, and how useful
  the participants found the materials and information presented.

Strategies:

- Electronic polling.
- Evaluation forms

Materials Required:

- Questions and Answers for polling ***(see Appendix M)***
- Data projector, Lap top, hand held answering devices ***(see Appendix G).***
- Laminated letters A, B,C,T & F- ***(see Appendix F),*** white board, dry erase markers.
- Pens/ pencils, evaluation forms ***(see Appendix N)***

In this activity there will be two evaluations performed. One evaluation of the participants in the form of a post test to assess what was retained and learned throughout the day. The other is an evaluation form to assess the quality of the workshop and to gain input for any future improvements. The post-test questions will be carried out through the use of 1) electronic polling or 2) manually. Electronic polling is a process in which the participants will read a question on the screen and answer the question with option A, B, C or True or False by clicking the answer of choice on their handheld device. This device will then

send their answer to a program which tabulates the rooms response and produces and chart with the percentages of who answered what answer. Prior to starting this session make contact with the IT department to ensure this technology will work. Give these questions to your IT department in charge of the polling and have them incorporated into the electronic polling system. Ensure that each participant has a handheld answering device. If there is no ability to perform electronic polling please have laminated letters (A, B, C, T, F), size of one regular sheet of paper, available for each participant.

Evaluation forms will be handed out to be filled out by each participant.

Option 1: Electronic Polling

Step 1: Give questions and answers to your information technology department prior to the workshop to ensure the technology will work. If technology not available or will not work proceed to option 2.

Step 2: Once IT capabilities confirmed begin session by handing out handheld answering devices. Each participant will receive their own device.

Step 3: Explain to the participants how the devices work.

> *A question or statement will appear on the screen and will be read out loud. There will be multiple-choice options for answers or true and false. You will choose the answer you think is correct by clicking the corresponding button on your handheld. For example first button equals A, second B, third C, fourth T and fifth F.*

Step 4: Begin electronic polling of individual questions.

Step 5: Once everyone has answered show the percentages of who selected which option (through the electronic polling).

Step 6: Show correct answer and read out note attached.

Step 7: Repeat steps 4-6 for each question until all questions completed.

Option 2: Manual Laminated Letters

Step 1: Prior to starting workshop it was discovered that electronic polling was unavailable or not working. You will now need enough laminated letters of A, B, C ,T and F for each participant. (for example 10 participants you will need 10 A's, 10 B's, 10 C's ….) (see sample laminated letter A).

Step 2: Explain activity to participants.

There will be a question or statement read out loud and posted on the screen via the data projector. Options for answers are either A, B or C or T or F for true or false. Please hold up the laminated letter you feel is the correct answer.

Step 3: Read out question and show options for answers

Step 4: Once everyone has answered you will tally the number of each answer given and mark on white board (for exam; count how many participants held up letter A and mark it on the white board, then do the same for each other letter and tabulate percentages; 10 participants out of 20 held up A, therefore 50% voted for A).

Step 5: Read out correct answer and discuss.

Step 6: Repeat steps 3-5 until all questions complete.

Step 7: Inform the class about the paper evaluation forms for the workshop

These evaluation forms are private and confidential and are filled out anonymously if desired. The information will only be used by the facilitator to evaluate and improve the current workshop.

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Appendix A: Recruitment Letter

Recruitment Letter

(Date; eg September 1st, 2016)
(Nurse Manager)
(Unit)
(organization)
(city/town)

Re: Flu Champion Education Day

Dear (managers name),

This year (enter your organization) is trying a new initiative to help increase our health care workers influenza vaccination rates. This is important because the World Health Organization and the Canadian National Advisory Committee recommends that 90% of all health care workers get immunized against influenza but despite this recommendation health care workers do not get routinely immunized. We are planning a one- day educational work shop to engage highly motivated individuals who will help promote and administer the influenza vaccine to their co-workers.

We are asking for your assistance, as managers, to identify nurses from your respective units to participate in this day. The staff selected would need approval for educational leave from work. If the workshop falls on the selected staffs days off, they would require a day off in lieu or straight time paid for educational leave. If the workshop is on a selected staff member's day to work they would need to be replaced from their regular duties for the duration of the workshop.

There are a few pre-requisites needed in order to be eligible to participate. The selected RN/LPN must; 1) be proficient in deltoid, IM, immunizations, 2) display strong leadership and interpersonal skills, 3) have completed (organization) immunization module if required, and 4) have read the attached articles prior to the work shop (see appendix B: Required Readings).

Once you have selected the participants, and they have accepted the invite, please forward their names to myself at the email address below no later than (late August). The work shop is planned for early to mid September.

Thank you,

(Facilitators name)
(Title)
(Organization)
(Address)
(email address)

Appendix B: Required Readings

REQUIRED READINGS

Effects of influenza vaccination of health-care workers on mortality of elderly people in long-term care: a randomised controlled trial

William F Carman, Alexander G Elder, Lesley A Wallace, Karen McAulay, Andrew Walker, Gordon D Murray, David J Stott

Summary

Background Vaccination of health-care workers has been claimed to prevent nosocomial influenza infection of elderly patients in long-term care. Data are, however, limited on this strategy. We aimed to find out whether vaccination of health-care workers lowers mortality and the frequency of virologically proven influenza in such patients.

Methods In a parallel-group study, health-care workers in 20 long-term elderly-care hospitals (range 44–105 patients) were randomly offered or not offered influenza vaccine (cluster randomisation, stratified for policy for vaccination of patients and hospital size). All deaths among patients were recorded over 6 months in the winter of 1996–97. We selected a random sample of 50% of patients for virological surveillance for influenza, with combined nasal and throat swabs taken every 2 weeks during the epidemic period. Swabs were tested by tissue culture and PCR for influenza viruses A and B.

Findings Influenza vaccine uptake in health-care workers was 50·9% in hospitals in which they were routinely offered vaccine, compared with 4·9% in those in which they were not. The uncorrected rate of mortality in patients was 102 (13·6%) of 749 in vaccine hospitals compared with 154 (22·4%) of 688 in no-vaccine hospitals (odds ratio 0·58 [95% CI 0·40–0·84], p=0·014). The two groups did not differ for proportions of patients positive for influenza infection (5·4% and 6·7%, respectively); at necropsy, PCR was positive in none of 17 patients from vaccine hospitals and six (20%) of 30 from no-vaccine hospitals (p=0·055).

Interpretation Vaccination of health-care workers was associated with a substantial decrease in mortality among patients. However, virological surveillance showed no associated decrease in non-fatal influenza infection in patients.

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See Commentary page ???

Institute of Virology, University of Glasgow, Glasgow, UK (W F Carman PhD, L A Wallace PhD, K McAulay BSc)**; Department of Occupational Health, Bellshill Hospital, Lanarkshire** (A G Elder MPH)**; Greater Glasgow Health Board, Glasgow** (A Walker PhD)**; Public Health Sciences, University of Edinburgh** (Prof G D Murray PhD)**; and Academic Section of Geriatric Medicine, University of Glasgow, Glasgow Royal Infirmary, Glasgow G4 0SF** (Prof D J Stott MD)

Correspondence to: Prof David J Stott
(e-mail: d.j.stott@clinmed.gla.ac.uk)

Introduction

Influenza is one of the leading causes of respiratory infection.[1] It remains an important cause of death in elderly people, with most excess mortality in patients older than 65 years.[2] Environmental factors play an important part in determining the risk of infection, and grouping of frail elderly people in long-term care creates an environment that is likely to allow rapid spread of influenza infection. Case-control studies have shown that influenza vaccination of elderly people in long-term care is associated with decreased risk of pneumonia and death.[3] This strategy is supported by The Chief Medical Officers in the UK and by the Centers for Disease Control in the USA, who recommend influenza vaccination for elderly people who have chronic disease or who are in long-term care.[4,5] However, the protection afforded by vaccination of frail elderly patients is frequently incomplete, probably because of impaired immune function through inability to develop adequate protective circulating antibody concentrations after vaccination.[6,7]

Vaccination of health-care workers has been suggested as an additional or alternative strategy to lower rates of nosocomial transmission to patients at high risk of complications. We have found serological evidence of influenza infection in 23% of hospital staff in a winter season.[8] The potential is therefore high for influenza to be brought into elderly-care homes by susceptible health-care workers, and for infection to be transmitted to other health-care workers and to patients. In a previous pilot study, we found that vaccination of health-care workers was associated with a decrease in mortality of elderly patients in long-term care from 17% to 10% over a winter season.[9]

We did a multicentre, randomised, controlled study to find out whether vaccination of health-care workers can lower mortality and the frequency of laboratory-proven influenza infection in elderly patients in long-term-care hospitals.

Methods

Study design

The study was a parallel-group design with cluster randomisation. Clusters were based on 20 UK National Health Service medical long-term-care geriatric hospitals across west and central Scotland. Hospitals were randomly allocated to be offered routine vaccination of health-care workers or not to be offered vaccination. Randomisation of clusters was balanced and stratified for policy for vaccination of patients and size of hospital. Hospitals were paired according to number of beds and policy for vaccination of patients, and one was chosen from each pair by random-numbers table for health-care workers to be vaccinated. Ten hospitals had a policy of vaccinating all consenting patients without contraindications, and in the other ten, the policy was to vaccinate primarily on request from patients or their relatives. Randomisation of sites was done by the study statistician (independent of the clinicians involved in the study). The study was approved by all the relevant local-

hospital ethics committees. We obtained written informed consent from health-care workers who agreed to be vaccinated. Witnessed verbal consent was obtained from patients for nose and throat swabs to be taken.

In hospitals offered vaccination, the day and night nurses, doctors, therapists, porters, and ancillary staff (including domestic staff and ward cleaners) were given a letter informing them of the study and asking whether they would be willing to be interviewed and considered for influenza vaccination. Structured interviews to find any contraindications to vaccination and administration of vaccine to suitable health-care workers were done at the places of work by a team of trained study nurses. The vaccination programme was completed by the end of October, 1996.

All patients who were resident in the hospitals on Oct 31, 1996, were entered into the study. We recorded patients' ages and sex and measured degree of disability with the modified (20-point) Barthel index.[10] Patients admitted after the census date were recorded but excluded from the study. We recorded mortality among patients during 6 months, from Nov 18, 1996, to March 31, 1997.

At the end of the surveillance period (March 31, 1997) we sent questionnaires to the largest subgroup of health-care workers, the ward nursing staff (trained and untrained) to complete anonymously, asking whether they had received influenza vaccine during the autumn or winter. The response enabled us to estimate the uptake of influenza vaccine in health-care workers in hospitals not offered routine vaccination.

Virological surveillance and laboratory analyses

We selected a random sample of 50% of patients in each hospital for prospective virological monitoring. Randomisation was done centrally by computer-generated random numbers. Routine weekly community monitoring reports of influenza produced by the Scottish Centre for Infection and Epidemiological Health from returns from family-physician practices were used to define the start of the winter epidemic, at which time we started virological surveillance.

Combined nose and throat swabs on single swabs were taken by trained nurses every 2 weeks from Dec 14, 1996, until Feb 14, 1997, which gave a maximum of four samples per patient over this period. Swabs were placed into 1·8 mL viral transport medium (Life Technologies, Paisley, UK) and delivered in ice to the Institute of Virology on the day of collection or kept overnight in the fridge and transported on ice the next day. A sample was removed on receipt and stored at −70°C for reverse-transcriptase PCR (RT-PCR) analysis. At the times when study nurses took routine samples, they took additional opportunistic nose and throat swabs from non-randomised patients who the ward nurses thought had an influenza-like illness. The ward nursing staff were asked to take routine nasal swabs within 12 h of death for any patient who died.

Tissue cultures for isolating the Madin Darby canine kidney (MDCK), and Rhesus monkey kidney (RMK) cells (BioWhittaker, Verviers, Belgium) were seeded into 96-well plates between 24 h and 48 h before sample inoculation. Samples (25 μL) were inocculated in duplicate on to monolayers and maintained in serum-free medium at 34°C for 7 days, with trypsin (0·25 ng/mL) added to the MDCK cell line only. After 7 days, the cells were fixed in the 96-well plates with a 1:1 acetone and methanol mixture (each 50% volume) and air dried. Direct immunofluorescence of influenza A and B virus in these cells was done with 1:2 dilutions of fluorescein conjugated monoclonal antibodies (Imagen Influenza A and B, DAKO Diagnostics Ltd, Cambridge, UK).

To extract nucleic acid and synthesise cDNA, 100 μL samples from the patients randomised to routine virological surveillance were pooled (two individuals' samples from different time points in one pooled sample). RNA was extracted with the High Pure Viral RNA kit (Roche Diagnostic, Penzberg, Germany). Viral RNA was eluted in 50 μL water, and cDNA synthesis was done with random primers

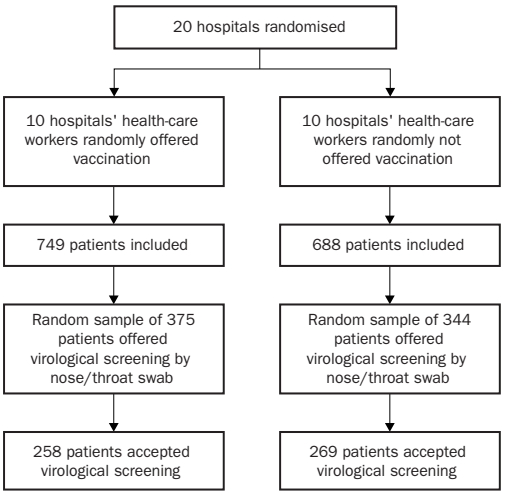

Figure 1: **Trial profile**

Detection of influenza A (H3 and H1) and B viruses by multiplex RT-PCR was done with nested primer sets from the matrix gene regions.[11] under optimum conditions.[12] A nested PCR was done with TaqStart antibody (Clontech, Palo Alto, USA) in a "hot-start" PCR reaction.

Statistical analysis

Power calculations for mortality among patients were based on our previous study of 1994–95. We calculated that, with a total sample size of 1600 patients in 20 hospitals, we would have at least 80% power to detect a decrease in mortality from 15% to 10% at 5% significance (two-tailed), with allowance for the clustered design.[13] Power calculations for virological sampling showed that 500 patients would be required to give 80% power at 5% significance (two-tailed) to detect a decease in influenza infection rates from 25% to 15%.

We decided a priori to do analysis by calculation of simple summary statistics for each cluster and then do analysis of these summary values. This approach lacks sensitivity but is robust, transparent, and valid.[14] We compared mortality rates in the two groups with the Mann-Whitney test. After the end of the study, it became apparent that hospitals were not well matched for patients' Barthel Scores and patients' influenza-vaccination rates. We therefore considered the effect of adjusting the primary analysis for these imbalances. Incomplete data for patient-level covariates meant that a full multilevel approach to the analysis was not possible without making strong, implausible, and untestable assumptions about the mechanisms that led to the incomplete data. Instead, we calculated summary statistics to describe the mix of patients in each hospital, and these values were included in a multiple linear-regression analysis. The response variable in these analyses was the empirical logit of each hospital's mortality rate that is, the natural logarithm of the odds on death. A standard continuity correction was made by addition of 0·5 to the number of deaths and the number of survivors when the odds were calculated. The logit transformation was used to satisfy the distributional assumptions required for the regression analysis and to allow

	Vaccine group	No-vaccine group
Number of hospitals	10	10
Total number (range) of patients	749 (44–109)	688 (44–105)
Mean (SD) age (years)	82·0 (8·8)	82·5 (8·6)
Proportion (range) men	29% (14–45)	31% (18–50)
Median (range) Barthel score	5 (3–7·5)	3 (1–5)
Mean proportion (range) influenza-vaccine uptake	48 (0–94)	33 (0–70)

Table 1: **Baseline characteristics of patients**

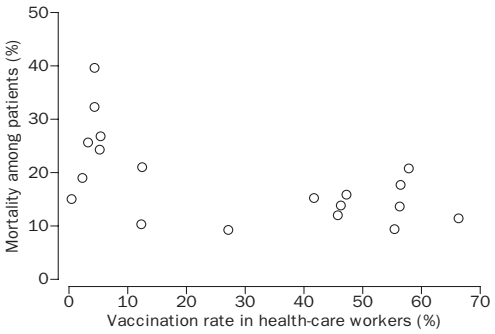

Figure 2: **Vaccination uptake in health-care workers and mortality among patients for each hospital**

the effect of the vaccination to be expressed as an odds ratio. Results were significant at p<0·05.

Results

1217 health-care workers were employed in the hospitals offered influenza vaccine; 620 (50·9%) were vaccinated (figure 1). The questionnaires from the same sites showed an uptake of 49·8% in respondents (trained and untrained nurses), compared with 4·8% in hospitals not offered vaccine. The questionnaire return rates were estimated to be 68% from nurses in vaccine hospitals and 49% in no-vaccine hospitals.

1437 patients (749 in vaccine hospitals 688 in no-vaccine hospitals) were included in the study (figure 1). The groups were well matched for age and sex (table 1). The uncorrected mortality among patients was 102 (13·6%) of 749 in vaccine hospitals compared with 154 (22·4%) of 688 in no-vaccine hospitals (odds ratio 0·58 [95% CI 0·40–0·84], p=0·014]). The relation between vaccination uptake in health-care workers and mortality among patients and between vaccination uptake in patients and mortality are shown in figures 2 and 3, respectively. Regression analyses showed significant associations between mortality among patients and rate of vaccination of patients per site, median Barthel score per site, mean age per site, and proportion of male patients per site. The adjusted odds ratios for the effects of vaccination of health-care workers on mortality among patients are shown in table 2.

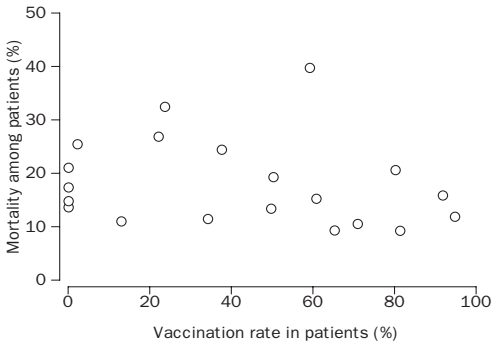

Figure 3: **Vaccination uptake and mortality among patients for each hospital**

Statistical model	Odds ratio (95% CI)	p
Unadjusted analysis	0·58 (0·40–0·84)	0·011
Adjusted for Barthel score	0·62 (0·41–0·95)	0·044
Adjusted for vaccination of patients	0·60 (0·39–0·90)	0·026
Adjusted for Barthel score, age, and sex	0·59 (0·37–0·95)	0·044
Adjusted for Barthel, age, sex, and vaccination of patients	0·61 (0·36–1·04)	0·092

Table 2: **Odds ratios for the impact of health-care-worker vaccination on mortality in patients**

	Vaccine hospitals	No vaccine hospitals
Routine surveillance		
Total patients	258	269
Culture positive		
Influenza A	3 (1%)	9 (3%)
Influenza B	3 (1%)	1 (0·4%)
PCR positive		
Influenza A	10 (4%)	17 (6%)
Influenza B	4 (2%)	1 (0·4%)
Patients with symptoms		
Total patients	29	39
Culture positive		
Influenza A	0	1 (3%)
Influenza B	0	0
PCR positive		
Influenza A	3 (10%)	5 (13%)
Influenza B	0	1 (3%)
Samples taken at death		
Total patients	17	30
Culture positive		
Influenza A	0	4 (13%)
Influenza B	0	0
PCR positive		
Influenza A	0	6 (20%)
Influenza B	0	0

Table 3: **Results of tissue culture and PCR for influenza infection on nose and throat swabs**

A subgroup of 719 patients (375 in vaccine hospitals and 344 in no-vaccine hospitals) underwent routine virological surveillance. Combined nose and throat swabs were obtained from 527 (73%) of these patients (258 in vaccine hospitals, 269 in no-vaccine hospitals). At least three samples were obtained in each of 225 (60%) patients in hospitals offered vaccine, and 219 (64%) in hospitals not offered vaccines. In total, 1798 samples were collected from the 527 patients (mean 3·4 samples per patient). 68 additional opportunistic swabs were taken from patients who were not part of the screening programme but who had symptoms consistent with influenza or upper-respiratory-tract infection (29 in vaccine hospitals, 39 in no-vaccine hospitals). 47 samples were taken from patients after death (17 in vaccine hospitals, 30 in no-vaccine hospitals). 21 samples were positive by tissue culture, compared with 47 by PCR (table 3). All samples that were positive by tissue culture were also positive by PCR. In the samples taken at death, none of 17 was positive from patients in hospitals offered vaccine, compared with six (20%) of 30 from those in hospitals offered no vaccine (p=0·055). The two groups did not differ significantly in the proportions of swabs positive in culture or PCR for routine (p=0·42) or opportunistic samples (p=0·54), although there was a higher rate of influenza infection in hospitals offered no vaccine (table 3). No patient had more than one epidose of influenza during the study and no patient had a dual infection (influenza A plus B).

Eight of 11 influenza-A-positive samples were found in the second of the routine virological surveillance samples, which were taken in the first 2 weeks in January at the peak of the community influenza A epidemic.[15] A

similar pattern was seen for PCR samples taken at death (five of six positive).

Discussion

We achieved a vaccine uptake in health-care workers of about 50%. This proportion is slightly lower than the 60% vaccinated in our previous study,[9] but is similar to other vaccination programmes of health-care workers in long-term-care homes in the USA that gave compliance rates of 46–54%.[16] Our programme of influenza vaccination was associated with a decrease in mortality among patients. The effects of various possible confounders must, however, be taken into account before this association can be accepted as causal.

Patients from hospitals in which health-care workers were routinely offered vaccine had slightly lower Barthel scores and were more likely to receive influenza vaccine than patients from the no-vaccine hospitals. Disability is a strong predictor of fatal outcome of infections in elderly nursing-home residents.[17] However the between-group difference in baseline Barthel score, although significant, was small and, therefore, unlikely to have been an important contributor to the differences in mortality between the two groups of patients, which is supported by the multivariate regression analysis.

The differences in vaccination uptake in patients were unexpected, since in the study design we had stratified randomisation of hospitals according to their policies for vaccination of patients. Our programme of vaccination of health-care workers may have raised awareness of the risks of influenza for elderly patients and led to an increased use of influenza vaccine in hospitals offered vaccination compared with previous practice. The higher uptake of influenza vaccine in patients in those hospitals than in hospitals not offered vaccination (48 *vs* 33%) could be a contributory factor to lower mortality among patients. The impact of vaccination of health-care workers on mortality among patients was, however, stable in various statistical models, which suggests that the unadjusted estimate of the odds ratio is not biased because of confounding. As expected, the precision of the estimate declines in more complex models that used many variables, based on only 20 observations. The mortality results are similar to a previous smaller-scale study that we did in the winter of 1994–95, in which we found that vaccination of health-care workers was associated with a decrease in mortality from 17% to 10% in elderly long-term-care patients.[9] That study was done in 12 sites and involved 1059 patients. There is good evidence, therefore, that a programme of influenza vaccination of health-care workers substantially lowers mortality among elderly patients in long-term care, probably through prevention of nosocomial transmission.

We made a deliberate decision not to use a blinded study design with placebo vaccination of health-care workers. We wanted to investigate effects of a programme offering vaccination to health-care workers compared with the current UK practice of not routinely offering vaccine. The primary endpoint, mortality, was objective and not subject to observer bias. We were concerned that the use of masking and placebo vaccine would lower the participation rate of health-care workers, and would potentially undermine the whole study.

The observed lack of any clear association of vaccination uptake in patients with lowered mortality is noteworthy. The elderly patients we studied were more disabled than those in UK private nursing homes or government-funded residential homes.[18] Many UK geriatricians believe that routine influenza vaccination of this frail group of long-term-care patients is unlikely to be beneficial,[19] which is reflected in the variable use of influenza vaccine under normal policy. Previous case-control studies of elderly people in residential care that have shown benefits through decreases in the number of cases of pneumonia and of deaths have generally looked at fitter elderly people than we studied.[3] Although we did not design our study primarily to find out whether vaccination of patients lowers mortality, we found no association between vaccination uptake rates in patients and mortality. The results are also similar to our previous study.[9] The degree of protection offered by vaccination is significantly decreased in frail and disabled elderly people.[7,20] Our data also suggest that vaccination of this subgroup of elderly people does not influence mortality.

Despite an advanced programme of virological surveillance, including tissue culture and PCR, we saw no significant difference in laboratory-proven influenza infection in randomly sampled patients from hospitals offered vaccine compared with those not offered vaccine, although more influenza was detected (by culture and PCR) in samples from patients in no-vaccine hospitals. The positive detection rate in these hospitals of 6·7% was much lower than the anticipated rate of 25% used in our power calculations. Fortnightly nose and throat swabs may have missed some influenza infections that occurred and resolved between sampling dates. Furthermore many patients declined to provide all four planned samples. Although the sampling period was targeted at the peak time for influenza, some patients may have become infected outside this surveillance period. Our detection rate for influenza is probably, therefore, an underestimate of the true infection rate. Samples taken at death were positive in 20% of deaths in the no-vaccine hospitals compared with none in the vaccine hospitals, consistent with a major effect of vaccination of health-care workers on fatal influenza in frail elderly patients. Samples were obtained, however, from only a small proportion of all deaths, and so these results should be interpreted cautiously.

PCR was more than twice as sensitive as tissue culture to detect influenza. This difference occurred in some samples because detection of influenza was improved when sampling was done during periods of low viral load in the upper respiratory tract, and in others because viability of the virus may have been lost during transport and processing of samples. PCR contamination seemed not to have been an issue since no patients had more than one positive sample or had a dual infection (influenza A and B). All positive results on culture were also detected by PCR. Our results further confirm that PCR is probably better than tissue culture for laboratory confirmation of influenza, and should be used as the primary assay in clinical studies in which laboratory confirmation is required.[21]

The Wuhan H3N2 variant appeared for the last time in the year of the study, 1996–97. There was a good match in the study year between the prevailing influenza variants and those in the vaccine (H3N2 and H1N1 and

B variants). A good match between the vaccine and prevailing influenza virus is likely to be important in obtaining the maximum protective effect of vaccination.

Contributors

All investigators contributed to the design, writing, and redrafting of the paper. William Carman supervised the virological laboratory analyses. Alexander Elder contributed to the supervision and training of the study nurses, Lesley Wallace and Karen McAuley did the laboratory analyses. Gordon Murray prepared the randomisation scheme and analysed the main mortality data. David Stott supervised the running of the clinical part of the study, and took the lead role in writing and redrafting the paper.

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We thank J Scott (study coordinator) and the research nurse team for all their hard work in ensuring the smooth and effective running of the study; all the health-care workers who took part, especially the ward nursing staff for their active support; G Canning, J Davie, S Fraser, D Kenie, H MacMillan, L Martin, P Murdoch, B Mishra, R Petterson, M A Roberts, J Taylor, and B O Williams, who acted as local study coordinators; P V Knight for advice on sickness-absence data for health-care workers; and the Wellcome Trust for financial support (grant reference number 048452/Z/96).

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FEATURE

Increasing vaccination rates among health care workers using unit "champions" as a motivator

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Jason M. Slaunwhite, PhD (c),
Steven M. Smith, PhD,
Mark T. Fleming, PhD
Department of Psychology,
Saint Mary's University
Halifax, Nova Scotia, Canada

Robert Strang, MD
Nova Scotia Department of
Health Promotion & Protection

Cathy Lockhart, RN, BScN
Isaac Walton Killam
Health Centre

Corresponding author:
Jason M. Slaunwhite
Department of Psychology,
Saint Mary's University,
Halifax, Nova Scotia, B3H 3C3
Phone 902-420-5846
Fax 902-496-8287
jason.slaunwhite@smu.ca

ABSTRACT

Key members (a.k.a. "champions") within specific work units were provided with a brief training session designed to increase awareness of the benefits associated with influenza vaccination. The champions were responsible for encouraging members of their work units to accept an influenza vaccination and in some cases had the requisite training to administer the vaccination on site. Work units were randomly assigned to either champion present or champion absent conditions. Results show increased vaccination compliance for groups where a champion was present (N = 23). An independent sample t-test revealed a significant difference between the two groups $t = 2.30$, $p < .03$ which resulted in a percentage change from 41% in the unchampioned group to 52% in the championed group. Analyses which included only those units that had a fully trained champion (N=13) produced a similar percentage increase in vaccine uptake from 41% to 54% (although this did not reach statistical significance; $p = .08$). Overall, the presence of a unit champion did produce a clinically relevant increase in vaccination rates in championed work units. This result has implications for future vaccination campaigns in hospital settings. Future research targeting the barriers and drivers of influenza vaccination among HCWs is recommended.

Key words: Influenza vaccine, health promotion, intervention, compliance

INTRODUCTION

According to the Public Health Agency of Canada, an estimated 10-25% of Canadians contract the influenza virus each year (1). For the most part, those infected will recover completely from all associated symptoms; however, an estimated 20,000 hospitalizations and 4,000 deaths are attributed to the complications of influenza each year in Canada (2). Although influenza has the greatest impact on the health and well-being of the elderly, individuals with chronic conditions, or those with compromised immune systems, it is also important for health care workers to be immunized against influenza. Health care workers (HCWs) are not necessarily at increased risk for complications associated with the influenza virus; however, the possibility of transferring the influenza virus to the aforementioned at-risk groups is of great concern. Therefore, there have been concerted efforts to vaccinate the health care worker segment of the "healthy" population (3). Because HCWs work in close proximity to those considered at increased risk of infection and complication, Canadian HCWs are offered a publicly funded influenza vaccine at the beginning of each influenza season by their employers.

Although influenza immunization for health care workers is offered at no cost to the individual, the overall acceptance of the vaccination is low. In Canada, results of questionnaire studies revealed that only 37% of Emergency Department (ED) personnel from four teaching hospitals and a median proportion of 29% of HCWs from a cross section of Alberta nursing homes had been vaccinated against influenza in their annual vaccination campaigns (4, 5). More recent data suggests that the vaccine coverage rates among HCWs in Canada range from 26-61% (6). Overall, these low acceptance rates are surprising considering the Canadian National

RETURN to Index

Advisory Committee on Immunization (NACI) recommendation of having 90% of eligible HCWs vaccinated (6), the evidence that supports the effectiveness of influenza vaccination (7) and the potential for adverse outcomes at the individual (increased health care visits, complications of influenza such as pneumonia and inability to do usual routines such as work and maintain active daily lifestyles) (8, 9), organizational (lost work days, costs for replacement workers) (10) and societal (decreased patient safety associated with nosocomial infection) (11, 12, 13) levels when HCWs are not vaccinated.

Based on the aforementioned research studies, it is apparent that annual influenza vaccination is an effective method for reducing the overall incidence of illness associated with the influenza virus. Moreover, associated benefits appear to be at the individual (reduced illness associated with influenza), organizational (e.g., reduction in lost work days, increased productivity) and societal levels (increased patient safety). Despite the proven effectiveness of influenza vaccination and recommendations from NACI, health care centres in Canada still struggle to achieve adequate seasonal influenza vaccine coverage among HCWs.

Overview and rationale for research

At the Halifax Capital District Health Authority (CDHA), there has been a concerted effort to increase the acceptance rate of the influenza vaccine among staff. Although the centre has set a target vaccination rate of 70% of all employees, from 2000-2004 the vaccination rates were between 38% and 42% (14, 15). For the most part CDHA has focused on increasing the vaccination rates by implementing knowledge-based campaigns that highlight the importance of receiving an influenza vaccine. Although this method is useful in explaining why it is important to receive an annual vaccination, previous research outside of the health care field has shown that knowledge based campaigns may not be as effective when attempting to influence attitude or behaviour change (16). For example, a significant amount of research has suggested that norm based campaigns (i.e., campaigns which attempt to highlight or modify the social norms in the area) might be equally if not more effective that typical information based campaigns (17, 18). Although these norm-based campaigns have focused on environmental behaviours, norm based campaigns have also proven effective in the health domain (19).

One method that has been used to influence social norms in organizations is often referred to as "opinion leadership". Opinion leadership is defined as "the degree to which an individual is able to influence another individuals' attitude or behaviour informally in a desired manner" (20). Opinion leaders are typically individuals from a similar social status as the individual(s) they are attempting to influence. From an organizational perspective, employees are more likely to be persuaded by individuals that hold a similar position in the organization. For example, previous research has shown that direct persuasion tactics that use authority figures or rewards as methods to promote acceptance of a change program are not effective (21). In contrast, programs that used an opinion leadership approach were able to promote successful change in a variety of different contexts including safer sex campaigns, urinary catheter care, service delivery, and stroke assessment (22, 23, 24, 25). In order to increase influenza vaccination rates at CDHA, we felt it was important to use a similar program that used front line workers as "champions" of the influenza vaccination campaign. Champions in this context are individuals from a similar position in the organizational hierarchy as the individuals they are attempting to influence. Previous studies have shown increases in vaccination rates following the adoption of a champion or peer vaccinator initiative (26, 27). Although our program was not a traditional opinion leadership program in that we did not have the ability to create a peer-to-peer champion selection, we did use a similar approach where managers selected individuals that were at a similar position socially in their respective work units to act as champions. Using individuals from a similar position in the organization hierarchy to promote influenza vaccination is also expected to influence the normative nature (duty of care and commonality) of influenza vaccination versus using a traditional knowledge-based approach. Based on this rationale we hypothesised that occupational groups where a champion was present would have significantly higher levels of influenza vaccination compliance than the groups where no champions were present.

Table 1:
Work units where a champion was identified and completed training

Work Unit	% Vaccinated 2004	% Vaccinated 2005	Percentage Change 2004-2005
Neurology	38 (N = 24/64)	47 (N = 27/57)	9%
Gynaecology Radiation Oncology	22 (N = 12/55)	23 (N = 13/56)	1%
Orthopedics	45 (N = 14/31)	56 (N = 20/36)	11%
Otolaryngology	43 (N = 15/35)	47 (N = 20/43)	4%
Cardiology	56 (N = 28/50)	70 (N = 31/44)	14%
Hemodialysis-1	38 (N = 39/102)	56 (N = 44/78)	18%
Urology	57 (N = 28/49)	66 (N = 33/50)	9%
Post Anaesthetic Care Unit-1	66 (N = 21/32)	74 (N = 23/31)	8%
Transitional Care Unit-1	36 (N = 15/42)	57 (N = 25/44)	21%
Palliative Care	27 (N = 7/26)	42 (N = 11/26)	15%
Intermediate Care Unit-1	50 (N = 51/102)	59 (N = 52/88)	9%
Oral Surgery	39 (N = 32/83)	42 (N = 27/64)	3%
Medicine	31 (N = 22/72)	67 (N = 45/67)	36%

Participants, setting and intervention

Matching of units

In 2005, work units within an acute care facility were matched on previous year's influenza vaccination rates, physical size and primary function (e.g., support services, surgical unit), creating a final sample of 46 work groups (or 23 pairs). The rationale for matching units was to have equal representation of champions throughout the entire hospital facility and to remove possible sampling errors associated with the aforementioned variables (e.g., previous year's immunization rate, primary function). Next, matched units were randomly assigned to either a champion present or champion absent conditions. Prior to commencing our research, ethics approval was granted from both the hospital's and Saint Mary's University Research Ethics Boards.

Identification of champions

The selection of unit champions utilized an opinion leadership process. Champions were identified by contacting the heads of various departments and requesting that they select an individual willing to serve as a champion. It was communicated to the department heads that these individuals did not have to be in a position of authority. More importantly, we wanted individuals that operated in a front-line capacity and that were well liked by co-workers. Additionally, we asked managers to choose an individual who they viewed as a leader in their department. We communicated that the proposed champion be someone that co-workers trusted, who were committed to follow through on the study and willing to promote and encourage co-workers to accept influenza immunization. The proposed champions were also to be someone who accepted the influenza immunization yearly themselves. Managers were required to support the champion process by allowing the unit champion to attend an all-day training session prior to influenza season.

Champion training

Through the Occupational Health Department at CDHA we were able to train the pre-selected individuals. The training consisted of a one-day educational session on the influenza virus, the importance of HCW influenza immunization, common misbeliefs about influenza immunization and, where appropriate, training in the administration of influenza vaccine. Presentations from various health professionals regarding the importance of vaccine compliance were also included in the full-day training session. In addition, each champion was provided with supporting literature which included 1) standing order, 2) Occupational Health Pledge of Confidentiality, 3) learning module for influenza immunization, 4) learning module for the treatment of anaphylaxis, 5) influenza learning module, 6) various pieces of literature provided by Public Health, 7) influenza vaccine supply list, 8) influenza immunization clinics schedule, and 9) consent form for administration of the vaccine. Although 23 champions were invited to attend the training sessions, only 13 champions were present for the full-day course. The individuals who did not attend the champion training were provided with the identical supporting literature as those who attended the full-day session.

Outcomes

Data analysis

A total of 46 work units (23 units where a champion was present, 23 units where a champion was absent) were selected for participation in the study. Post-intervention analyses were conducted using a series of two-tailed independent samples t-tests in statistical software package SPSS version 15.0. The independent samples t-test revealed a significant difference between the championed and non-championed groups (t (22) = 2.86, $p < .03$). Group comparisons revealed that the percentage of individuals who received an influenza vaccine in the champion absent condition was 41% whereas in the champion present group, compliance was significantly higher at 52%, (95% confidence interval for increase 2.9%-18.2%).

In order to control for possible group effects the data were also compared by year using a series of paired sample t-tests. Using archival data collected internally from CDHA, we were able to determine whether there was a significant increase from the previous year's vaccination rates for both the championed and un-championed groups. In groups were a champion was present the vaccination rate increased from 44%

Table 2:
Control work units – no champion

Work Unit	% Vaccinated 2004	% Vaccinated 2005	Percentage Change
Intermediate Care Unit-2	29 (N = 19/66)	22 (N = 13/59)	7%*
Respiratory Therapy	50 (N = 25/50)	38 (N = 18/48)	12%*
General Medicine-Dermatology	32 (N = 22/68)	27 (N = 18/67)	5%*
Cardiac Catheterization Unit	70 (N = 23/33)	75 (N = 27/36)	5%
Radiation Oncology	60 (N = 30/50)	84 (N = 38/45)	24%
Marrow	23 (N = 16/69)	51 (N =35/68)	28%
Hemodialysis-2	38 (N = 17/45)	43 (N = 19/44)	5%
Post Anaesthetic Care Unit-2	32 (N = 12/38)	56 (N = 20/36)	24%
Transitional Care Unit-2	45 (N = 30/67)	31 (N = 23/75)	14%*
Progress Care/Family Medicine	13 (N = 6/47)	29 (N = 12/42)	16%
Ambulance	27 (N = 33/124)	18 (N = 22/120)	9%*
Medical Education-Clinical Clerks	12 (N = 10/83)	15 (N = 14/94)	3%
Voice Services	32 (N = 24/74)	53 (N = 32/60)	21%

* Denotes a decrease in vaccination rate from 2004-2005.

to 54% in (t (21) = 4.38, $p < .001$) or a 10% increase (95% confidence interval for increase 4.8%-13.6%). For groups where no champion was present, the overall vaccination percentage increased slightly (38% to 41%), but this change was not significant (t (21) = 1.16, $p = .25$).

Secondary data analysis

Although we used an initial sample of 23 matched work units, and champions were identified in all work units, not all of the identified champions actually attended the training sessions. Fortunately, we were able to identify the units where champions were identified, but no training took place. When we excluded these 10 units from further analysis, the vaccination percentage increase for the championed groups remained (41% in the non-championed group and 54% in the championed group) however, the relevant t-test did not reach accepted levels of significance (t (24) = 1.79, $p = .08$, two-tailed). The change in significance without any change in percentage difference suggests this is simply an issue of statistical power. Results for each individual work unit are presented in Tables 1 and 2.

DISCUSSION

Summary of main results

Results suggest that the use of a unit champion is an effective intervention when attempting to increase the rates of health care worker influenza vaccination in a hospital setting. For the 23-unit sample, vaccination rates increased significantly as compared with units without champions and also as compared with previous years on the same unit.

Explanation for findings

It is clear that having an assigned champion in a work unit can influence vaccination rates. However, what is less clear is the impact of the training of the champions. Perhaps simply identifying a champion would be sufficient to obtain the desired results. Future research should explore this possibility.

Limitations of study

As previously described, the attendance at the champion training sessions was quite low. Of the 23 selected champions only 13 attended champion training. This low attendance rate introduces three possible issues with the current study. First, the low attendance rate dropped the number of groups available for statistical analysis and the ability to detect an effect. Second, it is possible that the unit managers representing the 10 champions who did not attend the champion training do not support the champion process. That said, we know that the untrained champions still promoted the influenza vaccination campaign within their respective units even though they were not trained in how to administer the vaccination. Thus, this could suggest directions for future research; perhaps training is not necessary to increase vaccination rates, simply identifying an appropriate champion is sufficient. Third, when we excluded the match pairs associated with the champions whom did not attend training the representation of

support services was much higher in the non-championed group. It is possible that support services are inherently different than groups that contained medical staff.

Another possible limitation of this research could be related to the manner in which the champions were selected. Unit mangers were solely responsible for identifying the champion from their group. It is possible that certain inherent biases were present in this process.

Conclusions & future research

The results of this study are very promising. Although we were able to see an increase in influenza vaccinations for the championed group, there were still approximately 46% of staff that are refusing an annual influenza vaccination. Although a very small minority of these individuals may be refusing influenza vaccinations for legitimate reasons (e.g., contraindications, allergies) there are still a number of unanswered questions with regard to non-compliance. One possible approach to understanding these low compliance rates is to target the psychological drivers that are associated with vaccine refusal. Although there have been some efforts to understand knowledge, attitudes and beliefs surrounding vaccine acceptance there have been very few research studies that incorporate proven psychological theory in their design. Future research should employ tactics and models from such areas such as social psychology and social marketing which have proven effective in attempting to alter behaviour. Examples include, but are not limited to, the theory of planned behaviour (28), the elaboration likelihood model (29) and the health action process approach (30).

Future research should also train unit champions in tactics that assist in persuading the "non-compliers". Currently the unit champions are provided information on influenza and influenza immunization, as well as, vaccination training (if appropriate); however, they are not specifically trained in how to encourage individuals to accept a vaccination. Training interventions should be designed to target the actual barriers and drivers of influenza vaccination acceptance among HCWs. The selection of the unit champions should also be conducted anonymously to avoid possible biases with this process.

Finally, systematic research should be undertaken in order to understand what elements of the champion process is necessary to influence change in vaccination rates. Understanding these elements would be very useful when attempting to develop the most cost-effective and workable interventions that increase health care worker compliance with influenza vaccination.

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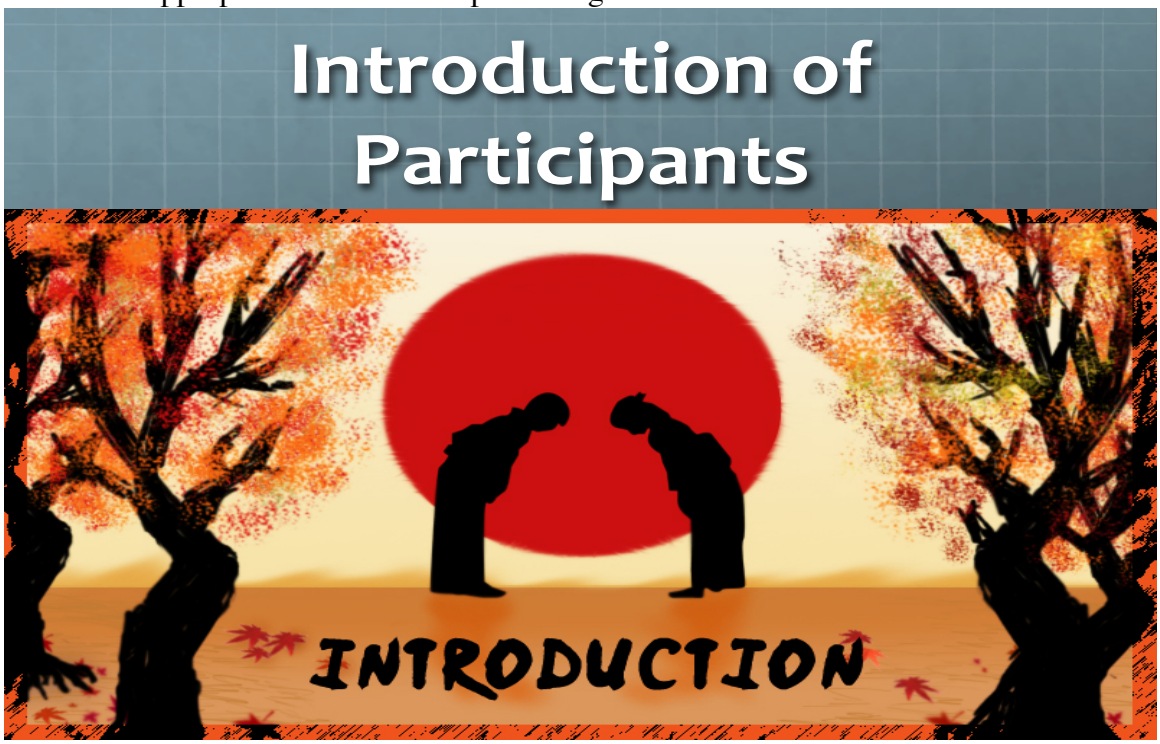
Appendix C: Introduction Power Point

Power Point

Tell a bit about yourself and your background and why you are passionate about the flu vaccine, and your past experiences.

Make sure appropriate number of copies of Agenda available



Go around the room and ask;What are your names?, What is your professional designation? And Where do you currently work?

Goal of the Workshop

- **Goal:**
- The overall goal of this program is:
- To increase a nurses awareness of the significance of being vaccinated for influenza.

Objectives of the Workshop

- **Objectives:**
- To have an increased knowledge about the influenza vaccination
- To become motivated nurses to take on the role of a "flu champion"
- To have discussed strategies that promote influenza vaccination
- To be able to identify challenges related to influenza vaccination uptake

Transition into the ice breaker activity: electronic polling.

Appendix D: Sign In Sheet

Sign in Sheet

NAME	RN / LPN	UNIT	EMAIL	PHONE #
Eg. Jane Doe	**RN**	**3B**	**Jane.doe@centralhealth.nl.ca**	**777-2222**

Appendix E: Questions & Answers for Electronic Polling

Questions: Electronic Polling

1) *Question*: The influenza vaccine can cause influenza? True or False

Answer: ***False,*** the vaccine can cause mild "flu like" symptoms such as fever, aches, pains

2) *Question*: How long is a person contagious once infected?
   a) 1-3 days
   b) 3-5 days
   c) 5-7 days

Answer: ***C; Can be contagious for short period without displaying any symptoms***

3) *Question:* How many people in Canada are estimated to be infected with influenza each year?

   a) 3.5- 7 million
   b) 300-500 thousand
   c) 3-5 thousand

Answer: ***A***; ***Fact: the flu is still the leading infectious disease causing hospitalization and death in Canada***

4) *Question:* How many people in Canada are estimated to be hospitalized due to influenza each year?

   a) 5,000
   b) 20,000
   c) 700

Answer: ***B***

5) *Question*: How many people in Canada are estimated to die due to influenza each year?

   a) 5,000
   b) 300
   c) 4,000

Answer: ***C; Fact this number can climb to close to 6,000 if you include all those who die of complications post influenza infection such as pneumonia***

6) *Question:* What percentages of health care workers at our health facility are vaccinated?

a) 80-90%
b) 35-55%
c) 25-35%

Answer: ***B (fill in your organizations stat)***

7) *Question:* What are the percentages of health care workers in our province vaccinated?

a) 10-20%
b) 75-85%
c) 40-60%

Answer: ***C (fill in your provinces stat)***

8) *Question:* What are the percentages of health care workers in our Country vaccinated?

a) 15-20%
b) 20-30%
c) 40-60%

Answer: ***C (Canada)***

9) What is the main reason you get the flu shot?

a) To protect yourself
b) To protect your family
c) To protect your patients

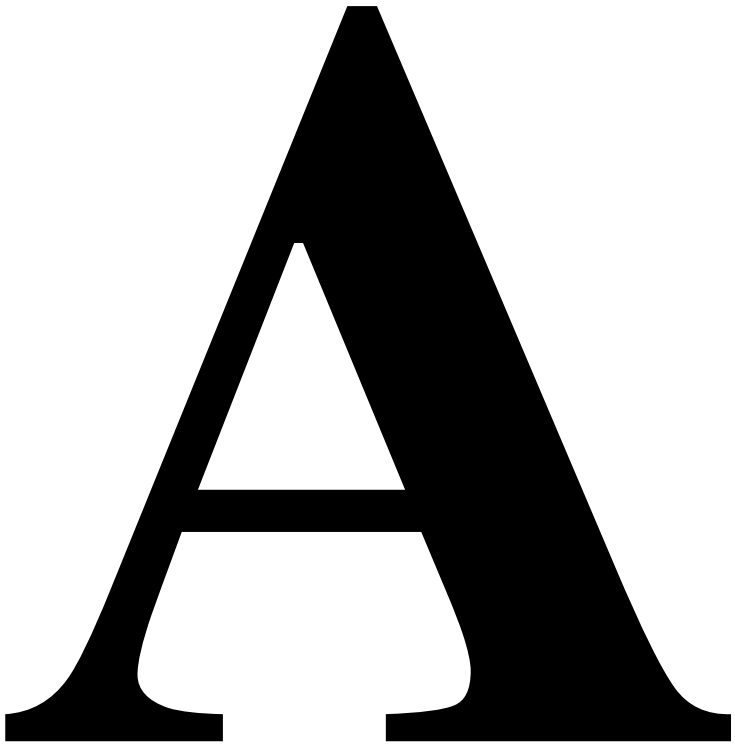
- ***note no correct answer (just for polling effect)***

Reflective Question: Why do you think people are vaccinated? Why not?

End session by brainstorm reasons together. Write ideas down and have participants share personal experiences and or reasons for vaccination or not. (10-15 minutes).

Appendix F: Sample Letter

Sample Letter for Lamination (400 font size)

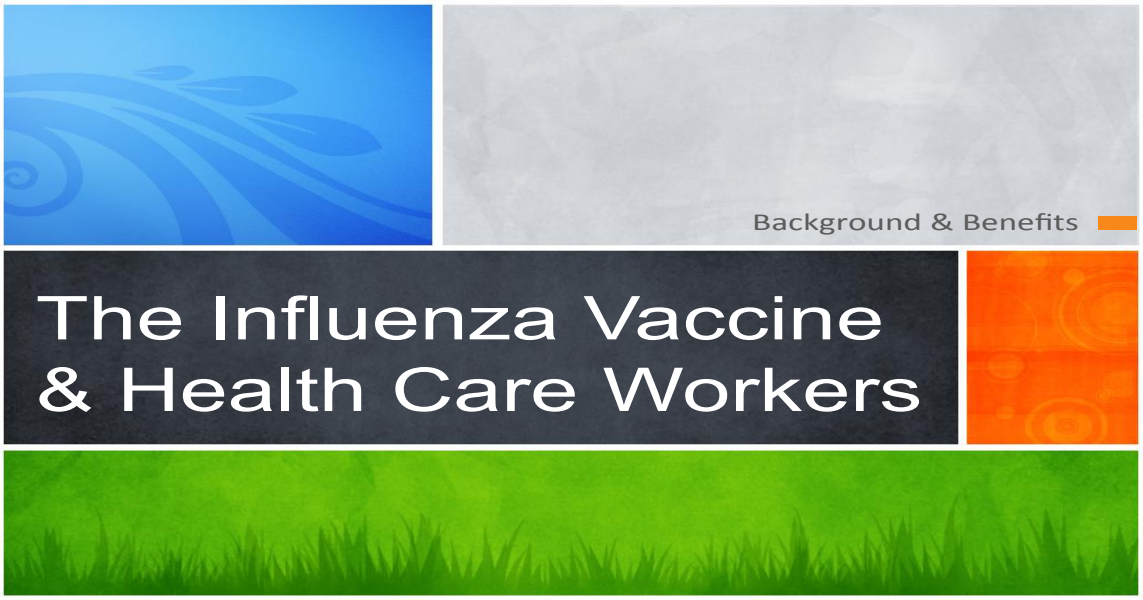


Appendix G: Sample Electronic Polling Device

Sample Electronic Polling Device Image

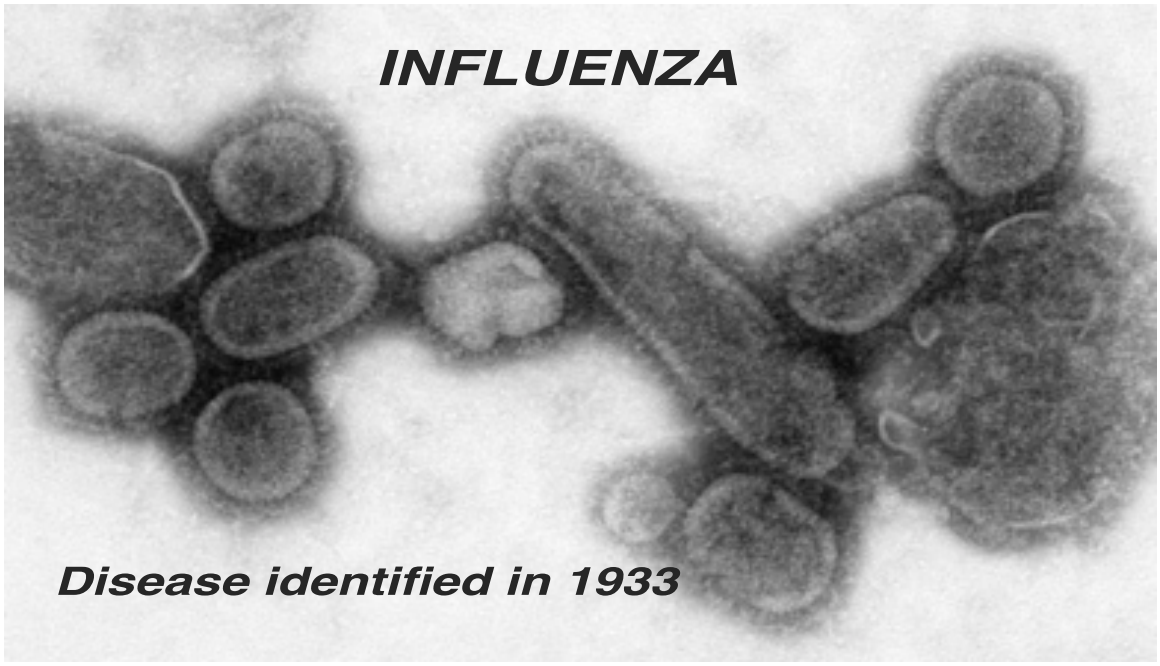
Appendix H: Power Point "The Influenza Vaccine and Health Care Workers"

Power Point



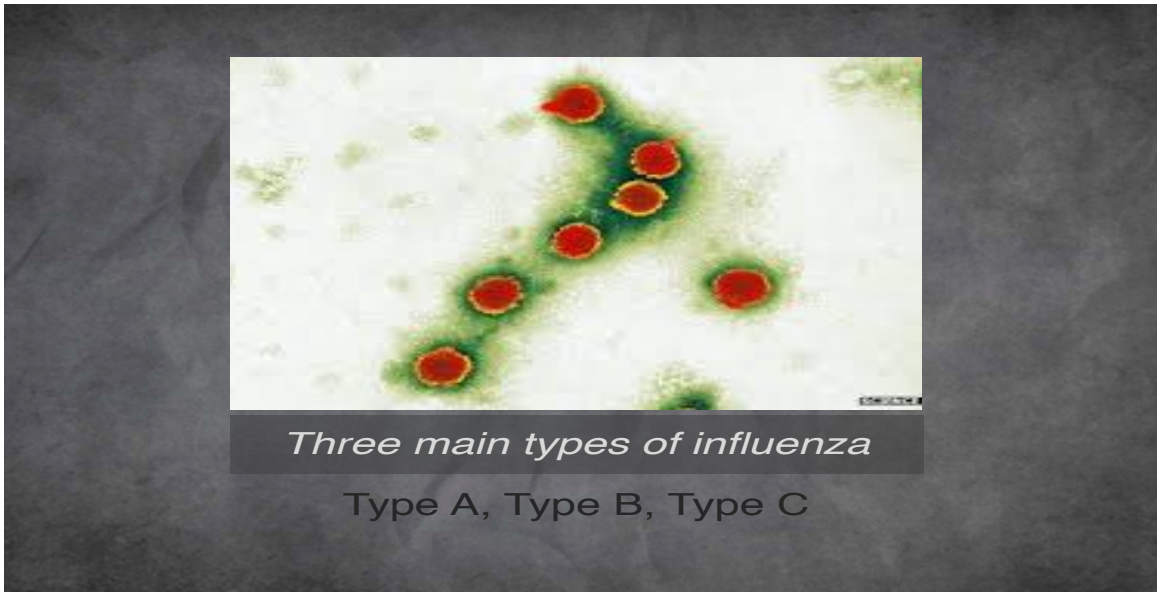
The Influenza Vaccine & Health Care Workers (HCW)

Background



NOTES:
The word influenza is derived form Italian; with a literal translation of "influence". Used for description of disease since 1500's.

Influenza had been noted in the literature as early as 2400 years ago. It was not identified in humans until 1933 by Wilson Smith, Christopher Andrews and Patrick Laidrow.
Influenza is a highly contagious viral infection of the respiratory passages



Type A: affects humans, animals and birds. This type causes pandemics and worldwide epidemics. Most varied and adaptable viruses
Type B: affects only mammels, less severe than type A
Type C: affects only mammels; rarely causes disease

3-5 million cases of severe illness

250,000-500,000 can result in death

Worldwide, influenza causes approximately three to five million cases of severe illness in which 250,000 to 500,000 can result in death.

National Impacts of Influenza

20,000 hospitalizations

4,000 deaths

Annually, in Canada, 4000 deaths and 20,000 hospitalizations are estimated to be related to influenza

Provincial Impacts of Influenza

279 hospitalizations

15 deaths

In 2012/2013 Newfoundland had 723 confirmed cases of influenza resulting in 279 hospital admissions and 15 deaths.

In 1931, viral growth in embryonated hen's eggs was reported
In the 1940's the US military developed and tested the first inactivated influenza vaccine
late 1940's it was discovered that influenza changes annually (different strains)

Benefits

Benefits to Vaccine

Flu Vaccination can . . . .

Protect you

Protect your family

Protect your patients

Protecting yourself also protects those around you who are more at risk for contracting the flu, such as your vulnerable patients
Can make your illness milder if you do get sick

The flu vaccine can help protect people who are at a greater risk of getting seriously ill, like older adults (greater than 65), people with chronic conditions and…….

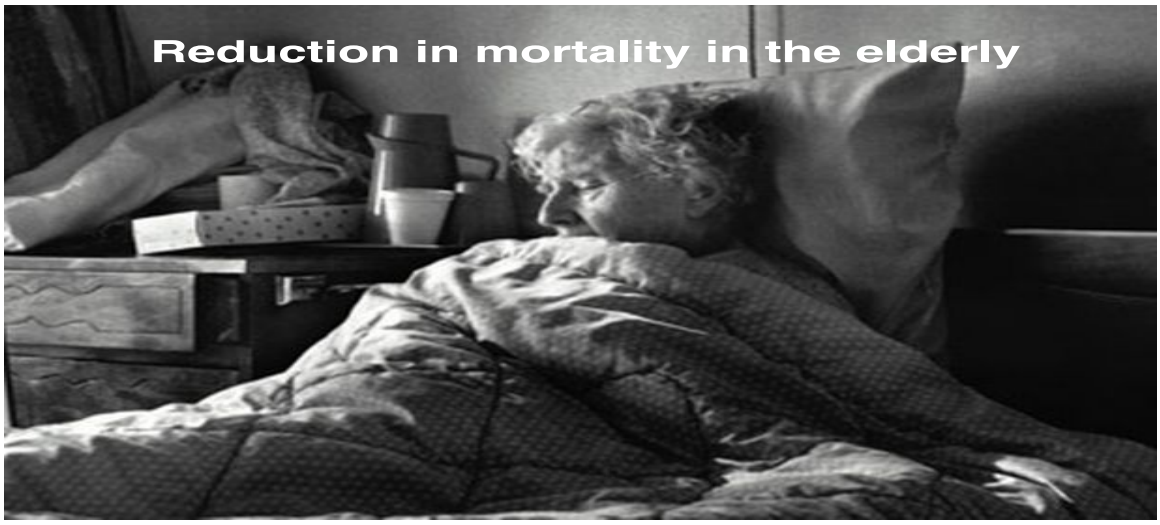
young children.

Protects your patients, who are at their most vulnerable while under your care.

Flu Vaccine can:
Reduce hospitalizations

One study showed flu vaccination was associated with a 71% in flu related hospitalizations among adults of all ages and a 77% reduction in adults 50 years and older during the 2011-2012 season.
Flu vaccination has also been associated with a reduction in hospitalization of people with diabetes (79%) and lung disease (52%).
One study showed that flu vaccination reduced children's risk of flu related Pediatric ICU admissions by 74% during the 2011-2012 flu season

Health care worker being vaccinated has been linked to . . .



One study of 12 geriatric medical and long term care sites (n=1059 HCW) reported a 7% reduction in mortality rates during the seasonal influenza outbreak where there were higher numbers of HCW vaccinated.
Another systematic review revealed that when higher numbers of HCW were vaccinated there was a 29% reduction in mortality rates and a 42% relative risk reduction in influenza like illness

One study (n=3,483 nursing home residents) showed a significant decrease in HCW sick leave (42%) in the nursing home with higher HCW vaccination rates (69.9%) versus the nursing home with lower HCW vaccination rates (31.8%).
Saxen & Virtanen (1999) double-blinded randomized control trial (RCT) found that vaccination of HCW (n= 427) reduced absenteeism due to respiratory infection by 28% (p=0.02).

We have now heard some of the important aspects in favor of the influenza vaccine. Yet, despite this vaccination rates of HCW and the general public as a whole remains sub par.
Here is a short clip done by Rick Mercer to give his point of view on the flu shot.

The WHO and the Canadian National Advisory Committee (NACI) recommends that 90% of all health care workers (HCW) get immunized against influenza .

WHY DO WE GET VACCINATED OR NOT?

Reasons for choosing NOT to be vaccinated

Perceived Susceptibility

Perceived Harmful Effects

Effectiveness

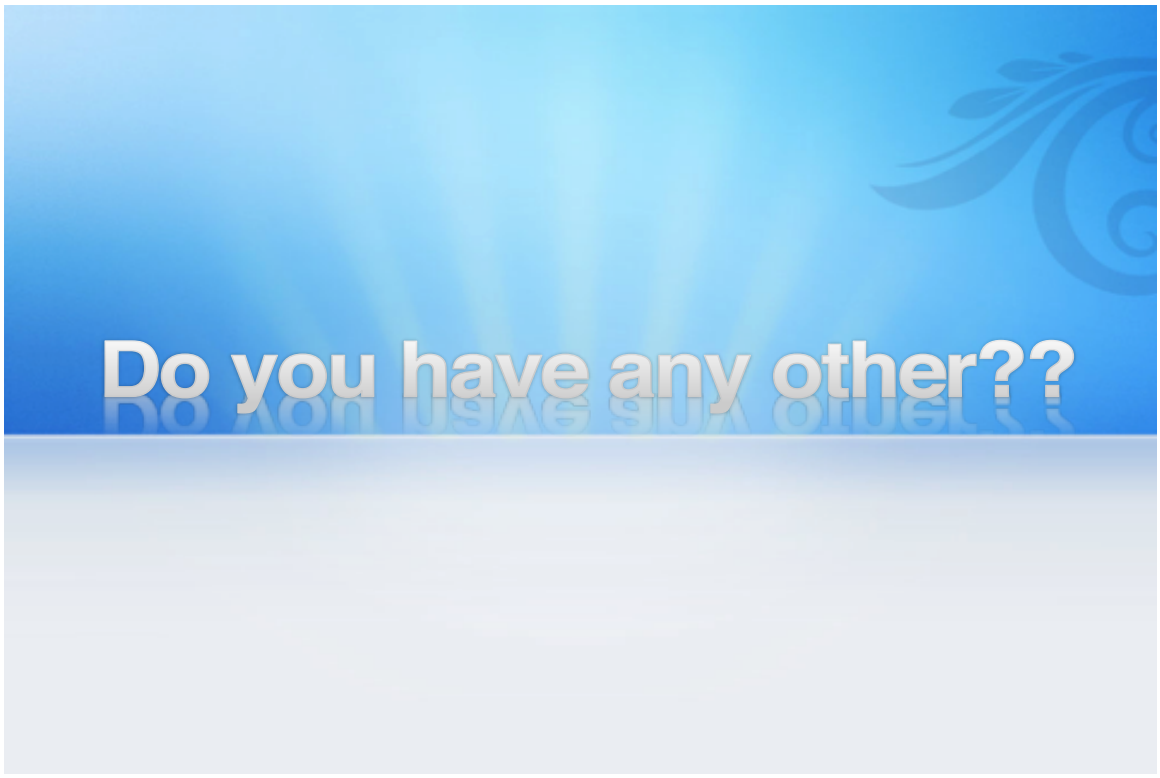
Access

Perceived susceptibility:
A key reason noted in the literature as to why health care workers refuse to get the influenza vaccine is a lack of concern about contracting and getting ill as a result of influenza .

Perceived harmful effects:
Another barrier to health care workers receiving the influenza vaccine is fear of having an adverse reaction, or they will get the "flu" from the vaccine
Corace et al.'s (2013) cross sectional survey of (n=3,275 HCW) reported that the biggest barrier to vaccine uptake was the belief that the vaccine could cause the illness (72%).

Effectiveness:
HCW refusal of the influenza vaccine has been linked to a general disbelief of vaccinations, doubt in the effectiveness of the vaccination, inconvenience, not having the time to get the vaccination, and peer influence .
Even small numbers of HCW who oppose the vaccine can negatively influence the views of their indifferent co-workers.
A study done by Quach, Pereira, Kwong et al (2013), (n=23) found that perceived vaccine effectiveness was the most notable barrier.

Access:
Accessibility has been widely reported by HCW another key reason for not getting the vaccine.
HCW described a to lack of time to leave a busy unit and go to the location where the vaccine was being administered . One successful solution noted was the use of mobile vaccine carts that will go to the health care workers place of employment to administer the vaccine



Use this as ***a reflective question*** to discuss with class any other personal or experienced reasons for not being vaccinated.

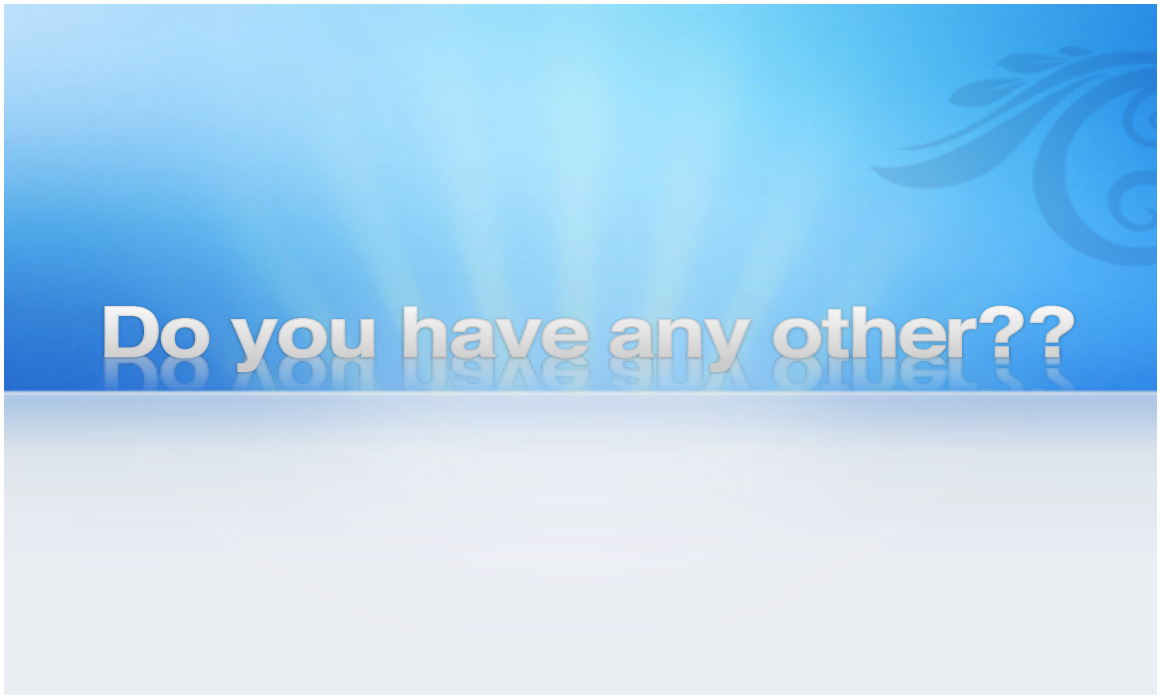
Reasons for accepting vaccination

These are factors found in the literature as to why health care workers chose to be vaccinated.

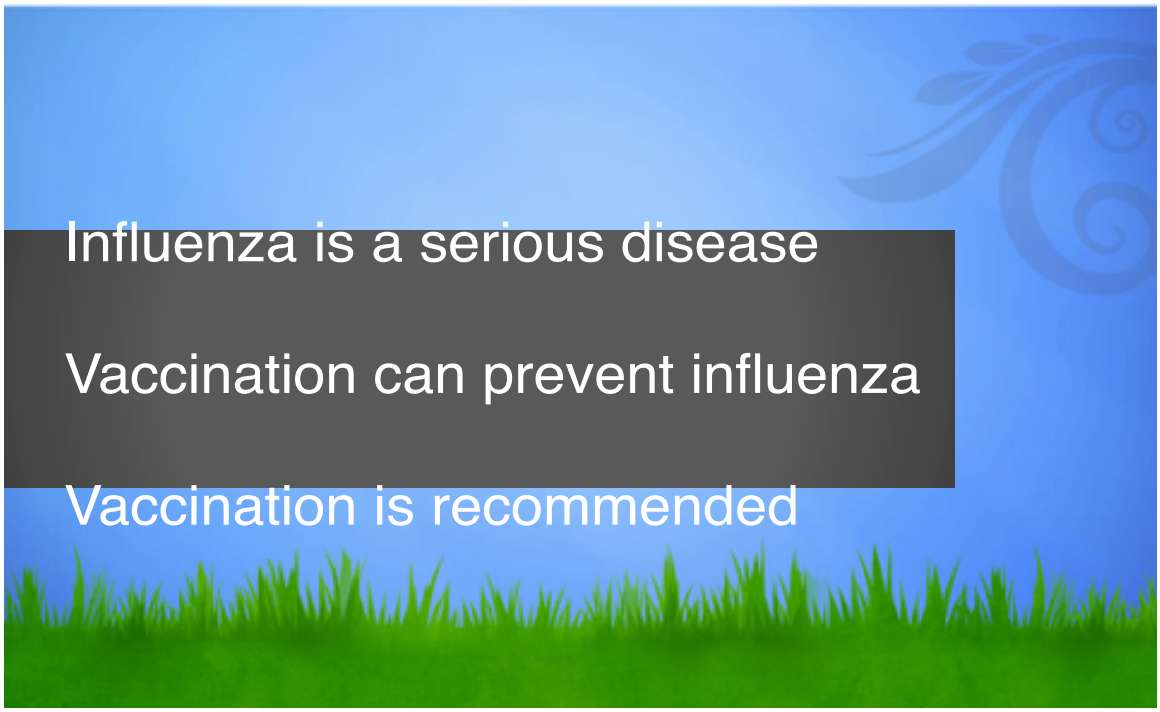
Self protection / family / patient
A HCW personal attitude was also noted to contribute to the decision to be vaccinated. If a HCW was concerned with self-protection and was in close proximity with patients, family and children they had higher vaccination rates

Age:
Age of the HCW has been found to play a role the decision to be vaccinated or not
That is the older the HCW, the higher the vaccination rate.
Bonfiglioli et al (2013) study of HCW (n=172) in an Italian hospital found that with each additional year of age the probability of being vaccinated would increase by 6%

Past vaccine practice:
HCW who have been vaccinated in the past against influenza tend to get the vaccination
A systematic review of 21 studies reported that a past history of vaccination was amongst the top three factors with the strongest association with vaccination, the others being, belief in the effectiveness of the vaccine, and older age.


Do you have any other??

KEY POINTS


Influenza is a serious disease
Vaccination can prevent influenza
Vaccination is recommended

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After completion of any further questions or discussions break for coffee (30 minutes)

Coffee Break

The facilitator must arrange for food and beverages for the coffee break prior to the day of the workshop.

Take this time to set up the two tables separate for the stations needed in activity #5. Go to activity #5 to see what needs to be set up.

Appendix I: Clues and Answers

Clues and Answers

The words to be laminated will be in the right column and the correct corresponding clue which will be up on a white board in the from of the room will be found in the left column.

Clues	Laminated answers
1) Vaccine used for ages 6 months and older	Trivalent
2) What type of virus is used for #1?	Inactivated
3) How many strains in this vaccine?	Three
4) Vaccine recommended for ages 2-17?	Quadrivalent nasal spray
5) What type of virus is used for #4?	Live attenuated
6) How many strains in this vaccine?	Four
7) Common side effects	Soreness, redness, fever, swelling
8) Uncommon side effect	Gullian-Barre Syndrome, anaphylactic
9) Storage temperature for vaccine	2-8 degrees celcius
10) Awrong match vaccine is ineffective	False

Extra words: please put in the listed extra words that will not be used

4-8 degrees celcius
vomiting
duavelent
two strains
True

Clarifications, Explanations and Questions:

Read and discuss: “Once a team has completed the clues in the correct order the information below should be relayed to them about each section. Allow 5 minutes for questions during and or after explanations given.

The two types of vaccines available in Canada are;

1) Trivalent and,

2) Quadrivalent.

Trivalent is an inactivated virus with three strains. An inactivated virus is one that is grown in an egg but is NOT a live virus therefore it is important to note that it CANNOT cause influenza. This vaccine is given as an IM deltoid injection and is safe for ages 6 months and older.

Quadrivalent nasal spray is a live attenuated (weakened) virus available in Canada. The viruses are cold-adapted and temperature sensitive, so they replicate in the nasal mucosa rather than the lower respiratory tract, and they are attenuated so they do not produce classic influenza-like illness.

The fear of adverse effects of the influenza vaccine is still very evident despite The Vaccine Adverse Event Reporting System evidence of the vaccine safety. Although the influenza vaccine has minor side effects (e.g, fever, muscle aches, soreness and redness at the injection site) they subside within 48 hours. As a health care provider you can make others aware of these minor symptoms in advance and also suggest taking acetaminophen or ibuprofen prior to the injection for comfort. ***(emphasize)***

The main adverse reaction that health care workers fear is Guilliene Barre syndrome. This syndrome has been linked to the influenza vaccine for many years but the chances of getting it are reported to be close to one in two million. Gullain Barre has been more likely to occur following an influenza infection versus an influenza vaccination ***(emphasize this point).*** People often think if they vaccine is not a high percentage match it is useless. This is incorrect as although it will not be as effective as a higher match, it will still provide some immunity to that strain type of influenza (type A, type B).

Appendix J: Sample Answer for Lamination

Sample Laminated Answer (170 font size)

Trivalent

2-8°C

Appendix K: Signage for Stations

Station 1 Posters:

How To Use a Hand Sanitizer

1 Apply alcohol-based hand rub

2 Rub over all surfaces of hands and fingers until dry

Newfoundland & Labrador HealthLine 1•888•709•2929

Newfoundland Labrador

www.gov.nl.ca/health

Station 2 Poster:

Droplet - Contact Precautions

Visitors: Report to Nursing Station

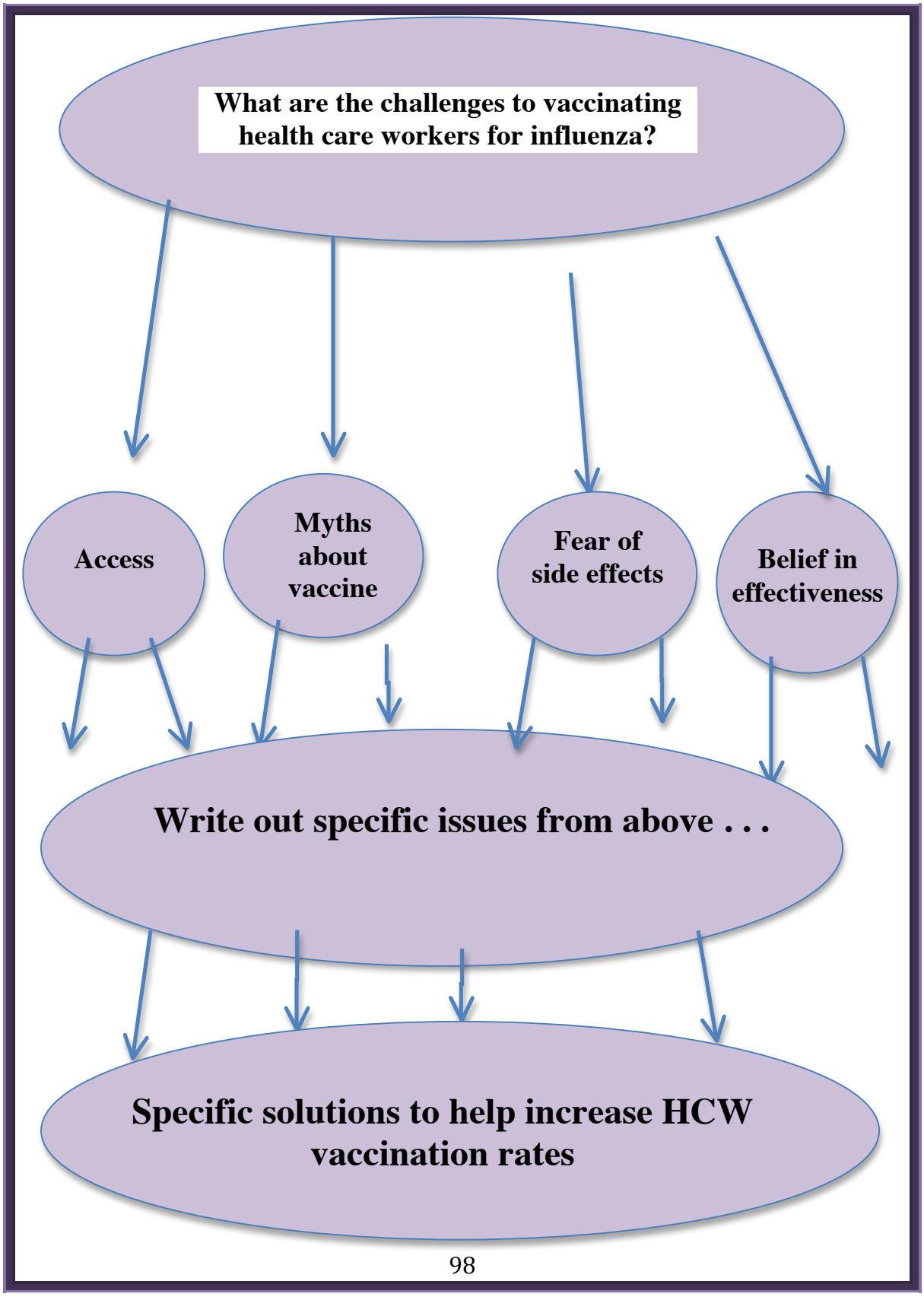
Clean Hands	Wear Mask and Eye Protection	Wear Gloves	Wear Gown If providing direct care

Central Health

- ☐ **Visitors:** Keep to a minimum. Wear mask and eye protection and if providing direct care wear gloves and gown.
- ☐ **Single room (preferred):** Door may remain open.
- ☐ **Equipment:** Dedicate to patient. Disinfect or discard after use.
- ☐ **Transport:** Patient must clean hands and wear a mask.

Newfoundland Labrador

Appendix L: Concept Mapping Sample


What are the challenges to vaccinating health care workers for influenza?
Access
Myths about vaccine
Fear of side effects
Belief in effectiveness
Write out specific issues from above . . .
Specific solutions to help increase HCW vaccination rates

Appendix M: Questions and Answers for Polling

Questions

1) Question: What year was the first approved influenza vaccine created?"

   A) 1940's

   B) 1930's

   C) 1950's

Answer: A. Developed and used for US military for World War II

2) Question: The WHO recommends that what percentage of HCW be vaccinated against Influenza yearly?

   A) 75%

   B) 90%

   C) 65%

Answer: B. The vaccination of HCW against influenza is considered a standard of care.

3) Question : The type of injectable influenza vaccine used currently in Canada is;

   A) Trivalent

   B) Quadrivalent

   C) Duovelant

Answer: A. Trivalent is the only approved three strained inactivated vaccine for Canada and Quadrivalent is the approved live virus nasal spray.

4) Question: How many types of Influenza viruses exist?

A) 2

B) 3

C) 4

Answer: B. There are three types of influenza.
Type A: affects humans, animals and birds. This type causes pandemics and worldwide epidemics. Most varied and adaptable viruses
Type B: affects only mammals, less severe than type A
Type C: affects only mammals; rarely causes disease

5) Question: Which temperature would the influenza vaccine be stored in?

A) 2-8° C

B) 1-4° C

C) 2-6° C

Answer: A

6) Question: What type of isolation is required for prevention of influenza transmission?

A) contact

B) droplet

C) contact and droplet

Answer: C. In addition to the vaccine, proper hand washing and contact and droplet isolation are measures to prevent the transmission of influenza.

7) Question: What is a “flu champion”?

A) Someone who has won a flu contest

B) Someone who receives formal education and provides positive and accurate information about the influenza vaccine in the workplace

C) Someone who has contracted influenza A.

Answer: B

Appendix N: Evaluation Form

Evaluation Form

To what extent do you agree with the following statements? **Please CHECK the relevant box for each statement**	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Unknown / NA**
1. The workshop met your expectations	☐	☐	☐	☐	☐
2. The material was presented in a logical manner	☐	☐	☐	☐	☐
3. I was satisfied with the content of each session	☐	☐	☐	☐	☐
4. I feel I have increased my knowledge base pertaining the influenza and the influenza vaccine	☐	☐	☐	☐	☐
5. The interactive session (electronic pollings, stations, vaccine and side effects & concept mapping) facilitated my understanding of influenza and the influenza vaccine	☐	☐	☐	☐	☐
6. I feel equipped to educate misinformed co-workers who oppose the influenza vaccine	☐	☐	☐	☐	☐
7. I feel more motivated and prepared to promote the influenza vaccine	☐	☐	☐	☐	☐
8. I feel competent to act as a flu champion	☐	☐	☐	☐	☐

What part of the workshop was most interesting to you?

What part of the manual was least interesting to you?

What would you change about the manual?
