

Influenza vaccination in emergency
department workers:
Knowledge, attitudes, and practices

Ósk Rebekka Atladóttir

Master of Public Health

MPH 2014:12



norden

Nordic School of Public Health
NHV

Influenza vaccination in emergency department workers:
Knowledge, attitudes, and practices

© Nordic School of Public Health NHV
ISSN 1104-5701
ISBN 978-91-86739-77-5



Master of Public Health

– Thesis –

Title and subtitle of the thesis Influenza vaccination in emergency department workers: Knowledge, attitudes, and practices				
Author Ósk Rebekka Atladóttir				
Author's position and address Registered Nurse, Emergency Department at The Sahlgrenska University Hospital. Gröna stråket 4, 413 45 Gothenburg, Sweden.				
Date of approval 12.09.2014		Supervisor NHV/External Ingemar Qvarfordt		
No. of pages 66	Language – thesis English	Language – abstract English	ISSN-no 1104-5701	ISBN-no 978-91-86739-77-5

Abstract

Aim: This study aimed to investigate the knowledge and attitudes of healthcare workers regarding influenza, influenza vaccination, and vaccination practices in emergency departments in Gothenburg, Sweden.

Method: This cross-sectional study used a self-administered questionnaire distributed to nurses, assistant nurses, and physicians in three emergency departments at The Sahlgrenska University Hospital in January–February 2014.

Results: Among 214 participants, 56% were nurses, 27% assistant nurses, and 17% physicians. The response rate was 77%. A total of 66 participants (31%) were vaccinated against influenza during the previous 12 months. The highest vaccination coverage occurred in the oldest age group (56%; $P < 0.05$). Past vaccination strongly predicted future vaccination behavior ($P < 0.001$). Our data revealed no significant difference in vaccination coverage between profession, work experience, hospital, or gender. The mean knowledge score was higher among vaccinated vs. unvaccinated healthcare workers (17.9 ± 2.7 vs. 16.8 ± 2.6 , respectively; $P < 0.05$). Moreover, influenza risk perception was higher among participants who were vaccinated during the previous 12 months compared to unvaccinated participants ($P < 0.001$). Interestingly, more unvaccinated healthcare workers believed that personal behavior determines health (higher internal locus of control) compared to vaccinated workers ($P < 0.05$). More than half of vaccinated healthcare workers stated that they got vaccinated to avoid influenza. Almost half of the unvaccinated workers voiced concern about vaccine side effects. Fourteen percent of all respondents mentioned patient protection as an important factor in their decision to receive influenza vaccination.

Conclusion: This study demonstrates a need for improved knowledge about influenza and influenza vaccination in healthcare workers. Increased risk perception of influenza can increase vaccination coverage in emergency department personnel, and may reduce the incidence of health care-associated influenza.

Key words

Influenza vaccination, healthcare workers, knowledge, attitudes, emergency departments

Table of Contents

1. INTRODUCTION	5
1.1 Influenza, influenza vaccination and health care	5
1.2 Health care workers attitudes to and knowledge about influenza and influenza vaccination	8
1.3 Public health perspective and Public Health in the Nordic countries	8
1.4 Influenza vaccination recommendations	10
1.5 Main concepts	12
2. RELEVANT THEORETICAL FRAMEWORK	13
2.1 Attributions theory	13
2.2 Health Locus of Control	13
2.3 Multidimensional Health Locus of Control	14
2.4 The Health Belief Model	15
3. AIM AND RESEARCH QUESTIONS	16
3.1 Aim	16
3.2 Research questions	17
4. METHODS	17
4.1 Study design	17
4.2 Data collection	18
4.3 Questionnaire	18
4.4 Data analyses	20
4.5 Ethical considerations	20
5. RESULTS	22
5.1 Study population	22
5.2 Influenza vaccination	23
5.2.1 Influenza vaccination and knowledge	25
5.2.2 Influenza vaccination and risk perception	27
5.2.3 Influenza vaccination and Multidimensional Health Locus of Control Scale	28
5.3 Quantitative content analysis of the open-ended questions	29
5.4 Health Belief Model and the respondent's quotations	31
6. DISCUSSION	33
7. CONCLUSION	40
REFERENCES	42
Appendices	47
The English version of the questionnaire	47
The Swedish version of the questionnaire	56

1. INTRODUCTION

1.1 Influenza, influenza vaccination and health care

Influenza

Seasonal influenza is an acute viral infection caused by influenza virus. There are three types of influenza viruses; influenza A, B and C. Influenza A and B are the most common types in humans. Influenza viruses circulate globally and cause epidemics in the northern hemisphere during the winter and early spring (1). Seasonal influenza is characterized by a sudden onset of high fever, headache, muscle pain, dry cough, sore throat and runny nose. Some people infected with the virus may only have vague symptoms compatible with common cold or even no symptoms at all. Recovery from fever and other symptoms can take up to a week. The incubation time, the time from infection to symptom debut, is usually two to three days. Seasonal influenza virus spreads easily by contact transmission mainly by hands or by air in droplets (1, 2). Adults are infectious from the day before the symptoms emerge to about five days afterwards (3).

Seasonal influenza can cause severe illness that requires hospitalization and sometimes leads to death. Worldwide, the influenza epidemic results in about three to five million cases of severe illness annually and between 500.000-1.000.000 deaths (1, 4, 5). The highest risk of complications due to influenza illness is among children younger than two years, persons 65 years or older and people with chronic diseases such as chronic heart and lung diseases, kidney or liver failure, haematological or metabolic diseases or weakened immune system (1). The most common complications due to influenza infection are secondary bacterial infections like acute bronchitis and pneumonia. Sinusitis is also a common complication in adults, while young children often suffer from ear infections and intensive coughing (6). The main cause of the excess morbidity and mortality rate associated with influenza are secondary pneumonia and heart failure in the elderly (7).

Influenza vaccination

Influenza vaccination is the most important measure for preventing influenza and its complications and can prevent between 60-80 % of influenza related illnesses (4, 8). A large prospective cohort study, including all persons aged 65 years and older (260.000 participants) was performed over three influenza seasons in 1998 to 2001 in Stockholm. In the study, the relative risks of mortality among vaccinated versus unvaccinated individuals were estimated. The results showed

that influenza vaccination was associated with a reduction in all-cause mortality by 14, 19 and 1% respectively (9).

Safe and effective influenza vaccines have been used for more than 60 years and side effects are relatively uncommon (1, 10). A committee of experts at the World Health Organizations (WHO) develops and decides every year which three or four influenza strains shall be in the vaccination shot (11). The influenza virus surface molecules haemagglutinin (H) and neuraminidase (N) are the strain markers and are essential for the immune system to recognize and fight the virus and its infectivity. Many different combinations of H and N exist and the virus is named according to which H and N molecules they contain; *I.e.* influenza A (H1N1), (H1N2), (H2N1) and so on. These surface structures constantly change, partly through minor changes from year to year (drift) and sometimes by greater sudden changes (shifts). Therefore, new influenza vaccines are produced every year (6). Studies have shown that a person's concentration of protective antibodies against influenza viruses declines over the course of a year after vaccination (7). Thus, the vaccination has to be administrated once a year. The elderly and patients with certain chronic medical conditions usually have a weaker immune response to the influenza vaccine. Their immunological protection against influenza infection can therefore be weaker although they will experience a milder illness and fewer complications if they are vaccinated than if they are not (8, 12).

The pattern of each winter influenza epidemic depends on the proportion of the population that has protective immunity against each seasonal virus. When major changes of the virus occur very few have protection against the influenza infection. Thus, pandemics can occur where millions can get sick all over the world. The Spanish Flu in 1918 (H1N1), Asian Flu of 1957 (H2N2), the Hong Kong Flu of 1968 (H3N2), pandemic influenza A (H1N1)pdm 2009 in 2009-2010 are all examples of influenza pandemics due to a major shift in the surface structure of the influenza virus (13).

Influenza and health care

Health care associated influenza infections are well known and have both direct and indirect consequences (3, 14, 15). Influenza illness in hospitals is considered nosocomial if symptoms start at least two or three days after hospital admission. Influenza outbreaks in hospitals can directly increase morbidity among patients as well as health care workers. Indirect consequences are disturbances in the normal function of the health care system; lack of health care workers, work overload, fewer elective admissions, fewer operations and income loss due to work absenteeism (15). Health care workers can be a key source for influenza transmission in hospitals as they are exposed to both infected patients and patients in high risk groups, in particular those who work in the front line like in emergency units. Furthermore, health care workers can have mild influenza symptoms mimicking the common cold or sore throat, and thereby spread

influenza virus without knowing it. Moreover, health care workers often have a strong work commitment and many of them go to work despite vague influenza like symptoms (3). The attack rate (the proportion of susceptible individuals exposed to a particular pathogen who become infected (16)) of influenza infection in the population is 5-20% but can be as high as 60% in health care workers (5).

Vaccination coverage among healthcare workers varies substantially between different studies and countries. In Switzerland, England and Germany the vaccination coverage varies from 14 to 48% (3, 5, 17, 18). In a recently conducted cross sectional web based survey in 27 European countries the vaccination coverage in health care workers ranged between 13 and 89% (19). In February 2014 the proportion of vaccinated persons over 65 years old in Sweden was 45%, no figures on vaccination coverage was available for neither risk groups nor health care workers (20). Several studies on influenza vaccination coverage in health care workers have shown a higher vaccination rate in physicians compared to other health care professions. In the United States, The Centers for Disease Control and Prevention (CDC) influenza season report from 2012-13 showed that 72% of all health care workers reported having had an influenza vaccination. The coverage rate was 92% among physicians, 89% among pharmacists and 85% among nurses (21). In another study from France the vaccination coverage for physicians, nurses and nurse assistants were 49%, 31% and 28%, respectively (22). And in a German report, physicians were significantly more likely to be vaccinated than nurses [38.8% vs 17.4% ($p < 0.001$)] (23).

Seasonal influenza vaccination of health care workers can reduce patient morbidity and mortality, increase patient safety and reduce work absenteeism in the health care (3, 24-26). In a systematic review on influenza vaccination for health care workers who work with institutionalised elderly persons it was found that deaths from pneumonia were significantly reduced as well as deaths from all causes (26). Another recently published review of four randomized trials and four observational studies found that vaccination of health care workers was protective for influenza-like illness and laboratory-confirmed influenza in the patients (27). In a randomized, placebo-controlled double blind study conducted in Finland on work absenteeism the authors found that influenza vaccination of health care workers reduced absenteeism related to respiratory infections by one third (28).

In the emergency departments at The Sahlgrenska University Hospital, approximately 35 % of those who seek health care are older than 65 years. The health status of these elderly citizens is very heterogeneous but older citizens are in general more vulnerable to influenza infections and complications. Simultaneously, many patients seek health care having symptoms of influenza or upper respiratory tract infections. The risk of spread of influenza infection is therefore considerable and demonstrates the important role of the health care workers concerning infection prevention.

1.2 Health care workers attitudes to and knowledge about influenza and influenza vaccination

The most common reasons for health care workers to not take the influenza vaccination are lack of knowledge, misconception and negative attitudes; *i.e.* the belief that influenza vaccination is ineffective, fear of side effects, the belief that influenza vaccine is harmful, that the vaccine should be given only to high risk groups, that one does not feel vulnerable to infection, one never gets influenza, lack of time to get vaccinated, that it hurts to take the shot and tenderness of the injection site (3, 5, 17, 29).

In a review on knowledge and attitudes regarding influenza vaccination among nurses it was found that higher knowledge and positive attitudes to influenza vaccination had a significant positive association with vaccination coverage. It was also found that higher risk perception of influenza illness was associated with higher vaccination coverage (4).

In a meta-analysis where 13 studies were reviewed the predictors of seasonal influenza vaccination coverage among health care workers in hospitals were analysed. It was concluded that knowing that the vaccine is effective, being willing to prevent influenza transmission, believing that influenza is highly contagious, understanding that influenza prevention is important and having a family were associated with a twofold higher vaccine coverage (30). It has also been shown that factors that can increase vaccine acceptance include a wish for self-protection, previous receipt of influenza vaccine, a desire to protect patients, and perceived effectiveness of the vaccine (24).

1.3 Public health perspective and Public Health in the Nordic countries

Seasonal influenza epidemics are a public health problem causing an estimated 500.000-1.000.000 deaths annually worldwide (14). An estimation on influenza related deaths in the countries of the European Union from 2012 showed that almost 40.000 people die prematurely every year of influenza related illness (31). During the influenza season 2012-2013 it was estimated that between 640.000 and 1.8 million people became ill in influenza in Sweden. More than 200 patients needed intensive care, 100 of them were under 65 years old and belonged to a risk group and only few of them were vaccinated (32).

The ability of the influenza virus to influence large parts of the population during a short period of time poses a high demand on the health and social care systems.

Absenteeism from work and school has a negative impact on the society. At worst, seasonal influenza can disturb the function of important basic public services such as the health care, schools and public transports (4, 14, 17) .

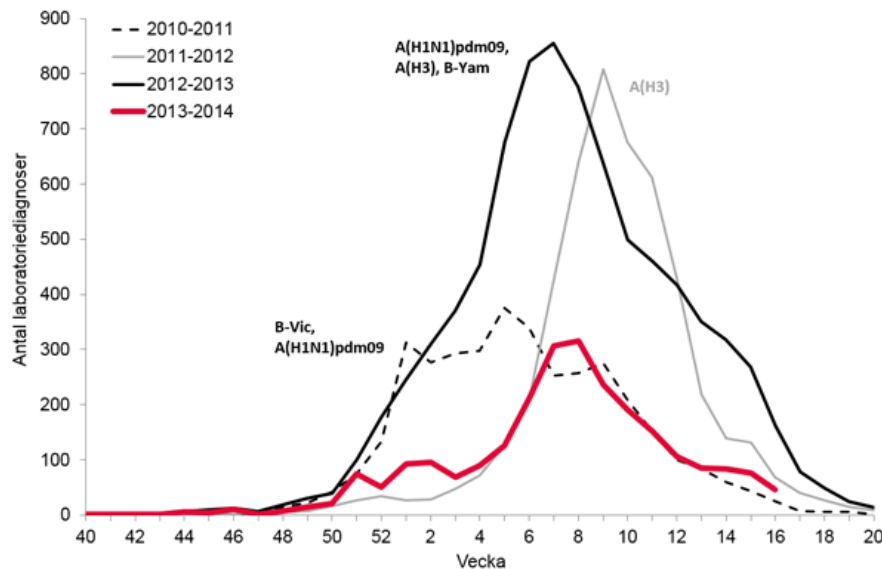


Figure 1. Number of laboratory confirmed influenza cases in Sweden (all types) per week during 2010 to 2014 (With permission from The Public Health Agency of Sweden, Folkhälsomyndigheten).

In Sweden, The Public Health Agency has developed an influenza surveillance system to be able to monitor and react to influenza epidemics and possible pandemics. This is done by; counting numbers of searches on a medical web site, laboratory and sentinel surveillance, statutory clinical reporting of hospitalized cases of influenza A (H1N1)pdm09 and by counting the number of calls to medical telephone advisers (Sjukvårdsrådgivningen) about influenza like symptoms, Figure 1 (20, 33).

The recommendations for seasonal influenza vaccination at The National Public Health Institutions in the Nordic countries are similar. However, in Sweden and Denmark it is not recommended that all healthcare workers should be vaccinated against seasonal influenza (34, 35). In Finland, Norway and Iceland on the other hand, it is recommended that all healthcare workers are vaccinated because of the risk of getting infected by patients or infecting susceptible patients (13, 36, 37).

The Public Health Agency in Sweden has presented national public health goals where the overall objective is to create conditions for good health on equal terms

for the entire population. The document is divided into eleven sections where the seventh section focuses on the protection against infections. Preventive measures, including vaccination, are according to The Public Health Agency a prerequisite for Sweden to have a good protection against infections. Vaccinations are considered one of the most cost-effective interventions in public health (38).

1.4 Influenza vaccination recommendations

The Global Action Plan (GAP) for Influenza Vaccines is a strategy developed by the WHO to increase the use of seasonal influenza vaccine. The objective of the project is to support their member states to find ways to reduce disease burden of seasonal influenza infections. This includes strategies to be prepared to respond to an eventual pandemic and to motivate the industry to produce sufficient amounts of influenza vaccines to be able to immunize at least two billion people in 2015. The GAPs aim is also to encourage the member states to formulate appropriate policies for seasonal influenza vaccination programs, to plan for equitable access in the event of pandemics and to promote for further research and development (39).

In 2009 the European Union Council of Ministers recommended that EU member states adopt and implement national action plans for seasonal influenza vaccination, so that by the 2014-2015 winter season they will reach a vaccination coverage rate of 75 % for "older age groups" and, if possible for other risk groups. The member states are also encouraged to improve vaccination coverage among healthcare workers (40). Currently there is a discrepancy between the European Union recommendations and the actual vaccination coverage in risk groups and health care workers. The public health consequences of low vaccination coverage include increased morbidity, hospitalizations and mortality associated with influenza related complications (41).

Table 1. The Swedish National Board of Health and Welfare (Socialstyrelsen) recommends annual seasonal influenza vaccination to the following groups (34):

- Adults 65 years and older
- Pregnant women in the second and third trimesters
- People with chronic diseases
 - Chronic cardiac disease
 - Chronic respiratory disease
 - Unstable diabetes mellitus
 - Weakened immune system due to disease or medication
 - Chronic liver or kidney failure
 - Extreme obesity (greatest risk if BMI>40) or neuromuscular diseases that affect breathing
 - Children with chronic diseases or multiple disabilities

The World Health Organization (WHO) and European Union (EU) recommend annual vaccination for the same groups as The Swedish National Board of Health and Welfare but also recommend vaccination for children from six months to two years and for all health care workers (Table 1) (1, 11).

The Infection Control Unit at The Sahlgrenska University Hospital in Gothenburg recommends that health care workers who are involved in patient care should be vaccinated against seasonal influenza (2). It is then up to the chief at each ward to decide if the personnel is offered vaccination free of charge or not. All health care workers in the emergency departments at The Sahlgrenska University Hospital are offered free annual vaccination. In recent years approximately 20-30% of the entire health care staff has been vaccinated against influenza (personal communication). The Sahlgrenska University Hospital has no joint registration of how many health care workers get vaccinated although it is registered by the person responsible for the vaccination at each ward unit in a database called Svecac. However, the accuracy of the registration is unclear.

1.5 Main concepts

Vaccination

The Swedish National Board of Health and Welfare (Socialstyrelsen) definition of vaccination is: "*Vaccination involves ingesting parts of the infectious agent that causes a disease, or the entire infectious agent in a weakened form. If a person is exposed later to infection the body's immune system is activated and capable of destroying the infectious agent before illness*" (42).

Health care workers

Health care workers in this study are nurses, assistant nurses and physicians who have legitimation and are working in the emergency wards at The Sahlgrenska University Hospital.

Knowledge

Many different definitions of knowledge are available. This one was chosen; "Information, understanding, or skill that one gets from experience or education"(43).

In this study knowledge refers to knowledge about influenza vaccination and seasonal influenza.

Attitudes

People's attitudes are made of two main components; cognitive (knowledge and information) and affective (feelings, emotions and evaluation of what is seen as important) (44). Attitude is the person's conscious or unconscious, openly displayed or concealed, cognitive or emotional feelings to something. Attitudes are assumed to be products of learning or building on past experience and are in close relation to behaviour, but the association is not clear. Changing attitudes can result in change in behaviour and vice versa but attitudes can be hard to change. New information or increases in personal skills have proven to change attitudes. According to social psychology theories behaviour change is partly determined by the attitude to that particular behaviour. Also, individuals attitude to a particular action are influenced by the persons beliefs, motivation, drives and the influences from social norms. (44, 45).

2. RELEVANT THEORETICAL FRAMEWORK

2.1 Attributions theory

Attribution is a concept used in the field of social psychology to explain how people see and interpret the causal relationships in their own and others actions (46). Fritz Heider is considered to have founded the attribution theory in 1958 (45). The attributions theory is a term for many models that attempt to illuminate peoples understanding of causality. In this theory, which has been applied to health behaviour, people see the social world as predictable and controllable, making explanatory attributions to understand the world around them and seeking reasons for a particular event. With explanatory attributions, people make judgments about what the cause was of a certain event. In the attribution theory distinctions are made between self and other attributions (45). Interpersonal attributions happen when the cause of the events involves two or more individuals. If the individuals' actions or motives for the action are questioned then the individual will need to explain reasons for the action. Then, it is likely that the person will present himself/herself in the most positive light (46, 47).

Four dimensions of attributions have been defined; internal versus external, stable versus unstable, global versus specific and controllable versus uncontrollable. The attribution theory is used to study health, health related behaviour and behaviour in relation to illness.

2.2 Health Locus of Control

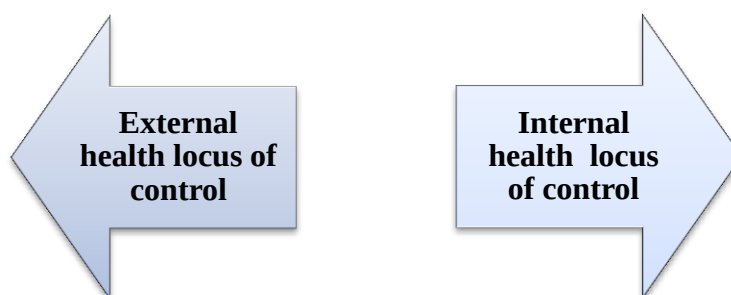


Figure 2. The concept of Health Locus of Control showing the individuals perceived control of situations.

External health locus of control; Health behaviour outcomes are outside the person's control, determined by fate or chance or by powerful others, independent of work or efforts.

Internal health locus of control; Health behaviour outcomes are within the persons control and determined by the person's work or efforts.

Internal versus external individual attributes were developed further in the social learning theory into the concept of Locus of Control by Julian Rotter in 1966 (48). Locus (Latin for "location" or "place") of Control has been applied to health as a construction of the individual's perceived control of a situation and is widely used in personality studies (49). The concept relates to the individuals' choices in relation to disease and health behaviour, whereas behaviour depends on previous experiences in the field of health. Individuals with a high degree of Internal Health Locus of Control have capacities or skills like knowledge, possession of information and the motivation to influence their health. Individuals with a high degree of External Health Locus of Control on the other hand believe in fate or chance and are more dependent on others. They do not consider that their own effort promotes health but explain adversity in health as uncontrollable factors such as luck and chance (45). Rotter emphasized though that internal and external Locus of Control represent two ends of a continuum and individuals are not either or but sometimes both at the same time.

2.3 Multidimensional Health Locus of Control

The Health Locus of Control concept was developed further by Wallston to the Multidimensional Health Locus of Control scale (MHLC) (49). The aim of using the scale is to assess to which extent individuals perceive that their health is determined by their own behaviour. The scale contains 18 questions that are divided into three subscales (each containing six items); internality, a matter of chance externality and powerful others externality. All of the subscales are independent of one another. People who score high on the internal subscale feel that they have greater capacity to influence and control their own health than those who score lower (50). The higher the score on the chance or powerful others subscales, the lesser an individual perceives that he can influence his health by a certain behaviour. The MHLC scale will be further described below in the method section. MHLC is an instrument that can provide an analysis of individuals' choices and behaviour in situations concerning their health.

In this study the MHLC scale will be used as a tool to understand influenza vaccination behavior, *i.e.* to see if the scores in the subscales of MHCL differ between the vaccinated and unvaccinated individuals.

2.4 The Health Belief Model

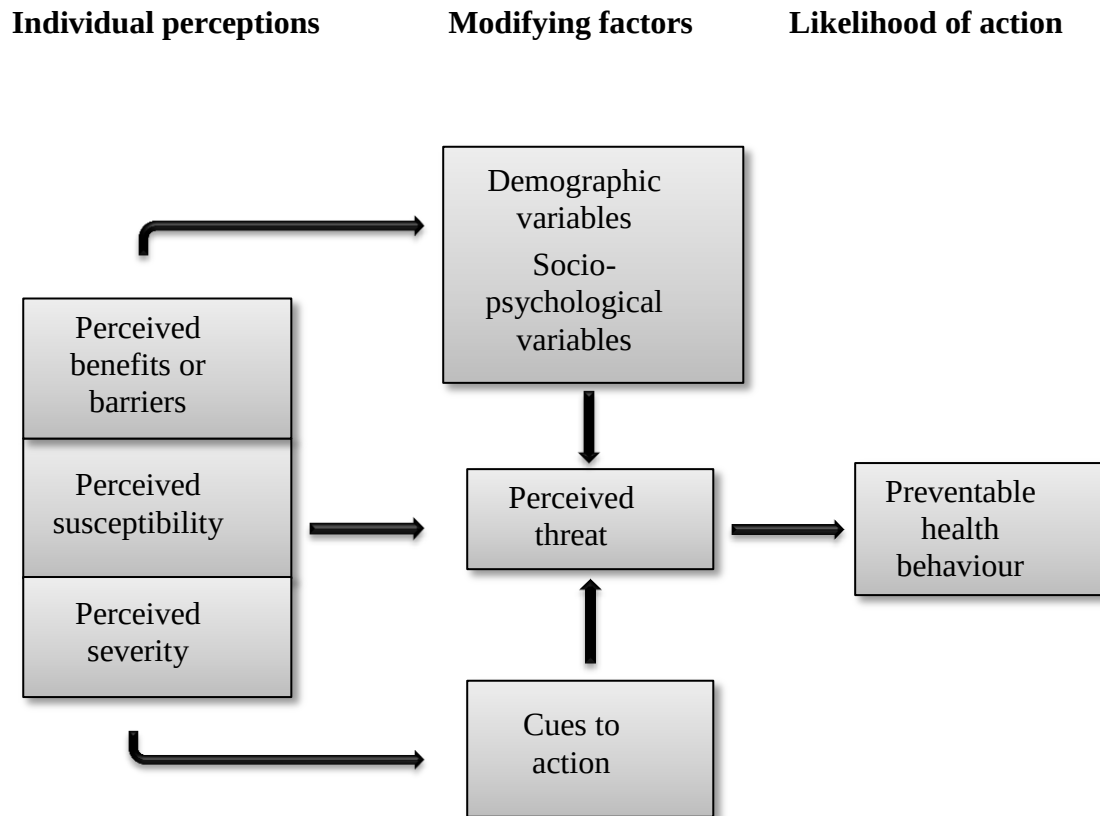


Figure 3. The Health Belief Model, used in research to predict preventive health behaviour. Modified from Naidoo and Wills (44).

The Health Belief Model is a social cognitive model that focuses on behaviour and how to predict preventive health behaviour. The Health Belief Model was developed in the early 1950's by social scientists at the United States Public Health Service in order to understand the reasons for failure of people to participate in disease prevention or screening tests (51). The model was further modified in 1966 by Rosenstock and in 1980 by Becker (44, 47). In the Health Belief Model behaviour is considered as a result of fundamental values that individuals have and develop through life. In relation to disease the most important values that influence persons health behaviour are; how vulnerable a person perceives that he/she is in relation to getting a disease, how the severity of a disease is perceived, how to behave or what to do to avoid getting a disease, how much threat a disease poses, the benefits of preventive behaviour and cues or signals to action such as information, feeling ill or having symptoms. These core

values then predict the likelihood that a behaviour will occur through the modification of demographic variables (age, gender, ethnicity) and socio-psychological variables (social class, personality, peer pressure) (Figure 3) (45).

Individuals that are considering changing their behaviour enter a cost benefit analysis of that particular behaviour. That also includes the person's beliefs concerning the likelihood of the illness happening to them. For a behaviour change to take place individuals must; have a motivation to change, feel threatened by their current behaviour, feel that a change would be beneficial in some way and feel competent to carry out the change (44).

The health belief model can be used theoretically to predict how likely it is that healthcare workers get vaccinated against influenza. By using the model, questions about how exposed healthcare workers feel to influenza infection, how severe influenza illness is perceived, what they can do to avoid influenza illness and the benefits of vaccination and thereby avoiding influenza can be asked (Figure 3).

3. AIM AND RESEARCH QUESTIONS

3.1 Aim

The main purpose of this study was to investigate health care workers knowledge, attitudes and vaccination practices in relation to influenza and influenza vaccination at three emergency departments in Gothenburg, Sweden.

A secondary purpose of this study was to investigate if health care workers vaccination behaviour in the emergency departments is influenced by age, gender, profession, work place or work experience.

The main hypothesis was that healthcare workers with limited knowledge of and negative attitudes to influenza vaccination are less likely to be vaccinated.

3.2 Research questions

- Are health care workers who have greater knowledge of seasonal influenza more likely to be vaccinated against seasonal influenza than health care workers with less knowledge?
- Are health care workers who perceive influenza illness as a greater risk for their health more likely to be vaccinated than health care workers with lower risk perception?
- Are health care workers with a high degree of internal locus of control more likely to be vaccinated than health care workers with low degree of internal locus?
- Are health care workers who believe that coincidence controls their health, and that life events happen by chance, less likely to be vaccinated against influenza?
- Is seasonal influenza vaccination behaviour of the health care workers influenced by age, gender, profession, work place and years worked within health care?

4. METHODS

4.1 Study design

This was a cross-sectional study, conducted at three emergency departments in Gothenburg where attitudes to and knowledge of influenza and influenza vaccination were investigated. A questionnaire especially formed for this purpose was used. The questionnaire called "King's Nurses Influenza Questionnaire 2011" was developed and validated by researchers in England who gave a written consent for the use in this study (52). The questionnaire was translated by the author from English to Swedish (See Appendices). The translation was reviewed and adjusted by a bilingual Swedish / English nurse and further reviewed by the authors' supervisor and colleagues. After a thorough evaluation, no further validation of the questionnaire's translation was conducted.

The study design and methodology were chosen by the author who wanted to learn how to perform a quantitative study and to learn how to use and perform basic statistical analyses. An advantage of a cross sectional design is that it is practical, relatively easy to perform and not as time consuming as prospective studies (53). This study is descriptive in nature since it describes the vaccination

status and investigates the associations between knowledge, attitudes and influenza vaccination behaviour (47). The author also wanted to be able to provide data on influenza vaccination coverage in Swedish emergency departments, data that have previously been unavailable.

4.2 Data collection

A self-administered questionnaire was distributed to all nurses and assistant nurses as well as to a convenient sample of physicians at the Sahlgrenska University Hospital's three emergency departments; Sahlgrenska, Mölndal and Östra, during four weeks in January and February 2014. The questionnaire was distributed to the staff in named envelopes along with information on study. After completion the questionnaires were returned anonymously into a box in the emergency departments. A list with names of the health care workers in Sahlgrenska and Östra was obtained from the heads of the departments. In Mölndal no list was provided, instead the chiefs themselves named and distributed the envelopes. The questionnaire was either completed on the same day that it was distributed or taken home and returned later. The author provided information to the participants concerning the aim and purpose of the study. Information about the study was also given for the first ten days at the start of each shift by the supervising nurse in each emergency department. All participants were informed that all responses were treated confidentially.

4.3 Questionnaire

Through the questionnaire, data about knowledge and risk perception towards influenza and influenza vaccination was collected. The Multidimensional Health Locus of Control score was assessed to understand to which extent individuals perceive that their health is determined by their own behaviour. The individual vaccination practices during the last five years were also collected. In addition, the participant gave written reasons for having the influenza vaccination or not and demographic information was gathered.

Knowledge

The original English questionnaire contained 22 items that tests the knowledge of seasonal influenza, influenza pandemics and influenza vaccination. In this study, two questions were excluded (number 21 and 22) because of their unclearness. Questions 13 and 14 included subgroups of questions, three and five items,

respectively. Altogether there were 27 items to answer, true, false or unsure. Knowledge about influenza was defined as the total number of correct answers with a possible score between 0 and 27. For the purpose of further analysis the median of correct answers was calculated and then the respondents were divided into low and high knowledge groups (1-17 points = low knowledge; 18-27 points = high knowledge).

Risk perception

Risk perception of influenza and pandemics was assessed by 12 items on a four point Likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree, 0=undecided). The risk perception score was calculated as the mean of all 12 items, giving a score of 0-4. Two questions from the original version of the questionnaire were removed (5-6) since they were considered to reflect knowledge rather than risk perception.

Multidimensional Health Locus of Control (MHLC)

Eighteen questions representing different aspects of Multidimensional Health Locus of Control (MHLC) were assessed (49). A six point Likert scale was used (1=strongly disagree, 2=moderately disagree, 3=slightly disagree, 4=slightly agree, 5=moderately agree, 6=strongly agree). Questions number; 1, 6, 8, 12, 13, 17 represent "Internal Locus of Control" with a possible range of 6-36. The higher the score is, the higher the Internal Locus of Control. Questions number; 2, 4, 9, 11, 15, 16 represent "Chance" with a possible range of 6-36 where high score means a higher belief in chance. Questions number 3, 5, 7, 10, 14 and 18 represent "the powerful others" and were not analysed in the study. All of the subscales are independent of one another. "The powerful others" questions are primarily used to study patients dependence on physicians or other health care workers concerning their health. In this study the participants were not patients and these answers were therefore not analysed.

Vaccination practices

Five questions were used to assess vaccination practices. Participants were asked: a) if they had been vaccinated during the last 12 months, b) if they had recommended vaccination to their patients, c) if they intended to get vaccinated the next season 2014, d) if they were going to recommend vaccination to their patients in the future and c) how many times they had been vaccinated against seasonal influenza during the last five years.

The English version of the questionnaire also contains questions about influenza A (H1N1)pdm 2009. These questions were not included in the current study

because this year's seasonal influenza vaccine contains this strain in the vaccination shot and it was considered confusing for the participants to be asked separately about influenza A (H1N1)pdm 2009.

Open ended questions and demographics

The participants were asked to write three reasons for why they would or would not vaccinate themselves, irrespective of if they got vaccinated or not.

Finally, demographic data was collected; age, gender, highest educational level, profession, how many years they had worked with health care and if the respondent was spending more than 10% of their working hours on patient care.

4.4 Data analyses

All statistical analyses were performed using IBM SPSS Statistics version 22. Data are presented as mean $\pm$ standard deviation or median (interquartile range). For comparisons between groups, unpaired t-test or one-way ANOVA was used for normally distributed data and Mann-Whitney U-test or Kruskal-Wallis test for non-normally distributed data. Pearson Chi-square or Fishers exact test were used to explore the statistical differences between the categorical variables. $P < 0.05$ was considered statistically significant. No sample size calculations (power calculation) were conducted when the study was designed. Instead the aim was to include as many participants as possible to attain a comprehensive picture on the study subject.

A quantitative content analysis was used to organize and make counts of the frequency of the written answers to the open ended questions (47). This was performed by reading through all the written answers in the questionnaires and the answers were categorized according to vaccination status. All answers were analysed. The answers were organized into themes by their similarity. Some of the quotations were categorized according to The Health Belief Models different themes (boxes). Quotations that were considered descriptive of the different themes were chosen to clarify the reasons that lead to vaccination or not (45).

4.5 Ethical considerations

Due to the nature of this study, using an anonymous questionnaire without any sensitive personal information, approval from a regional ethical board was not considered necessary (54). Nevertheless, The Swedish Data Inspection Board was

contacted regarding the health care workers personal data. Their answer was that each ward chief was responsible for the disclosure and distribution of a list with names of the health care workers on request and that the author was responsible for the data management.

Prior to completion of the questionnaire all participants were provided with information on the aim and purpose of the study. Participation in the study was voluntary. All questionnaires were answered and returned anonymously and did not contain any sensitive information.

5. RESULTS

5.1 Study population

Of 226 distributed questionnaires, 175 were returned: a response rate of 77%. The response rate varied between the three hospitals. In Sahlgrenska it was 95%, in Mölndal 74% and 60 % in Östra. The questionnaire was completed by 118 nurses and 57 assistant nurses. In addition, 36 physicians participated in the survey. Three respondents didn't report their profession. The physicians are not employed at the emergency wards but are working there occasionally. At the time when the study was performed, questionnaires were distributed to the physicians who were working there by hand. The physicians are therefore not included in the response rate.

A total of 214 questionnaires were received, 150 respondents were women (71%) and 62 men (29%), two participants did not report their gender. One hundred and four respondents worked at Sahlgrenska, 65 in Mölndal and 45 in Östra. The majority of the participants were aged between 30 and 49 years (n=121; 57%). Characteristics of the respondents are presented in Figure 4 and in Table 2.

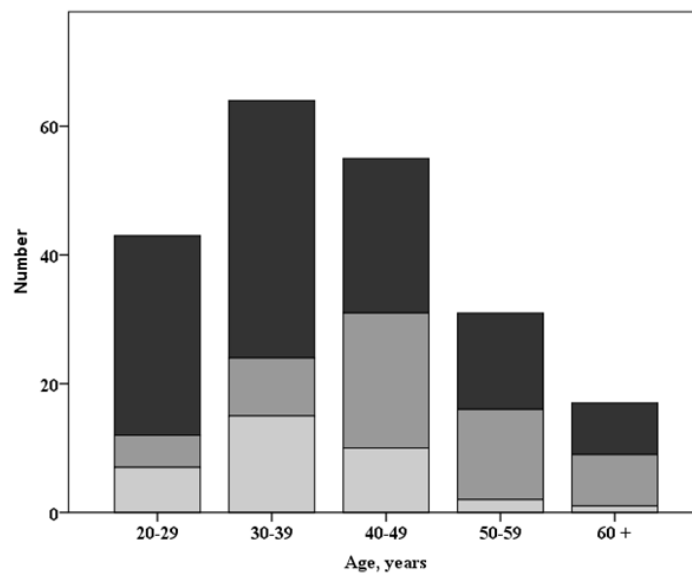


Figure 4. Age distribution of the participants; nurses (black, n=118), assistant nurses (dark grey, n=57) and physicians (light grey, n=36).

Table 2. Demographic characteristics of the participating health care workers.

Participant's n (%)	All n=214	Sahlgrenska n=104	Mölndal n=65	Östra n=45
Gender				
Male	62 (29)	40 (39)	11 (17)	11 (25)
Female	150 (71)	63 (61)	54 (83)	33 (75)
Age categories				
20-29 years	43 (20)	23 (22)	10 (15)	10 (23)
30-39 years	64 (30)	35 (34)	12 (19)	17 (39)
40-49 years	57 (27)	27 (26)	22 (34)	8 (18)
50-59 years	31 (15)	11 (11)	15 (23)	5 (11)
60 + years	16 (8)	7 (7)	6 (9)	4 (9)
Profession				
Ass. nurse	57 (27)	31 (30)	17 (27)	9 (21)
Nurse	118 (56)	44 (42)	39 (62)	35 (80)
Physicians	36 (17)	29 (28)	7 (11)	0 (0)
Education				
Upper sec. school	47 (22)	24 (23)	15 (23)	8 (18)
College/University	142 (67)	64 (62)	43 (67)	35 (80)
MSc/PhD	23 (11)	16 (15)	6 (9)	1 (2)

Data is presented as number (%). Two respondents did not report gender and three respondents did not report their profession.

5.2 Influenza vaccination

Of all health care workers 31% had been vaccinated against seasonal influenza during the last 12 months. Fifty seven percent had no intention of being vaccinated in 2014, 27% where going to be vaccinated and 16% were unsure. Thirty four percent of the assistant nurses got vaccinated during the last 12 months, 30% of the nurses and 25% of the physicians ($P= 0.6$). Thirty four percent of women and 24% of men got vaccinated last 12 months ($P= 0.2$). Vaccination coverage was not significantly different between hospitals ($P = 0.8$). The median work experience tended to be lower in those who were not vaccinated [11 years (6-23); Table 3] than of those who had been vaccinated during the last

12 months [14 years (7-30)] although the difference did not reach statistical significance ($P=0.2$).

Of those who got vaccinated during the last 12 months, 80% were going to get vaccinated in 2014 and 80% of unvaccinated were not going to get vaccinated ($P<0.001$; Table 4). Sixteen percent in both groups were unsure about getting vaccinated in 2014. Vaccination coverage was approximately 30% in all age categories except in the oldest group where 56 % had been vaccinated the last 12 months ($P<0.05$; Figure 5). Sixty seven percent of the health care workers had sometimes recommended influenza vaccination to their patients but among physicians all had done that.

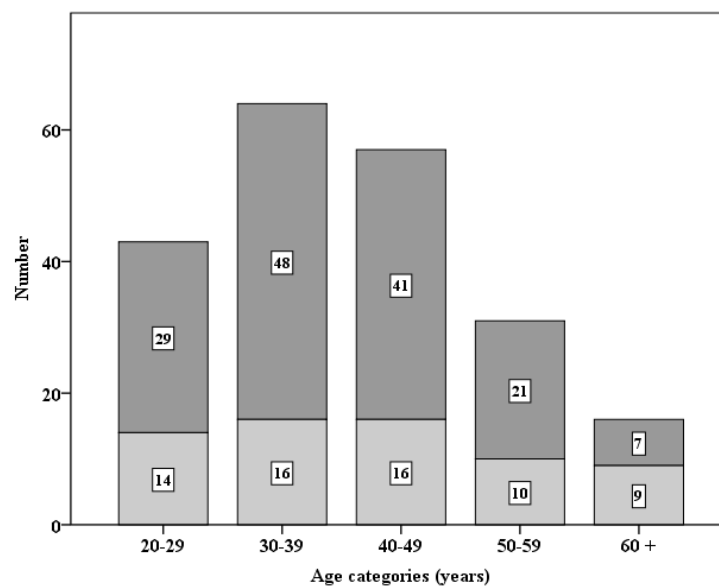


Figure 5. Influenza vaccination coverage during the last 12 months and the difference between age categories (the dark grey not vaccinated, light grey vaccinated).

Table 3. Characteristics of vaccinated and unvaccinated health care workers during the last 12 months.

	Vaccinated n=66	Unvaccinated n=147	P
Gender n (%)			0.2
Women	50 (76)	99 (67)	
Men	15 (23)	47 (32)	
Work experience (years)	14 [7-30]	11 [6-23]	0.2
Age categories n (%)			0.3
20-29 years	14 (21)	29 (20)	
30-39 years	16 (24)	48 (33)	
40-49 years	16 (24)	41 (28)	
50-59 years	10 (15)	21 (14)	
60 + years	9 (14)	7 (5)	
Profession n (%)			0.6
Assistant nurse	19 (29)	37 (25)	
Nurse	36 (55)	82 (56)	
Physicians	9 (14)	27 (18)	
Education n (%)			0.5
Upper secondary school	15 (23)	32 (22)	
College/University	40 (61)	102 (68)	
MSc/PhD	9 (14)	14 (10)	
Hospital, n (%)			0.8
Sahlgrenska	33 (50)	71 (48)	
Mölndal	21 (32)	44 (30)	
Östra	12 (18)	33 (22)	

Data is presented as number (%) or median [interquartile range]. Two respondents did not report gender and three respondents did not report their profession.

5.2.1 Influenza vaccination and knowledge

There was a significant difference in mean knowledge score between those who had been vaccinated the last 12 months (17.9 ± 2.7) and those who had not been vaccinated (16.8 ± 2.6 ; $P < 0.05$; Figure 6). There was also a significant difference

in knowledge score between those who intended to get vaccinated in 2014 and those who had no intention of getting vaccinated 2014 ($P < 0.001$; Table 4). Of the vaccinated, 64% had high mean knowledge score (≥ 18) compared to 42% of unvaccinated ($P < 0.05$). The mean knowledge score was significantly different between physicians (19.0 ± 1.9) and nurses (17.0 ± 2.7 ; $P < 0.001$) as well as assistant nurses (16.2 ± 2.5 ; $P < 0.001$). There was on the other hand no significant difference between nurses and assistant nurses ($P = 0.6$). There was no significant difference in mean knowledge score between men and women, between hospitals or between age categories. In question number nine, the false statement “Vaccinations give some people influenza” was correctly answered by 52% of those who got vaccinated during the last 12 months compared to 38% of the unvaccinated ($P = 0.09$). In question number 14 participants were asked if health care workers are recommended to have the annual seasonal influenza. The correct answer was that the statement is false. Vaccinated and unvaccinated answered the question wrongly in 90% and 80%, respectively.

Table 4. Influenza vaccination intentions, knowledge score, risk perception score and MHLC score of vaccinated versus unvaccinated health care workers.

	Vaccinated (n = 66)	Unvaccinated (n=147)	P
Influenza vaccination planned in 2014	53 (80)	5 (3)	< 0.001
Influenza vaccination not planned in 2014	3 (5)	118 (80)	
Influenza vaccination in 2014 unsure	10 (15)	23 (16)	
High knowledge score	42 (64)	61 (42)	< 0.05
Low knowledge score	24 (36)	86 (58)	
Knowledge (score)	17.9 ± 2.7	16.8 ± 2.6	< 0.05
Risk perception (score)	2.4 ± 0.4	2.2 ± 0.3	< 0.001
Internal MHLC (score)	24.7 ± 4.4	26.3 ± 3.8	< 0.05
Chance MHLC (score)	16.3 ± 6.0	16.5 ± 6.1	0.8

Data is presented as number (%) or mean $\pm$ standard deviation. Abbreviation: MHLC: Multidimensional Health Locus of Control.

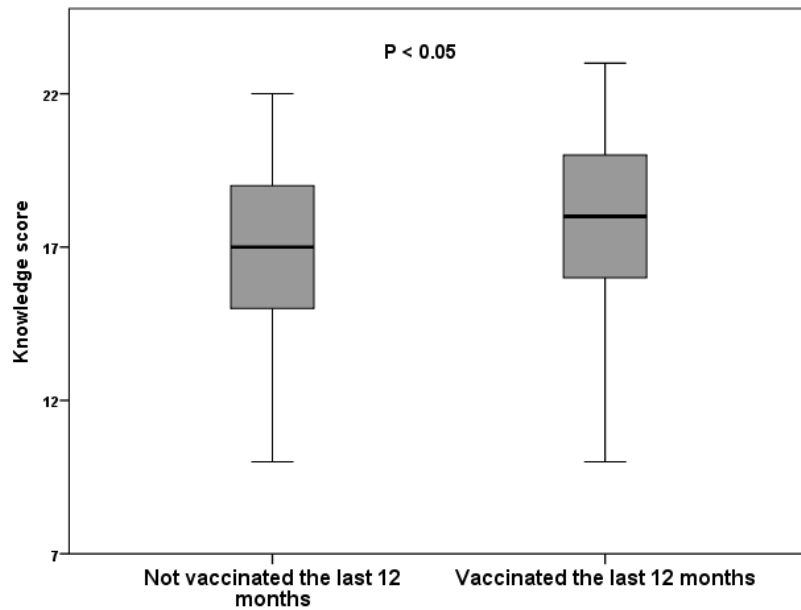


Figure 6. Mean knowledge scores in vaccinated versus unvaccinated respondents.

5.2.2 Influenza vaccination and risk perception

Health care workers who were vaccinated during the last 12 months had a significantly higher risk perception score (2.4 ± 0.4) than those who had not been vaccinated the last 12 months (2.2 ± 0.3 ; $P < 0.001$; Figure 7). The same pattern was seen when those who intended to get vaccinated in 2014 were compared to those who weren't going to get vaccinated in 2014 ($P < 0.001$).

There was no difference in risk perception between age categories, men and women, professions or hospitals.

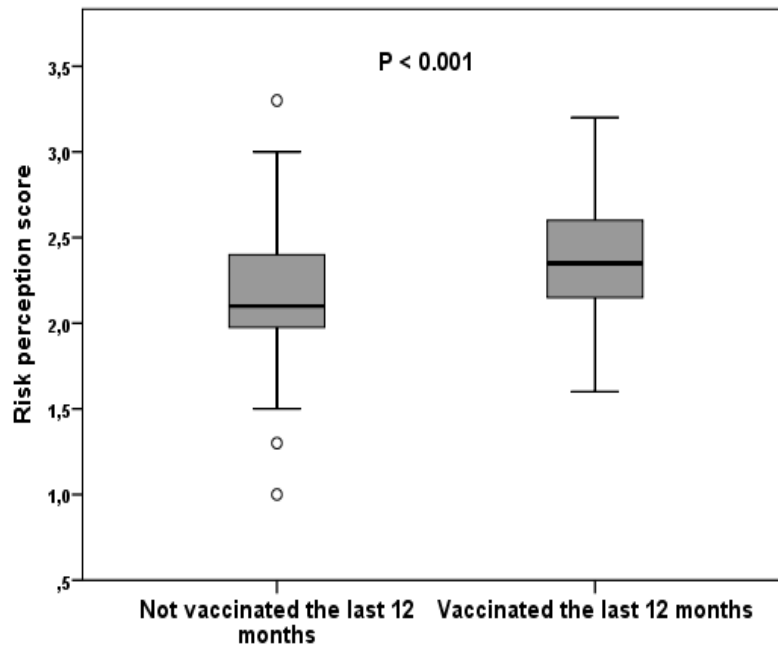


Figure 7. Mean risk perception score of vaccinated versus unvaccinated participants.

5.2.3 Influenza vaccination and Multidimensional Health Locus of Control Scale

The health care workers who didn't get vaccinated during the last 12 months had significantly higher score on the internal locus of control questions of the MHLC scale than those who got vaccinated ($P < 0.05$; Table 4). Participants who didn't intend to get vaccinated in 2014 also had higher score (26.4 ± 3.9) on the internal scale than those who are going to get vaccinated (24.9 ± 4.4 ; $P < 0.05$). Male respondents had significantly higher mean score (26.9 ± 3.3) than female (25.5 ± 4.2 ; $P < 0.05$). There was no difference between age categories, hospitals or professions in mean internal score.

There was no significant difference in the mean chance score of MHLC scale between the vaccinated (16.3 ± 6.0) and unvaccinated (16.5 ± 6.1 ; $P = 0.83$) participants or in the intention to be vaccinated in 2014. (16.4 ± 6.4) or not (16.4 ± 5.8 ; $P = 0.9$). There was no difference in the mean score in the chance score between gender, age, hospitals or professions.

5.3 Quantitative content analysis of the open-ended questions

Eighty seven percent (186/214) of the respondents provided written answers to the open ended questions. Of those who answered 58 (31%) were vaccinated and 128 (69%) unvaccinated (Table 5). The answers were categorized into six main themes and 25 reasons for being vaccinated or not. Of the vaccinated health care workers, 52% did it to protect their family, their children, their colleagues and others, 30% of unvaccinated mentioned the same reasons. Fifty seven percent of those who were vaccinated did it because they didn't want to get sick, 27% of those unvaccinated mentioned that in their answers. Twenty four percent of vaccinated said protection of patients was important whereas 12% of the unvaccinated. Of the vaccinated, 24% did it because they work with health care and feel exposed but 8% of the unvaccinated mention that reason.

Concerns about vaccine side effects was named by 40 % of those unvaccinated compared to 29% of those vaccinated. Being healthy was a reason to abstain from vaccination in 27% of unvaccinated and for five percent of those vaccinated.

Table 5. Participant's reasons for taking or abstaining from seasonal influenza vaccination, categorized into six main themes.

	All (n=186)	Vaccinated (n=58)	Unvaccinated (n=128)
Individual reasons			
To protect my family, my children, colleagues, others	37 %	52 %	30 %
I don't want to get sick	36 %	57 %	27 %
I am healthy	20 %	5 %	27 %
My immune system needs to work	15 %	7 %	18 %
I have never had influenza	12%	2%	17 %
To protect myself	10 %	17 %	6%
I'm pregnant	1 %	2%	-

Reasons related to the influenza vaccine			
Vaccine side effects	37 %	29 %	40 %
Concerns about safety or effectiveness of the vaccine	14 %	10 %	16 %
Became sick after previous influenza shot	8 %	7 %	9 %
Don't want to be injected with unknown substances	7 %	-	10%
It hurts to get the shot	6 %	10 %	4 %
Narcolepsy	2 %	-	2 %
Reasons related to risk of illness			
Not in high risk group	13 %	2 %	19 %
Not necessary	13 %	-	19 %
I'm in high risk group/ I have a disease	7 %	12 %	5 %
I can manage influenza	5 %	-	7 %
To avoid influenza complications	4 %	10 %	1 %
Reasons related to the profession			
To protect patients	16 %	24 %	12 %
Working in health care, can be exposed to influenza	12 %	21%	8 %
To prevent spread of influenza	9 %	12 %	8 %
Use of standard precautions	4 %	-	5 %
Economic issues			
To avoid sick leave and loss of income	16 %	22 %	14 %
Organizational reasons			
It's recommended	3 %	5 %	2 %
Don't have time	1 %	-	2 %

Data is presented as proportion (%) of all participants, of vaccinated and of unvaccinated participants.

5.4 Health Belief Model and the respondent's quotations

Most participants provided written reason for acceptance or abstention from influenza vaccination in the questionnaire. The quotations were categorized according to the Health Belief Model's different categories. Many respondents wrote similar quotations but those shown below were chosen because they were considered to be descriptive. The quotations were not categorized by vaccination status although it often becomes clear by reading them.

Perceived susceptibility

Here the respondents' written answers reveal their perception of how likely it is that they can get influenza.

"I see no reason to get vaccinated because I don't belong to a risk group"

"It's better to have influenza every seventh year and stay healthy in between than to get vaccinated every year"

"One becomes immune certain number of years after the disease"

Perceived severity

The participants had very diverse understanding of how severe the influenza illness is.

"I can manage influenza infection"

"I don't want to die that's why I get vaccinated"

Perceived benefit or barriers

The benefit of or the barrier to get the influenza vaccination becomes more clear when the respondents' own quotations are read.

"I'm convinced that my own immune response gets impaired by vaccination"

"I have a natural immunity because I had H1N1 in 2008"

"Unknown side effects that we don't know"

"I don't want to get injected with poison"

"I believe that natural immunity is more important when one is healthy than a vaccine"

"The vaccine cannot protect me 100%"

"I always get sick from the vaccine"

"I think it's hysteria every year"

“We need more information about the different influenza strains”
“The sick need the vaccine more than I do”
“There are many serotypes of influenza and there is only one in the shot”
“I am against the influenza vaccination because the region council wants me to have it”
“To reduce the spread of infection in the community”

Perceived threat

The participant’s perceived threat of influenza was very diverse.

“There is no reason at all to get vaccinated”

Cues to action

Cues to get the influenza vaccination as a preventive measure are revealed in these quotations.

“Milder illness if I get influenza but got vaccinated before”
“I take the vaccination because I don’t want to be anxious”
“To protect my colleagues”
“To protect my children”
“To be able to work when everybody else are sick”

Preventable health behaviour

In the Health Belief Model this represents the behaviour that leads to prevention of disease or illness.

“I have no reason to not get vaccinated”

6. DISCUSSION

This was a cross-sectional study, conducted at three emergency departments at the Sahlgrenska University Hospital. Health care workers attitudes to and knowledge about influenza and influenza vaccination, as well as their vaccination practices were investigated by a self-administered questionnaire. The study showed that one third of the health care workers got vaccinated against seasonal influenza during 2012. The past vaccination practice was a strong predictor of future plans of getting vaccinated. Vaccinated health care workers had greater knowledge about influenza and influenza vaccination than their unvaccinated colleagues. Health care workers who were vaccinated proved to have a higher influenza risk perception than the unvaccinated. Surprisingly, the findings showed that the unvaccinated health care workers had a stronger perception that their health was determined by their own behaviour (higher score of internal locus of control) than those who were vaccinated. No significant difference was found between gender, work experience, education, profession or hospitals in relation to vaccination status. However, more health care workers in the oldest age category had been vaccinated than in the other age categories. Of the vaccinated health care workers, more than a half stated that they got vaccinated to avoid becoming sick. Concerns about vaccine side effects were mentioned by almost a half of the unvaccinated. Only sixteen percent of all the participants mentioned protection of patients as an issue in relation to influenza vaccination.

Seasonal influenza vaccination coverage during 2013 in the emergency departments was around 30%. This is similar to results from previous studies on health care workers from in England, Ireland and France (18, 19, 22) but lower than in USA and Spain (19, 21). The health care workers in the oldest age category had the highest vaccination coverage. This seems logical since these individuals, who are approaching the age of 65 years, are considered to have a higher risk of suffering from complications due to influenza. The present study confirmed results from previous studies where a strong relationship between past vaccination behaviour and the future intentions of getting vaccinated was reported (3, 24).

In contrast to previous studies from USA, France and Germany, where more physicians got vaccinated than other health care professions, no difference was found in the current study (21-23). A possible explanation for this difference can be found in the theory of the Health Locus of Control. Nearly 60 % of the physicians are male and the male respondents in this study had a high score on the internal questions of the MHCL scale which was related to not being vaccinated. Individuals with a high score on the internal questions of MHCL consider themselves to be able to control and influence their own health. The physicians probably perceive that they can handle influenza and may not become so ill.

Another possible reason could be a difference in traditions. Physicians traditionally have a leading position in health care organizations and maybe that affects their decision of being vaccinated. In the current study, physicians had the highest knowledge score. Nevertheless, their high knowledge score did not result in higher vaccination coverage, confirming that the decision of being vaccinated is complex and determined by many factors.

The main hypothesis of this study, that health care workers with greater knowledge of influenza and influenza vaccination are more likely to be vaccinated, was confirmed. The results are in agreement with two previous studies from England where questionnaires on health care workers knowledge about and attitudes to influenza vaccination were also used. In one of these studies the same questionnaire as in this study was used, however, only nurses participated (18). In the other one the questionnaire was an online survey distributed by e-mail (29). A limitation of the latter was a low response rate and high influenza vaccination coverage of the respondents. Those who answered the questionnaire probably had a greater interest in influenza vaccination than the non-respondents, increasing the risk of a selection bias. The difference in knowledge score between the vaccinated and unvaccinated health care workers in the current study indicates that knowledge on influenza and influenza vaccination is insufficient among many health care workers in emergency departments. By educating health care workers, greater knowledge about influenza and reduction of misconceptions could probably increase the overall vaccination coverage. This fact is also pointed out in Hollmeyer's review article on influenza vaccination (17); that misconceptions and lack of knowledge highlights the importance of educating health care workers about influenza.

Nearly a half of the respondents stated that question number nine "Vaccinations give some people influenza" was correct and many were unsure. The statement is however wrong. The response pattern is similar to what was found in a cross-sectional observational study done in a large teaching hospital in Canada (55). The authors used a scale constructed of five dimensions from The Health Belief Model to study health care workers vaccination behaviour and attitudes. They found that the most important barrier to vaccination receipt was the perception that the vaccine itself could cause influenza (55). This misunderstanding is very important to acknowledge. That almost a half of the health care workers believe that they can get ill in influenza by influenza vaccination is an obvious hindrance when increased vaccination coverage is desirable.

The participants were asked if there are recommendations for health care workers as a group to take the annual seasonal influenza vaccination. The vast majority of both vaccinated and unvaccinated answered the question wrongly by saying that influenza vaccination is recommended to health care workers. This question was probably unfair and may have been formulated more accurately. At the same time the question reflects how confusing this issue is. Health care workers actually get

double messages. The Swedish National Board of Health and Welfare (Socialstyrelsen) does not recommend that all health care workers are vaccinated against seasonal influenza but only those who work in “high risk wards” like haematology departments and those who work with patients that are immunosuppressed. The Infection control unit at the Sahlgrenska University Hospital on the other hand does recommend vaccination to all health care workers and refers to the recommendations of WHO and EU. Thus, the recommendations are not the same from different authorities and health care workers have to decide by themselves if they should get vaccinated or not. At the same time many have insufficient knowledge on influenza vaccination and misconceptions are common. This is expressed in the written answers of the respondents by saying for example that it’s better to get influenza every seventh year and stay healthy in between, having a natural immunity because one had H1N1 in 2008, saying that there are many serotypes of influenza and there is only one in the shot and being convinced that their own immune response gets impaired by the vaccination.

As assumed in the hypothesis of the study, vaccinated health care workers had a significantly higher risk perception of influenza than unvaccinated. This has been demonstrated in several previous studies (4, 18, 30). The health care workers who understand the importance of the risk in connection with an influenza infection, and think there is a considerable risk of getting ill, are in general more prone to get vaccinated.

In the Multidimensional Locus of Control theory, individuals with a high degree of Internal Health Locus of Control are said to have capacities or skills like knowledge, possession of information and the motivation to influence their health (49). Vaccinated health care workers in this study had a lower Internal Locus of Control score than the unvaccinated. These results are in disagreement to what was hypothesized and also differ from results in a study on nurses from medical wards in England where the same questionnaire was used (56). In that study no difference in MLCH score between vaccinated and unvaccinated nurses was found. Individuals with a high degree of Internal Health Locus of Control are according to the theory supposed to be more confident that their behaviour influences their health. Therefore, in the current study it was assumed that those who got vaccinated did so because they believed that they could influence their health through vaccination. These results were surprising and one can only speculate on what the explanations might be. Emergency departments are challenging working places, it is therefore possible that the individuals who choose to work there are “tough” and believe that they easily can manage illness such as influenza. This is also reflected in the answers to the open ended questions where many of the vaccinated respondents said that they are healthy and others said that influenza vaccination is not necessary.

In a study published in 1971 (57) the relationship between influenza vaccination and “internal” locus of control in University students was investigated. The

authors found that those who had a higher score on their internal scale did not get vaccinated against seasonal influenza. They concluded that individuals who perceive that they are in greater control of their health have a feeling of non-vulnerability and a lack of concern. That seems to be a similar attribute to what many health care workers in the emergency departments have in the current study.

Another important factor that can influence unvaccinated health care workers is the use of standard precautions. Five percent of unvaccinated respondents claim that they use standard precautions in patient contact and that is the reason for not getting vaccinated. These individuals probably believe in the use of standard precautions and think that conventional hand hygiene, using facemasks and protective gowns are sufficient to protect them from getting infected.

Most of the respondents provided written answers to the open ended questions. These answers provide an additional understanding to the results in this study and give a deeper understanding of the various reasons behind the health care workers attitudes and the decisions of being vaccinated or not. The protection of family and colleagues was important to many of those who got vaccinated and this has also been found in previous studies on influenza vaccination of health care workers (3, 17, 55). However, the most important reason, mentioned by more than half of the vaccinated participants, was to protect themselves and thereby avoid getting sick which is in accordance with what has been found previously (17, 18)

Being healthy was a reason for not getting vaccinated in a quarter of the unvaccinated. Feeling healthy is probably an individual experience of being strong. By adding that statement into the Health Believe Model (Figure 3) one can see that the benefit of vaccination may not be perceived important enough and does therefore not lead to a preventive behaviour.

One fifth of the vaccinated health care workers mention working in health care and feeling exposed to influenza as a reason for getting vaccinated but only a few unvaccinated mentioned the same reason. Returning to the Health Belief Model (Figure 3), the *perceived susceptibility* of those who are vaccinated is greater than in those who didn't get vaccinated, an explanation that is supported by the results found by Shahrabani *et al.* (58). They used The Health Belief Model to study factors that influence nurse's decision of getting the influenza vaccination. Their results showed that perceived benefits from vaccination and cues to action affected the nurses' decision the most. Nurses who were vaccinated had higher perceived seriousness of the illness, higher perceived susceptibility and were more health prevention motivated than those who did not get the vaccine.

The Health Belief Model was also used in a Canadian study on vaccination behaviour and attitudes in health care workers (55). They found that those who received vaccination perceived a greater risk of becoming infected compared to

those who didn't. They also saw the benefits of vaccination and believed that the vaccine was safe. Vaccination rate was higher among health care workers who saw vaccination as important for their families and colleagues. This is in accordance with the results of the current study.

A greater portion of vaccinated health care workers than unvaccinated mentioned protection of patients as a reason for vaccination. This indicates that there is a difference in professional sense of responsibility between the vaccinated and unvaccinated. Various studies have published similar results regarding this issue. An Italian cross-sectional study with about 2000 participants from many different units in a University Hospital showed that around 20% of the health care workers got vaccinated. Of the vaccinated respondents, 36% stated that one of the reasons to get vaccinated was that they were afraid of transmitting influenza to their patients (59). Similar results were reported by Zhang *et al.* in their study on nurse's knowledge and attitudes on influenza vaccination in England. They found that 37% of the vaccinated nurses mentioned protection of patients as an important motive to get vaccinated, but only 19 % of unvaccinated (18). In a recent review on attitudes and knowledge on influenza it was found that self-protection was considered most important reason to get vaccinated (17) followed by protection of patients.

Half of all the respondents mention concerns about vaccine side effects and that they mistrust the safety and/or the effectiveness of the vaccine, figures that are in accordance with previous studies (3, 5, 30, 55). Two compatible studies to the current study, that also used questionnaires in investigating health care workers influenza vaccination knowledge and attitudes, demonstrated similar findings (56, 59). More than half of health care workers in these studies claim that they are concerned about side effects or safety of the vaccine. After the pandemic in 2009 with influenza A (H1N1)pdm 2009 (Swine flu) an increased incidence of narcolepsy in Sweden and Finland due to adjuvants in the Pandemrix® vaccine was reported (60). Reports of possible side effects of vaccines may cause concerns and side effects may be perceived as a greater threat than the illness itself. Subsequently, this can result in vaccination abstention and prevent health care workers from getting vaccinated against influenza.

Importance of the results for policy makers

According to the Swedish patient safety law (5 §, 2010:659) it is mandatory to protect patients from harm, physical or mental injury or illness and death, by taking adequate measures when they receive health care (61). Protecting patients from influenza infection in hospitals is a matter of patient safety and should be taken seriously. The Swedish National Board of Health and Welfare should consider recommending influenza vaccination to all health care workers. Such a

measure may prevent the spread of health care associated influenza infection and decrease morbidity and mortality of patients and health care workers. In addition, WHO and EU highlight this and recommend that all health care workers are vaccinated, so why don't we do that in Sweden?

To the author's knowledge, no study has previously been performed in Sweden on attitudes, knowledge and influenza vaccination practices in health care workers. This first study demonstrates a variety of misconceptions and knowledge deficits in health care workers in emergency departments. These results could help infection control professionals and public health planners to plan and implement education for health care workers about influenza and influenza vaccination. The results are also important for the chiefs of the emergency departments and higher chiefs at the Sahlgrenska University Hospital wards so that they can put more effort and emphasis on the health care workers influenza vaccination each year. Currently there is a disagreement between WHO and EU influenza vaccination recommendations and The Swedish National Board of Health and Welfare recommendations. First when that gap is closed it will be easier to point out the recommendations to health care workers and emphasize the importance of influenza vaccination.

Methodological considerations

Questionnaires are generally considered applicable for studies about facts and data but to a lesser degree for evaluation of attitudes and behaviour. In addition questionnaires are considered less reliable than individual interviews for instance because the participants cannot ask the researcher about the questions if they misunderstand them (53). However, this method was considered applicable because it has been used similarly in previous studies. The method is useful, in obtaining both descriptive data on health care workers influenza vaccination practices and information on knowledge and attitudes. This kind of information has previously been unavailable in Sweden. Attitudes and beliefs are more often studied by qualitative methods. A qualitative approach was therefore considered when the study was designed, but the current method was chosen because the author wished to perform a quantitative research study. Future research using a qualitative method in studying health care workers attitudes and beliefs in relation to influenza vaccination in Sweden are needed.

In the original English questionnaire, the age of the respondents was categorized. This was also done in the current study. To achieve a greater statistical power it would have been more appropriate to use the actual age of the participants. Then it would also have been possible to study more accurately trends or differences in vaccination coverage, knowledge scores or risk perception scores in relation to age.

Statistical power calculation is a tool that is frequently used in research to estimate how many subjects need to participate in a particular study to be able to demonstrate a hypothetical difference between two or more groups (47). When the current study was designed power calculations were not performed, instead the goal was to include as many participants as possible. In addition, power calculation wasn't considered necessary mainly because of the descriptive nature of this study. Preferably, power calculations should be performed during an early stage when a study is designed, both to avoid that too few subjects are included and thereby be able to answer the research question, *i.e.* to avoid type II error. Although not methodologically optimal, a power calculation was performed afterwards instead. By using knowledge score in vaccinated (77.2 ± 11.1) and unvaccinated (70.9 ± 11.4) nurses in the study by Zhang *et al.*(18), using a significance level of 5%, it was found that 20 participants were sufficient to achieve a statistical power above 80% in their study. By using the results from the current study, it would have been sufficient to include 35 individuals to achieve 80% power.

There are several biases that may have influenced the results of the study:

- Selection bias: The highest response rate (95%) was at the emergency department at The Sahlgrenska University Hospital. The health care workers there are the author's colleagues and were probably more willing to answer the questionnaire because of that. In addition, the author was able to remind the health care workers to complete the questionnaire.
- Non-response bias: Of distributed questionnaires, 51 (23%) weren't returned. It is a matter of speculation what characterizes the non-respondents. Perhaps they are less interested in influenza vaccination and maybe a larger proportion of the participants had been unvaccinated if everyone had returned their questionnaires. The questionnaires were distributed at the emergency departments when the respondents were working. How busy the shift was when the respondents received their questionnaire may have affected the possibility to answer it.
- Response set bias: *I.e.* the tendency of some individuals to answer all items the same way, for example always agreeing (53). This was seen in two answered questionnaires. Since the phenomenon was only seen in a small part of the answers these participants were however not excluded.

Validity and reliability of the study

Validity refers to the degree to which an instrument, *e.g.* questionnaire, measures what it is supposed to measure (53). Internal validity of an instrument is gained

when it has been satisfactorily tested repeatedly in the population for which it was designed (47). The English version of the questionnaire has been tested for internal validity and the results have been published (52). By translating the questionnaire to Swedish it may have lost some of the internal validity. A repeated testing of the questionnaire was not done in this study, both due to limited resources and because it was considered beyond the scope of this project. This is a limitation. Even though validity testing was not done, the author believes that the results are reliable and provides an important message. The low vaccination coverage that was demonstrated is also of clinical importance for patient safety.

External validity refers to the generalizability of research findings to a wider population of interest (53). In this research, health care workers in emergency wards participated. The results are to some extent generalizable to the wider population of emergency health care workers in Sweden but probably not to health care workers in hospitals in general. The personal characteristics of health care workers in emergency departments are probably often similar.

Reliability of a study is the reproducibility and consistency of the instrument used. This has been tested in England by the researchers who developed the questionnaire (52). By translating the questionnaire, there is a risk that it loses some of its reliability. Me, my supervisor, two researchers and several colleagues read and commented on the Swedish version of the questionnaire and after several adjustments it was considered satisfactory to use it.

A quantitative content analysis method was used for categorization of the respondent's written answers into themes. This process has its limitations. The categorization is subjective to the author and it would have been optimal to have two persons analysing the data into themes. The aim of having two investigators is to see if they both get the same results and as such ensuring the reliability of the research (47). That was not done in this study which limits how much inference can be drawn from the themes the written answers were divided into. The quotations chosen to represent The Health Belief Models different categories were chosen by the author and may shed a light on the authors view instead of being objectively chosen.

7. CONCLUSION

Influenza is a public health problem that can have considerable negative effects on the most vulnerable citizens in the community; the elderly, patients with chronic diseases and young children. These individuals frequently seek medical care and must be able to rely on a safe health care system.

This study demonstrates the need for improved knowledge about influenza and influenza vaccination. Increased risk perception of influenza, can increase health care workers influenza vaccination coverage at the emergency departments at

Sahlgrenska University Hospital and may reduce health care associated influenza and its negative consequences.

ACKNOWLEDGEMENTS

Finally, I would like to express my gratitude to all the people who have contributed to the enabling of this thesis. Great thanks to my supervisor Ingemar Qvarfordt, PhD, Nordic School of Public Health for his wise comments and great support during the process. Thanks to the chiefs at the three emergency departments for enabling the distribution of the questionnaire and helping collecting and informing the participants. I also want to thank all the participants for taking the time to answer the questionnaire. Thanks to the English researchers who were so kind to give the permission to use their questionnaire. Thanks to Oskar Ragnarsson, my husband for enlightening discussions, calming comments, words of encouragement and for teaching me to work with basic statistics. Thanks to my children Jóhanna Rut, Einar Atli and Ragnar Freyr for their love and great patience and my parents Rut and Atli for always being supportive and encouraging.

REFERENCES

1. Influenza 2009 [140130]. Available from: <http://www.who.int/mediacentre/factsheets/fs211/en/index.html>.
2. Vårdhygieniska riktlinjer för omhändertagande av patienter med misstänkt eller konstaterad influensa 2013 [140128]. Available from: http://www.sahlgrenska.se/upload/SU/omrade_medot/labmed/baktlab/infektionshygi-en/influensa.pdf
3. Hofmann F, Ferracin C, Marsh G, Dumas R. Influenza vaccination of healthcare workers: a literature review of attitudes and beliefs. *Infection*. 2006;34(3):142-7.
4. Zhang J, While AE, Norman IJ. Knowledge and attitudes regarding influenza vaccination among nurses: a research review. *Vaccine*. 2010;28(44):7207-14.
5. Music T. Protecting patients, protecting healthcare workers: a review of the role of influenza vaccination. *International nursing review*. 2012;59(2):161-7.
6. Sjukdomsinformation om influensa [140129]. Available from: <http://www.folkhalsomyndigheten.se/amnesomraden/smittskydd-och-sjukdomar/smittsamma-sjukdomar/influensa/>.
7. Seasonal Influenza. Questions and answers. 2013 [cited 140219]. Available from: <http://www.cdc.gov/flu/about/qa/disease.htm#immunity>.
8. Prevention and Control of Seasonal Influenza with Vaccines Recommendations of the Advisory Committee on Immunization Practices — United States, 2013–2014) 2013 [140128]. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6207a1.htm>.
9. Ortqvist A, Granath F, Askling J, Hedlund J. Influenza vaccination and mortality: prospective cohort study of the elderly in a large geographical area. *The European respiratory journal*. 2007;30(3):414-22.
10. Carrillo-Santistevé P, Ciancio BC, Nicoll A, Lopalco PL. The importance of influenza prevention for public health. *Human vaccines & immunotherapeutics*. 2012;8(1):89-95.
11. WHO/Europe recommendations on influenza vaccination during the 2013/2014 winter season. 2013 [140129]. Available from: http://www.euro.who.int/_data/assets/pdf_file/0009/217485/EURO_2013_2014-flu-vacc-rec-for-winter.pdf
12. Skyddseffekt av vaccination mot säsongsinfluensa [140130]. Available from: <http://www.folkhalsomyndigheten.se/amnesomraden/smittskydd-och-sjukdomar/vaccinationer/vacciner-a-o/influensa/skyddseffekt-av-vaccination-mot-sasongsinfluensa/>.
13. Influensavaksinasjon 2013 [140219]. Available from: http://www.fhi.no/eway/default.aspx?pid=239&trg=Content_6493&Main_6157=6287:0:25,5501&MainContent_6287=6493:0:25,6826&Content_6493=6441:68694::0:6446:10::0:0.
14. Seasonal influenza. [140128]. Available from: http://ecdc.europa.eu/en/healthtopics/seasonal_influenza/basic_facts/Pages/factsheet_professionals_seasonal_influenza.aspx.

15. Simeonsson K, Summers-Bean C, Connolly A. Influenza vaccination of healthcare workers: institutional strategies for improving rates. *North Carolina medical journal*. 2004;65(6):323-9.
16. Attack rate 2013 [140411]. Available from: <http://medical-dictionary.thefreedictionary.com/attack+rate>.
17. Hollmeyer HG, Hayden F, Poland G, Buchholz U. Influenza vaccination of health care workers in hospitals--a review of studies on attitudes and predictors. *Vaccine*. 2009;27(30):3935-44.
18. Zhang J, While AE, Norman IJ. Seasonal influenza vaccination knowledge, risk perception, health beliefs and vaccination behaviours of nurses. *Epidemiology and infection*. 2012;140(9):1569-77.
19. Mereckiene J, Cotter S, D'Ancona F, Giambi C, Nicoll A, Levy-Bruhl D, et al. Differences in national influenza vaccination policies across the European Union, Norway and Iceland 2008-2009. *Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin*. 2010;15(44).
20. Influenzarapport för vecka 7, 2014 2014 [140311]. Available from: <http://www.folkhalsomyndigheten.se/documents/statistik-uppfoljning/smittsamma-sjukdomar/Veckorapporter-influensa/2014/veckorapport-influensa-v7-2014.pdf>.
21. Influenza Vaccination Coverage Among Health-Care Personnel — United States, 2012–13 Influenza Season: CDC; 2013 [140403]. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6238a2.htm>.
22. Rothan-Tondeur M, de Wazieres B, Lejeune B, Gavazzi G, Observatoire pour le Risque Infectieux en Geriatrie A. Influenza vaccine coverage for healthcare workers in geriatric settings in France. *Aging clinical and experimental research*. 2006;18(6):512-6.
23. Wicker S, Rabenau HF, Doerr HW, Allwinn R. Influenza vaccination compliance among health care workers in a German university hospital. *Infection*. 2009;37(3):197-202.
24. Immunization of Health-Care Personnel. Recommendations of the Advisory Committee on Immunization Practices (ACIP) 2011 [140203]. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm?s_cid=rr6007a1_w.
25. Thomas RE, Jefferson T, Demicheli V, Rivetti D. Influenza vaccination for healthcare workers who work with the elderly. *The Cochrane database of systematic reviews*. 2006(3):CD005187.
26. Thomas RE, Jefferson TO, Demicheli V, Rivetti D. Influenza vaccination for health-care workers who work with elderly people in institutions: a systematic review. *The Lancet infectious diseases*. 2006;6(5):273-9.
27. Ahmed F, Lindley MC, Allred N, Weinbaum CM, Grohskopf L. Effect of influenza vaccination of healthcare personnel on morbidity and mortality among patients: systematic review and grading of evidence. *Clinical infectious diseases : an official publication of the Infectious Diseases Society of America*. 2014;58(1):50-7.
28. Saxen H, Virtanen M. Randomized, placebo-controlled double blind study on the efficacy of influenza immunization on absenteeism of health care workers. *The Pediatric infectious disease journal*. 1999;18(9):779-83.

29. Mytton OT, O'Moore EM, Sparkes T, Baxi R, Abid M. Knowledge, attitudes and beliefs of health care workers towards influenza vaccination. *Occupational medicine*. 2013;63(3):189-95.
30. Riphagen-Dalhuisen J, Gefenaité G, Hak E. Predictors of seasonal influenza vaccination among healthcare workers in hospitals: a descriptive meta-analysis. *Occupational and environmental medicine*. 2012;69(4):230-5.
31. Nicoll A, Ciancio BC, Lopez Chavarrias V, Molbak K, Pebody R, Pedzinski B, et al. Influenza-related deaths--available methods for estimating numbers and detecting patterns for seasonal and pandemic influenza in Europe. *Euro surveillance : bulletin Européen sur les maladies transmissibles = European communicable disease bulletin*. 2012;17(18).
32. Fler vaccinerar sig mot influensa 2013 [140305]. Available from: <http://www.folkhalsomyndigheten.se/nyheter-och-press/nyhetsarkiv/2013/december/fler-vaccinerar-sig-mot-influensa/>.
33. Influenzarapport för vecka 15-16, 2014: Folkhälsomyndigheten; 2014 [140328]. Available from: <http://www.folkhalsomyndigheten.se/amnesomraden/statistik-och-undersokningar/sjukdomsstatistik/influensa-veckorapporter/aktuell-influenzarapport/>.
34. Riskgrupper för årlig influensa 2013 [140201]. Available from: <http://www.socialstyrelsen.se/smittskydd/sjukdomar/influensa/riskgrupper>.
35. Personer med särskild risk i samband med influenzasmitte 2013 [140219]. Available from: <http://www.ssi.dk/Vaccination/Risikogrupper/Personer%20med%20sarslig%20risiko%20i%20samband%20med%20influenzasmitte.aspx>.
36. Bóluefni 2013 [140218]. Available from: <http://www.landlaeknir.is/influensa/adrir-vefir-um-influensu/frettir/frett/item21050/Boluefni-gegn-arlegri-influensu-er-nu-tilbuid-til-afhendingar>
37. Stoppa influensan. 2013 [140219]. Available from: <http://www.folkhalsomyndigheten.se/pagefiles/12693/R2011-26-Skydd-mot-smittspridning-Kunskapsunderlag-for-FHPR-2010.pdf>.
38. Skydd mot smittspridning. Kunskapsunderlag för folkhälsopolitisk rapport 2010 2010 [140219]. Available from: <http://www.folkhalsomyndigheten.se/pagefiles/12693/R2011-26-Skydd-mot-smittspridning-Kunskapsunderlag-for-FHPR-2010.pdf>.
39. Global action plan for influenza vaccines 2006 [140227]. Available from: http://www.who.int/influenza_vaccines_plan/en/.
40. EU Council Recommendation of 22 December 2009 on seasonal influenza vaccination 2009 [140305]. Available from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009H1019:EN:HTML>.
41. Ryan J, Zoellner Y, Gradl B, Palache B, Medema J. Establishing the health and economic impact of influenza vaccination within the European Union 25 countries. *Vaccine*. 2006;24(47-48):6812-22.
42. Vaccination 2011 [140306]. Available from: <http://www.socialstyrelsen.se/smittskydd/vaccination>.
43. Knowledge 2014 [140324]. Available from: <http://www.learnersdictionary.com/definition/knowledge>.

44. Naidoo J., Wills J. Foundations for Health Promotion. 3 ed. ed. London: Baillière Tindall Elsevier; 2009.
45. Ogden J. Health Psychology. A text book. 5 th. ed ed: Open University Press; 2012.
46. Attribution 2013 [140408]. Available from: [http://pediaview.com/openpedia/Attribution_\(psychology\)](http://pediaview.com/openpedia/Attribution_(psychology)).
47. Bowling A. Research methods in health:investigating health and health services. 2. ed. ed: Open University Press; 2002.
48. Julian R. Generalized Expectancies for internal versus external control of reinforcement. Psychological Monographs: General and Applied. 1966;80(1).
49. Kenneth A. Wallston. Multidimensional Health Locus of Control (MHLC) Scales 2007 [140225]. Available from: <http://www.nursing.vanderbilt.edu/faculty/kwallston/mhlcscscales.htm>.
50. Wallston KA, Wallston BS, DeVellis R. Development of the Multidimensional Health Locus of Control (MHLC) Scales. Health education monographs. 1978;6(2):160-70.
51. The Health Believe Model 2013 [140412]. Available from: <http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/SB721-Models/SB721-Models2.html>.
52. Zhang J, While AE, Norman IJ. Development and testing of an instrument to assess nurses' knowledge, risk perception, health beliefs and behaviours related to influenza vaccination. Journal of clinical nursing. 2012;21(17-18):2636-46.
53. Polit D, Hungler B. Essentials of Nursing research. 4 th. ed. New York: Lippincott; 1997.
54. Personuppgifter i forskningen– vilka regler gäller? : SCB; 2013 [140331]. Available from: <http://www.epn.se/media/63764/faktabroschyr-pul-forskning.pdf>.
55. Corace K, Prematunge C, McCarthy A, Nair RC, Roth V, Hayes T, et al. Predicting influenza vaccination uptake among health care workers: what are the key motivators? American journal of infection control. 2013;41(8):679-84.
56. Zhang J, While AE, Norman IJ. Nurses' vaccination against pandemic H1N1 influenza and their knowledge and other factors. Vaccine. 2012;30(32):4813-9.
57. Dabbs JK, J. "Internal control" and the taking of Influenza shots. Psychological Reports. 1971;28:959-62.
58. Shahrabani S, Benzion U, Yom Din G. Factors affecting nurses' decision to get the flu vaccine. The European journal of health economics : HEPAC : health economics in prevention and care. 2009;10(2):227-31.
59. Esposito S, Bosis S, Pelucchi C, Tremolati E, Sabatini C, Semino M, et al. Influenza vaccination among healthcare workers in a multidisciplinary University hospital in Italy. BMC public health. 2008;8:422.
60. Vaccinationskampanjen mot influensa A(H1N1) 2009 2011 [20140404]. Available from: <http://www.folkhalsomyndigheten.se/pagefiles/12869/vaccinationskampanjen-influensa-a-h1n1-2009.pdf>.

61. Patientsäkerhetslag (2010:659) 2010 [140128]. Available from:
http://www.riksdagen.se/sv/Dokument-Lagar/Lagar/Svenskforfattningssamling/Patientsakerhetslag-2010659_sfs-2010-659/.

Appendices

The English version of the questionnaire

Knowledge, Attitudes, Risk Perception of Influenza and Influenza Vaccination and the Relationship to Practice of Vaccination: Perspective among Nurses and Pharmacists

Please complete this questionnaire by ticking the box that best represents your answer.

If you feel that any of the questions are inappropriate, please do not feel that you have to answer them. If, after completing these questions, you want to add some more information, then please use the space provided on the back page. All information will remain confidential to the research team.

Please return this questionnaire to the following address using the enclosed prepaid envelope:

Jing Zhang c/o Professor Alison While
Florence Nightingale School of Nursing and Midwifery
King's College London
James Clerk Maxwell Building
57 Waterloo Road
London SE1 8WA.

☐ **I do not wish to complete this questionnaire, and am returning it to you uncompleted.**

Section A: Knowledge about Influenza and Influenza Vaccination

The following statements are about your understanding of influenza and influenza vaccination. **Please tick the box which best describes your views.**

1. Which of the following statements relating to Seasonal Influenza are true or false?

		True	False	Unsure
(1)	Seasonal influenza is an acute viral infection.			
(2)	Influenza circulates worldwide and can affect anybody in any age group.			
(3)	Seasonal influenza does not spread easily from person to person.			
(4)	Influenza causes annual epidemics that peak during winter.			
(5)	Influenza is not a serious public health problem.			
(6)	An epidemic can have an economic impact through lost workforce productivity, and strain upon health services.			
(7)	Influenza is never a serious disease.			
(8)	The most effective way to prevent influenza and its complications is vaccination.			
(9)	Vaccinations give some people influenza.			
(10)	Seasonal influenza vaccines are unsafe.			
(11)	Vaccination may have serious adverse effects.			
(12)	Seasonal influenza vaccine may cause Guillain-barré Syndrome (GBS).			
(13)	Groups at highest risk of complications of seasonal influenza are:			
	a. children younger than 2 years;			
	b. adults aged 65 or older;			
	c. people of any age with certain medical conditions.			

		Recommended	Not Recommended	Unsure
(14)	Which groups are recommended to have the annual seasonal influenza vaccination?			
	a. nursing-home residents;			
	b. elderly individuals living at home;			
	c. people with chronic medical conditions;			
	d. pregnant women;			
	e. health care workers (HCWs);			
	f. others with essential functions in society;			
	g. children aged six months to 2 years.			

2. Which of the following statements relating to Influenza A (H1N1) are true or false?

		True	False	Unsure
(15)	H1N1 virus is not related to previous or current human seasonal influenza viruses.			
(16)	Most people have immunity to H1N1 virus.			
(17)	H1N1 is spreading fast particularly among young people.			
(18)	Most people who contract the H1N1 virus experience a mild illness and recover at home.			
(19)	H1N1 can result in severe illnesses and death.			
(20)	Current seasonal influenza vaccines offer protection against H1N1 infection.			
(21)	H1N1 vaccines protect against the seasonal influenza.			
(22)	H1N1 vaccines are unsafe.			

Section B: Perception of the Risk of Influenza and Pandemics

The following questions are about the extent to which you agree or disagree with a series of statements. **Please tick the box which best describes your views.**

3. To what extent do you agree or disagree with the following statements?

		Strongly Agree	Agree	Disagree	Strongly Disagree	Undecided
(1)	Without seasonal influenza vaccination, I am sure I will get the influenza this year.					
(2)	If I do not get H1N1 vaccination this year, I think I am very likely to get this influenza this year.					
(3)	I get sick more easily than other people of my age.					
(4)	I get influenza easily.					
(5)	Seasonal influenza never causes death.					
(6)	Influenza A (H1N1) can cause death.					
(7)	If I had seasonal influenza, I would have to stay in bed.					
(8)	If I had seasonal influenza, I would be on sick leave.					
(9)	If I had seasonal influenza, I would pass it on to my family.					
(10)	If I had seasonal influenza, I would pass it on to my patients.					
(11)	If I had H1N1, I would have a severe illness.					
(12)	If I had H1N1 I might die.					

Section C: Views on Health Locus of Control The following questions are about the extent to which you agree or disagree with a series of statements. Each item below is a belief statement about your medical condition with which you may agree or disagree. This is a measure of your personal beliefs; obviously, there are no right or wrong answers. **Please tick the box which best describes your views.**

4. To what extent do you agree or disagree with the following statements?

		Strongly agree	Moderately agree	Slightly agree	Slightly disagree	Moderately disagree	Strongly disagree
(1)	If I get sick, it is my own behavior which determines how soon I get well again.						
(2)	No matter what I do, if I am going to get sick, I will get sick.						
(3)	Having regular contact with my doctor is the best way for me to avoid illness.						
(4)	Most things that affect my health happen to me by accident.						
(5)	Whenever I don't feel well, I should consult a medically trained professional.						
(6)	I am in control of my health.						
(7)	My family has a lot to do with my becoming sick or staying healthy.						
(8)	When I get sick, I am to blame.						
(9)	Luck plays a big part in determining how soon I will recover from an illness.						
(10)	Health professionals control my health.						
(11)	My good health is largely a matter of good fortune.						
(12)	The main thing which affects my health is what I do myself.						
(13)	If I take care of myself, I can avoid illness.						
(14)	Whenever I recover from an illness, it's usually because other people (for example, doctors, nurses, family, and friends) have been taking good care of me.						
(15)	No matter what I do, I'm likely to get sick.						
(16)	If it's meant to be, I will stay healthy.						
(17)	If I take the right actions, I can stay healthy.						
(18)	Regarding my health, I can only do what my doctor tells me to do.						

* Wallston K.A. et al (1978).

Section D: Practices regarding Influenza Vaccination

The following questions are about your practice regarding influenza vaccination with a series of statements. **Please tick the box which best describes your views.**

		Seasonal influenza	Influenza A (H1N1)
5.	Have you been vaccinated in the last 12 months?	☐ Yes ☐ No	☐ Yes ☐ No
6.	Have you ever recommend vaccination to any of your patients in the past?	☐ Yes ☐ No	☐ Yes ☐ No
7.	Do you intend to receive vaccination in 2010?	☐ Yes ☐ No ☐ Unsure	☐ Yes ☐ No ☐ Unsure
8.	Will you recommend vaccination to your patients in the future?	☐ Yes ☐ No ☐ Unsure	☐ Yes ☐ No ☐ Unsure
9.	How many times have you been vaccinated against seasonal influenza in the last 5 years?	_____ times	Not applicable

Section E: Factors about Vaccination Practices

10. Please give 3 reasons why you might have the vaccination.

For

a.
b.
c.

11. Please give 3 reasons why you might not have the vaccination.

Against

a.
b.
c.

Section F: About Yourself

12. What is your gender?

☐ Male

☐ Female

13. What is your age?

☐ 20-29 yrs

☐ 30-39 yrs

☐ 40-49 yrs

☐ 50-59 yrs

☐ 60

yrs or older

14. Please state the full name of the module you are taking:

15. What is your highest educational qualification?

☐ DipHE

☐ Bachelor Degree

☐ PGDip

☐ Masters

☐ Others (please specify:

)

16. Where is your place of work?

☐ Hospital

☐ Community

17. What is your speciality?

☐ Medicine

☐ Mental Health

☐ Surgery

☐ Older people

☐ Paediatrics

☐ Maternity

☐ Primary care

☐ Ambulatory care

18. When did you qualify?

_____ Year

19. Is more than 10% of your time on the job spent in direct patient contact?

☐ Yes

☐ No

20. I consent to the processing of my personal information for the purpose explained to me. I understand that such information will be handled in accordance with the terms of the Data Protection Act (1998).

☐ Yes

Is there anything else you would like to say about seasonal influenza or influenza A (H1N1/swine flu)?

Thank you very much for your help in completing this questionnaire.

For more information about this research, please contact:
Jing Zhang c/o Professor Alison While, Florence Nightingale School of Nursing and Midwifery, King's College London, James Clerk Maxwell Building, 57 Waterloo Road, London, SE1 8WA. alison.while@kcl.ac.uk

The Swedish version of the questionnaire.

Attityder till och kunskap om influensa-vaccination hos sjukvårdspersonal på Sahlgrenska Universitetssjukhusets akutmottagningar i Göteborg

Den här enkäten är en del av en mastersuppsats i folkhälsovetenskap vid Nordic School of Public Health NHV. Syftet med undersökningen är att få ökad förståelse om attityder till och kunskap om influensa och influensavaccination hos sjukvårdspersonal på akutmottagningar.

**Vänligen fyll i enkäten genom att kryssa i rutan
som bäst beskriver ditt svar!**

Om du vill lägga till någonting när du har svarat på frågorna kan du göra det på den tomma sidan längst bak. Enkäten är anonym och alla svar kommer att behandlas konfidentiellt.

Tack för din medverkan!

Osk Atladottir

Del A: Kunskap om influensa och influensavaccination Följande påståenden handlar om din kunskap om influensa och influensavaccination. Kryssa i den ruta som bäst beskriver din åsikt. 1) Vilka av följande påståenden om säsongsinfluensa är rätta eller fel?

		Rätt	Fel	Osäker
1)	Säsongsinfluensa är en akut virusinfektion.			
2)	Influensa sprids över hela världen och kan drabba vem som helst i vilken ålder som helst.			
3)	Säsongsinfluensa sprider sig inte lätt från person till person.			
4)	Influensa orsakar årliga epidemier som når toppen under vintern.			
5)	Influensa är inte ett allvarligt folkhälsoproblem.			
6)	En epidemi kan få ekonomiska konsekvenser genom ökad sjukfrånvaro och ökad belastning på hälso- och sjukvården.			
7)	Influensa är aldrig en allvarlig sjukdom.			
8)	Det mest effektiva sättet att undvika influensa och dess komplikationer är vaccination.			
9)	Vaccination orsakar influensa hos en del människor.			
10)	Säsongsinfluensavacciner är inte säkra.			
11)	Vaccination kan medföra allvarliga biverkningar.			
12)	Säsongsinfluensa vaccination kan orsaka Guillain-Barrés syndrom.			
13)	De grupper som löper störst risk för komplikationer vid influensa är:			
a.	barn yngre än 2 år.			
b.	personer äldre än 65 år.			
c.	personer med vissa sjukdomar oavsett ålder			

14)	Vilka grupper rekommenderas ta säsongsinfluensavaccination årligen?			
		Rekommenderas	Rekommenderas inte	Osäker
	a. Personer som bor på äldreboende;			
	b. Personer över 65 års ålder;			
	c. Personer med kroniska sjukdomar;			
	d. Gravida kvinnor;			
	e. Sjukvårdspersonal;			
	f. Andra personer som har en viktig funktion i samhället;			

2) Vilka av följande påståenden om influensa A (H1N1- Svininfluensa) är rätta eller fel?

		Rätt	Fel	Osäker
15)	H1N1 viruset är inte kopplat till tidigare eller nuvarande säsongsinfluensa virus hos människor.			
16)	De flesta människor är immuna mot H1N1 viruset.			
17)	H1N1 sprider sig snabbt, speciellt bland unga personer.			
18)	De flesta som smittas av H1N1 viruset blir lindrigt sjuka och tillfrisknar i hemmet.			
19)	H1N1 infektion kan orsaka en allvarlig sjukdom och dödsfall.			
20)	Årets influensavaccination innehåller skydd mot H1N1 infektion.			

Del B: Uppfattning om risken för influensa och pandemier

Följande frågor handlar om i vilken utsträckning du håller med eller inte håller med om en rad påståenden. **Kryssa i rutan som bäst beskriver din åsikt.**

3) I vilken grad håller du med eller håller inte med om följande påståenden?

		Håller med helt	Håller med	Håller inte med	Håller inte alls med	Osäker
1)	Utan säsongsinfluensa vaccination är jag säker på att jag kommer att få influensa i år.					
2)	Om jag inte tar H1N1 (Svininfluensa) vaccination i år, så är det mycket troligt att jag får den influensan i år.					
3)	Jag blir lättare sjuk än andra i min ålder.					
4)	Jag får lätt influensa.					
5)	Säsongsinfluensa orsakar aldrig dödsfall.					
6)	Influensa A (H1N1- Svininfluensa) kan orsaka dödsfall.					
7)	Om jag fick säsongsinfluensa, skulle jag bli sängliggande.					
8)	Om jag fick säsongsinfluensa, skulle jag vara sjukskriven.					
9)	Om jag fick säsongsinfluensa, skulle jag smitta min familj.					
10)	Om jag fick säsongsinfluensa, skulle jag smitta mina patienter.					
11)	Om jag fick H1N1 (Svininfluensa) skulle jag bli allvarligt sjuk.					
12)	Om jag fick H1N1 (Svininfl.) skulle jag kunna dö.					

Del C: Syn på hälsans " locus of control"

Följande frågor handlar om i vilken utsträckning du håller med eller inte håller med om en rad påståenden angående din uppfattning av ditt hälsotillstånd. Detta är ett mått på dina personliga åsikter, uppenbarligen finns inga rätta eller felaktiga svar. **Kryssa i den ruta som bäst beskriver din åsikt.**

4) I vilken utsträckning håller du med eller inte med om följande påståenden?

		Håller helt med	Håller delvis med	Håller med något	Håller inte med något	Håller delvis inte med	Håller inte alls med
1)	Om jag blir sjuk, är det mitt eget beteende som bestämmer hur fort jag tillfrisknar.						
2)	Om det är meningen att jag ska bli sjuk så blir jag det.						
3)	Regelbunden kontakt med min läkare är det bästa sättet för mig att undvika ohälsa.						
4)	Det mesta som påverkar min hälsa händer av en slump.						
5)	När jag inte mår bra bör jag rådfråga utbildad sjukvårdspersonal.						
6)	Jag har själv kontroll över min hälsa.						
7)	Min familj har mycket att göra med om jag blir sjuk eller håller mig frisk.						
8)	Jag har mig själv att skylla när jag blir sjuk.						
	Slumpen spelar en stor roll för hur snabbt						

9)	jag tillfrisknar från en sjukdom.						
10)	Sjukvårdspersonal styr över min hälsa.						
11)	Min goda hälsa är till en stor del fråga om tur.						
12)	Det som påverkar min hälsa mest är vad jag själv gör.						
13)	Om jag tar hand om mig själv jag kan undvika sjukdom.						
14)	När jag tillfrisknar från en sjukdom är det oftast pga. att andra människor (till exempel läkare, sjuksköterskor, familj och vänner) har tagit väl hand om mig.						
15)	Vad jag än gör, så blir jag förmodligen sjuk.						
16)	Om det är meningen att jag skall vara frisk så blir det så.						
17)	Om jag vidtar rätt åtgärder så kan jag hålla mig frisk.						
18)	När det gäller min hälsa, kan jag bara följa min läkares råd.						

Del D: Vanor gällande säsongsinfluensavaccination

Följande frågor handlar om dina vanor gällande influensavaccination.

Kryssa i den ruta som bäst beskriver din åsikt.

5)	Har du blivit vaccinerad de senaste 12 månaderna?	☐ Ja ☐ Nej
6)	Har du någonsin rekommenderat vaccination till någon av dina patienter?	☐ Ja ☐ Nej
7)	Tänker du vaccinera dig i år, 2014?	☐ Ja ☐ Nej ☐ Osäker
8)	Kommer du att rekommendera vaccination till dina patienter i framtiden?	☐ Ja ☐ Nej ☐ Osäker
9)	Hur många gånger har du vaccinerat dig mot säsongsinfluensa de senaste 5 åren?	_____ gånger

Del E: Angående vaccinationsvanor

10. Vänligen ge tre skäl till varför du inte vill vaccinera dig.

11. Vänligen ge tre skäl till varför du vill vaccinera dig.

För	Emot
a.	a.
b.	b.
c.	c.

Del F: Information om dig själv

12. Kön

☐ Man ☐ Kvinna

13. Ålder

☐ 20-29 år ☐ 30-39 år ☐ 40-49 år ☐ 50-59 år ☐ 60+år

14. Högsta utbildningsnivå

☐ Gymnasium ☐ Högskola /Universitet ☐ Högre akademisk utbildning

15. Yrkeskategori

☐ Sjuksköterska ☐ Undersköterska ☐ Läkare

16. Hur många år har du arbetat i vården? _____ År

17. Jobbar du mer än 10 % i patientnära arbete? Ja ☐ Nej ☐

18. Är det något annat som du vill säga om säsongsinfluensa eller influensa A (H1N1- Svininfluensa)?

Tack så mycket för ditt deltagande i denna undersökning!

För mer information eller frågor vänligen kontakta:

Osk Atladottir, sjuksköterska.

**Akut- och olycksfallsmottagningen Sahlgrenska - Sahlgrenska
Universitetssjukhuset Gröna stråket 4, 413 45 Göteborg.**

**MPH (Master of Public Health) student vid Nordic School of Public Health
NHV.**

E-post oskrebekka@hotmail.com

Tel: 0736378573

Handledare Ingemar Qvarfordt, Med. Dr., överläkare, högskolelektor.

