Does the unemployment rate influence influenza immunization rates in Canada?

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Major Paper present to the
Department of Economics of the University of Ottawa
In partial fulfillment of the requirement of the M.A. Degree
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ECO 6999

Ottawa, Ontario
August 2015

Abstract

Influenza is a common, and sometimes dangerous, respiratory illness that affects Canada and the rest of the world. The best preventative measure for influenza is an annual influenza vaccination. Understanding what factors affect an individual's decision to get an influenza immunization is critical for the development and execution of public health policy. Using data from the Canadian Community Health Survey (CCHS) linked with employment data from CANSIM, this study investigates how the unemployment rate, as well as other socioeconomic and health determinants, affects an individual's decision to get an annual influenza immunization. Temporary worsening of economic conditions (as proxied for by higher unemployment rates) has been shown to lead to better health and better health related behaviors, including for example, more sleep, more exercise and less smoking. In contrast, this study finds that the average change in unemployment rate associated with a recession ***decreases*** the likelihood a prime working age individual will get an influenza immunization by 7 percentage points. This might suggest that the opportunity cost of being sick, may outweigh the time cost of getting the immunization for an employed individual. As expected, higher levels of education, income and lower self-perceived health status increase the likelihood that an individual will get an influenza immunization.

Introduction:

Seasonal Influenza, commonly known as the flu, is a contagious respiratory illness that affects Canadians annually from November to April (Health Canada 2014). For some, the flu is a mild illness that results in absences from regular daily activities such as work. However, for those at high risk, seasonal influenza can result in hospitalization and death (CDC 2014). Serious complications from the flu, such as bronchitis and pneumonia, are most commonly seen in young children, the elderly and those with health conditions such as asthma, heart disease and weakened immune systems. Each year in Canada, complications from the flu result in approximately 20,000 hospital admissions and upwards of 3,000 deaths (Polisena et al., 2012).

The Canadian National Advisory Committee on Immunization states that the best preventative measure to reduce the likelihood of flu is the annual vaccine (Kwong et al, 2007). Immunization programs are developed independently by each provincial government and therefore differ across the provinces and territories, as shown in Table 1. In 2014, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, Yukon, Northwest Territories and Nunavut all offered free flu vaccines to all residents six months and older.[1] The other provinces, British Columbia, Quebec and New Brunswick, only offer free influenza vaccinations for high-risk individuals; who are chronically ill, elderly, pregnant, or those in close contact

[1] Public Funding for Influenza Vaccination by Province/Territory as of March 2015. Public Health Agency of Canada, 2015
http://www.phac-aspc.gc.ca/im/ptimprog-progimpt/fluvacc-eng.php#t1fn2
(accessed: 05/07/15)

with high-risk individuals. Low risk individuals can acquire a flu vaccine in these three provinces for a fee.[2]

It has been suggested that the efficacy rate of a flu immunization in healthy adults is around 80 percent, but efficacy has been shown to decrease for high-risk individuals to approximately 60 percent (Jefferson et al., 2010). From this, it can be inferred that higher immunization rates for healthy adults can increase herd immunity (Ward, 2014).[3]

One of the key challenges when measuring the efficacy of the annual flu immunization is that the strain of the influenza virus changes each year due to antigenic drift (Ward, 2014).[4] Due to the annual variation in the influenza virus, every year in the early spring the immunization cocktail is restructured based on information from the World Health Organization. Therefore once the immunization is made, efficacy of the shot depends on whether the developed cocktail matches well with the strains that end up circulating that year. Jefferson et al. (2007) did a systematic review that suggests that immunization efficacy was lower in lower match years, compared to immunizations in higher match years.

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[2] For low risk individuals the influenza immunization costs approximately $20-30 in British Columbia, Quebec and New Brunswick. http://www.immunizebc.ca/ask-us/questions/how-much-does-shot-cost-if-you-dont-qualify-free-shot (accessed 05/07/15)

[3] The medical definition of herd immunity is a reduction in the probability of infection that is held to apply susceptible members of a population in which a significant proportion of individuals are immune because the change of coming in contact with an infected individual is low. Merriam-Webster, Medical Dictionary Accessed from: http://www.merriam-webster.com/medical/herd%20immunity

[4] Antigenic drift is a mechanism for variation by viruses that involves the accumulation of mutations within the antibody-binding sites so that the resulting viruses cannot be well inhibited by antibodies against previous viral strains. Accessed from: http://www.flu.gov/about_the_flu/virus_changes/ (Accessed 30/07/15)

In Canada, the Public Health Agency of Canada (PHAC) records the statistics regarding influenza immunization rates. The estimated vaccine coverage among adults from 2001 to 2012 can be found in Table 2.[5] In 2012, 37.2% of the general public reported getting the seasonal influenza vaccine, an increase from the 2001 level of 32.7%. As expected, the take up rate of the influenza vaccine in the elderly population is much higher than the general population at a coverage estimate of 64.9% in 2012. The decrease in coverage in 2010 to 28.1% is somewhat misleading. This result is due the H1N1 influenza pandemic that broke out that year. H1N1 was a strain of the influenza virus that was not included in the 2010 flu shot cocktail, so a separate immunization was created. In many cases, individuals were seen to forgo the ineffective influenza vaccine for the H1N1 specific vaccine. While we can see immunization coverage generally increasing with time, coverage is still well below national target levels of 80% for high-risk individuals. Consequently, in the interest of public health, policy makers should understand what factors effect an individual's decision to receive the annual flu vaccine.

An individual's decision to get an annual flu shot is an example of the demand for preventative health care under uncertainty. An individual does not know whether they will get the flu, and if they do how severe it will be (Mullahy, 1999). Furthermore, if an individual does get the flu shot, they do not know how effective the shot will be. Therefore, an individual must decide whether to get immunized based on their expected utility of getting the flu shot versus their

[5] http://www.phac-aspc.gc.ca/im/nics-enva/vcac-cvac-eng.php (accessed 03/07/15)

expected utility of forgoing the shot. For many healthy individuals, a part of one's utility from the flu shot is the fact that they are contributing to herd immunity.

Understanding what factors influence an individual's decision to get a flu shot is critical for the development and execution of an effective influenza immunization program. Determinants of getting a flu shot can be divided into health related factors, such as having a regular medical doctor or smoking (Yoo and Frick, 2005), socioeconomic factors (Enrich et al., 2009), and micro and macroeconomic factors (Mullahy, 1999). While this paper will touch upon all these factors, the main focus will be on the relationship between the unemployment rate and flu vaccination. This paper ties together two strands of literature, one looking at the determinants of flu vaccination and the literature looking at the relationship between economic conditions and health behaviors.

The importance of economic conditions to health and health related behaviors has received much recent attention. Ruhm (2000) shows that total mortality rate and the unemployment rate are counter-cyclical. One explanation provided for this relationship is opportunity cost of time: when economic conditions are favourable, time intensive health enhancing behaviours become more costly. This hypothesis is tested in Ruhm (2005), where it is shown that increased unemployment rates lead to more leisure-time health activities such as exercise, less drinking and less smoking. The present study contributes to Ruhm's work as it furthers the investigation of how the cyclicality of macroeconomic conditions can affect health behaviors, such as getting an annual flu shot.

While no one to date has examined the cyclicality of flu vaccination, a few papers have investigated the relationship between certain aspects of labour market participation and flu vaccination. Schmitz and Wübker (2011), hypothesize that employment status could influence an individual's decision to get a flu immunization in to two opposing ways. First, an employed individual might place a higher value on leisure time, and therefore they might not want to spend the time getting the immunization. This would suggest that an increase in the unemployment rate might increase vaccination rates.

Second, is an employed individual's time while working is too valuable to risk losing time, and salary while being ill with the flu. This would suggest that an increase in unemployment rate might decrease vaccination rates.

Evidence for these types of relationships has been found in the data. Carman and Mosca (2014) show that the main cause of lower flu immunization rates is labour force participation using data from the Netherlands. Using American data Mullahy (1999) shows that higher involvement in the labour market was associated with a greater likelihood of flu vaccination. Thus a priori, it is unclear what the relationship between unemployment rates and flu vaccination might be.

Using data from CCHS linked with labour data from CANSIM this study finds that a 5 percentage point increase in unemployment rate, a characteristic increase during a recessionary period, decreases the likelihood of getting a flu shot by 2.3 percentage points for the main specification of individuals 15 years of age and older. When restricting the sample to those that make up most of the

working population, individuals 30-59 years of age, a 5 percentage point increase in the unemployment rate leads to a 7 percentage point decrease in the likelihood an individual will get a flu immunization. These results are consistent with the findings of Mullahy (1999) that when unemployment rate decreases, the opportunity costs of getting the flu is high and therefore individuals are more likely to invest in the flu immunization.

This research contributes to the existing literature in the following ways. My research presents evidence that the unemployment rate and vaccination rates move in opposite directions in Canada. This finding is in opposition of Ruhm (2000, 2005) that show that time intensive by health enhancing behaviors are forgone in good times but improve during economic downturns. This information could assist policy decisions and potentially aid the development of vaccination programs that target their efforts towards particular groups in the Canadian population.

This major research paper will develop as follows. The first section will present a review of literature that studies how socioeconomic, health behaviors and economic conditions affect the propensity to get a flu immunization. The second section will provide a description of the econometric model used in this paper. The third section will describe the data set, including the independent and dependent variables. The fourth section will discuss the estimations results and finally section five will detail the main findings and limitations of this paper.

1. **Literature Review:**

1.1 Socioeconomic Determinants of Flu Vaccination:

In this section I review the literature that discusses the determinants for the demand of preventative care. Where available, I also include evidence as it relates to determinants for the demand for a flu vaccination.

Many papers address the impact that education and income have on the demand for health care. Dunlop et al. (2000), suggests that lower income individuals are more likely to be frequent users of a primary care physician (at least six times per year) then higher income individuals in Canada. When looking at specialist utilization however, higher income individuals are more likely to visit a specialist. This suggests that higher income individuals may be more effective at vocalizing their need for health care. Dunlop et al. (2000) also show that Canadians who did not have a regular medical doctor were less likely to receive primary or specialize care. Consistent with Dunlop et al. (2000), in a European study by Enrich et al., (2009), household income positively affects the flu shot propensity.

Cutler and Lleras-Muney (2010), report correlations between education and mortality, heart disease, diabetes, lost days of work and self-reported health. They find that higher levels of education lead to greater use of preventative care services, such as getting a flu shot. Fletcher and Frisvold (2009) investigate how a getting a college education in the 1950s and 1960s affected an individual's demand for preventative care later in their lives. This study finds that getting a college education led to an individual being more likely to receive preventative care due to a greater access to health care.

Furthermore, Carmen and Mosca (2012) find that having good information about the flu shot positively influences an individual's decision to get vaccinated. In addition, Kwong et al. (2006) investigate the relationship between the introduction of the Ontario Universal Immunization program and immunization rates. They show that the vaccination rates for those individuals with higher income and education levels increased the most in Ontario. Education is also seen as a key determinant in the American study by Mullahy (1999). He also shows that increased levels of education positively and significantly correlated with the take-up for the immunization.

Quach et al. (2012), investigate how the propensity to get a flu shot differs across ethnic groups in Canada. They show that all ethnic groups, with the exception of those who self-identified with being Black, were more likely to get a flu immunization then those who self-identified with being White. In an Israeli study, Shahrabani and Benzion (2006), show that new immigrants were less likely to receive a flu vaccine compared to the native born group. Furthermore, Leburn (2012), shows that immigrants who have spent more time in Canada as residents or who are more proficient in English or French had higher rates of health care access and use. In particular, those immigrants who were not as proficient in an official language were less likely to get a flu immunization.

Rao, Mobius and Rosenblat (2008) use information on social networks to examine how friends can influence immunization decisions. Their results suggest that an individual's peer group positively affects that person's decision to be

vaccinated. For example, a person had an 8.3 percent increase in the likelihood of immunization if an additional ten percent of their friends have already been immunized.

1.2 Health Determinants of Flu Vaccination:

Many studies cite age as one of the main determinants of getting a flu shot (Zhdanava, 2013). Schmitz and Wübker (2011) find that as age increases, an individual's flu shot propensity will also increase. In addition, Schmitz and Wübker (2011) show that lower self-perceived health status, and good health behaviors increased the likelihood of getting a flu shot. In a Canadian study by Wang et al. (2007), they show that women and the elderly were more likely than other groups to get a flu shot. In addition, this study suggests that low perceive health status and having a chronic health condition are strong predictors of getting a flu shot (Wang et al., 2007). Health perception plays a large role based on whether or not an individual will get a flu vaccine. Kroneman et al. (2006) show that misconceptions with respect to the virulence of the flu and an individual's own resistance can lead to serious complications as a result of the influenza virus.

Polisena et al. (2012) show that having a regular medical doctor affects whether or not an individual will get a flu shot. In Maurer (2009) and Chi and Neuzil (2004), both find that when individuals discuss the flu shot with their regular medical doctor, it is more likely that they will get the shot. This is likely due to the fact that doctors can help less informed patients make medical decisions by sharing their information and insight.

Negative health behaviors are also an indicator as to whether or not an individual would get a flu shot. In an Israeli study by Shahrabani and Benzion (2006), shows that smoking cigarettes significantly reduces the likelihood an individual will get a flu shot. Furthermore, in a study from South Korea (Yoon Kee et al., 2007), individuals with healthy lifestyle habits like exercise, non-smoking and low alcohol consumption are shown to have higher rates of flu vaccination.

Maurer (2009) also shows that take up rates of flu shot differ between men and women. This result is consistent women being more risk averse than men when it comes to preventative health care, and therefore will be more likely to get an annual flu shot. Many studies (see Ward, 2014 and references therein) show that women are generally more likely to get a flu immunization then men.

1.3 Economic Conditions and Health/Health Care Utilization:

Based the theory outlined in Schmitz and Wübker (2011), employment status could influence both the time cost and illness opportunity cost of a flu vaccine. Time costs affect the propensity to get immunized as employed individuals have a higher opportunity cost of time, so they might forgo time intensive health care. Illness opportunity costs affect the propensity of immunization because once an individual gets the flu; they are unable to go to work and therefore may lose time at work as well as wages. To reduce these costs of being sick, an employed individual may be more likely to get a flu immunization. Both of these costs can influence an individual's decision whether or not they get vaccinated. This paper examines how changes in unemployment

rate effect an individual's decision to be immunized and may shed light as to which of these two costs act more heavily on the individual.

It has been shown that the cyclicality of macroeconomic conditions has an effect on various health outcomes. Ruhm (2000) shows that total mortality rate and unemployment rate are significantly counter-cyclical. One explanation for this counter-cyclical behavior could be due to the opportunity cost of time. If people are employed, they invest less in time intensive health activities, and therefore are less healthy. To further his research, in Ruhm (2003, 2005, 2007), he finds that increased unemployment led to more leisure-time health activities such as exercise, less drinking and less smoking. In addition, these findings were particularly pronounced in individuals of working age, employed and male. Ruhm suggests that changes in mortality rate patterns are part of a broader change in macroeconomic performance.[6] Furthermore, Gerdtham and Ruhm (2006), use aggregated data from 23 countries and finds that total mortality increases as the labour market strengthens. Miller et al. (2009), begin to explore the mechanisms behind the procyclical mortality pattern that Ruhm's studies investigate in the United States. They find that cyclical fluctuations among working aged individuals are not associated with health behaviors. They suggest that it is unlikely that changes in work force status affect mortality rates (Miller et al., 2009).

Similar to the work by Ruhm, Dehejia and Lleras-Muney (2004) find that babies born during times of high unemployment have better health outcomes

[6] More recently however (Ruhm, 2015), he demonstrates that from 1976 to 2010 UR and total mortality rates shift from being procyclical to weakly related. Ruhm suggests that the time period of in his new study coincides with the economic "Great Moderation", which was a period of less economic volatility.

partly explained by increased prenatal care by expecting mothers. Both studies suggest that when unemployment is higher there is more opportunity for time intensive health activities and therefore more positive health outcomes.

Mullahy (1999) uses U.S. micro data from the Health Promotion and Disease Prevention supplement to the 1991 National Health Interview Survey to estimate an OLS regression. Mullahy shows that higher state level unemployment leads to individuals being likely to get their annual flu vaccine in that year. This suggests that individuals are more likely to engage in health related activities because their cost of getting sick is high (Mullahy, 1999). Note that Mullahy (1999) uses one cross-section of data so he cannot speak to actual cyclicality of flu vaccination. Furthermore, Schmitz and Wübker (2011) reinforces Mullahy's findings showing that the rate of flu shot increases in the European Union, when there are more full-time workers.

Conversely, Carman and Mosca (2014) show that in the Netherlands that consistent with time constraints, those who have greater participation in the labour force were less likely to get a flu shot. It should be noted that unlike many countries, in the Netherlands the flu shot is not widely available and one must visit their general practitioner to receive it (Carman and Mosca, 2014). This fact may explain why employment negatively affected the propensity to get a flu shot in this particular study. It may take more time in the Netherlands to get a flu shot and therefore harder to get when you are employed. Ward (2014) also finds that those who work less, those individuals working as part-time employees as opposed to full time, are more likely to get a flu shot in Canada.

This research contributes to the existing literature in the following ways. My research presents evidence that the unemployment rate and vaccination rates move in opposite directions in Canada. This finding is in opposition of Ruhm (2000, 2005, 2007) that show that time intensive by health enhancing behaviors are forgone in good times but improve during economic downturns. This information could assist policy decisions and potentially aid the development of vaccination programs that target their efforts towards particular groups in the Canadian population.

In this paper, I will address how the unemployment rate affects an individual's decision to get the flu shot. The results from this research may aid health policy regarding how the flu immunization rates can be increased to cover more of the Canadian population.

2. Methodology

For this paper, I estimate the effect that unemployment rates have on an individual's decision to get a flu immunization. A binary dependent variable was used to estimate, whether or not an individual received a flu shot in that year, similar to the outcome used in Mullahy (1999). This variable was determined based on the CCHS question, "When did you have your last flu shot?" The outcome variable took on the value one for individuals who stated that their last flu shot was less than a year ago.

The key independent variable utilized was the average of the October and November provincial unemployment rate separated by year and age groups:

ages 15-24, 25-54 and 55+.[7] Based on the findings of numerous studies, such as Polisena et al. (2012), I make the assumption that most individuals decide to get a flu shot during peak immunization periods of October and November and therefore the unemployment rate in that period was most important to study.[8]

To control for the individual factors that might affect an individual's decision to get a flu shot, I estimate a probit regression model. I chose to estimate a probit regression model due to the fact that my dependent variable is binary. I report the marginal effect results to simplify the interpretation of the results

I estimate:

(1) $$P(flu_{ipt} = 1) = \beta_0 + \beta_1 UR_{pta} + \beta_2 P_p + \beta_3 Y_t + \gamma X_{ipt} + \varphi Z_{ipt} + \epsilon_{ipt},$$

where *UR* represents the average unemployment rate in October and November at the provincial level *p* for each month *t* and each age subsample *a*. *P* represents the province variable and *Y* represents the year. *X* represents socioeconomic individual characteristics such as age, gender, immigration status, education, income, employment and number of children for each individual *i*. *Z* represents health related variables such as self-perceived health status, having a regular medical doctor, household smokers, alcohol consumption and physical activity for each individual in each province over time. A detailed list of all independent variables can be found in Appendix A.

[7] $URpta = \frac{UR_{pta(October)} + UR_{pta(November)}}{2}$, where *p* represents the province, *t* represents the year and a represents the age group.

[8] In 2007, of the 44,280 individuals who got a flu shot that year, 38,822 individuals (88%) got their flu shot in either October or November. In 2009, 82% of individuals got their flu shot in either October or November. In 2012, 87% of individuals who got their flu shot got them in October or November. (CCHS 2007, 2009, 2012)

I run two separate probit regressions for men and women as it has been shown that women are more likely than men to utilize physician services and more likely to seek preventative health care (Pinkhasov et al., 2010). I also run the following robustness checks. To test if the effect of UR varies with out of pocket cost of the flu shot, I run two regressions: one with provinces that have universal flu immunization programs, meaning that flu shots were free for everyone over six months of age, and a regression with the provinces that do not have a universal flu immunization program.

Finally, as suggested by Schmitz and Wübker (2011), age greatly impacts an individual's decision to get a flu shot. Particularly, as you get older, the probability of getting the annual flu shot increases. In order to investigate this result in my model, I split to population into three age groups: 15 to 29, 30 to 59 and over sixty. In particular, I focus on looking at the working population age (the subsample ages 30 to 59) to see how unemployment rates affected their propensity to get a flu shot.

3. Data

I utilize weighted data from the Canadian Community Health Surveys (CCHS) from 2001 to 2012, which are produced by Statistics Canada.[9] These surveys are nationally representative and cover the population 12 years of age and older living in the ten provinces and three territories. It should be noted that individuals living on Indian Reserves and Crown Land, residents of health institutions, full-time members of the Canadian Armed Forces are excluded from

[9] http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226 (accessed 05/07/15)

the survey. Collectively, these exclusions represent less than 3% of the Canadian population aged 12 years of age and older. CCHS collects data about the health status, health care utilization and health determinants for the Canadian population.[10] In addition to health information, CCHS collects socio-demographic information, which provides a greater depth of understanding about the characteristics of the respondents. I pool together data from the 2001, 2003, 2005, 2007, 2009, 2010, 2011 and 2012 CCHS.

The provincial unemployment rate data was drawn from CANSIM, which is socioeconomic data that is available through Statistics Canada. This data provided monthly provincial unemployment rates for men, women and different age subsamples. The CANSIM data was merged with the CCHS pooled data by province, age and year.

I make the following sample restrictions: I remove individuals under the age of fifteen, as they are not captured in unemployment rate data. In addition, I have exclude data from the Yukon, North West Territories and Nunavut because in the CCHS data these three territories are grouped together and therefore I cannot attach territory specific unemployment rates.

Dependent Variable: *flu*

The dependent variable in this study is *flu*, which is measured based on an individual's response to whether they had received a flu shot in the past year. Since the main purpose of this paper is to determine whether unemployment rates have an effect as to whether or not an individual will get a flu shot, I use the

[10] http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226 (accessed 05/07/15)

survey question “When did you last have a flu shot?” as the key dependent variable. Table 3 defines all the dependent and independent variables in my analysis.

An individual’s health is a key factor that effects their decision to get a flu shot. Factors such as age, self-perceived health status, and having a regular medical doctor effect whether or not an individual will be more likely to get a flu shot. In addition to health, the cost of getting a flu shot could also affect an individual’s decision. This could include whether or not the province you live in provides a free immunization, since some provinces do not for low risk individuals.

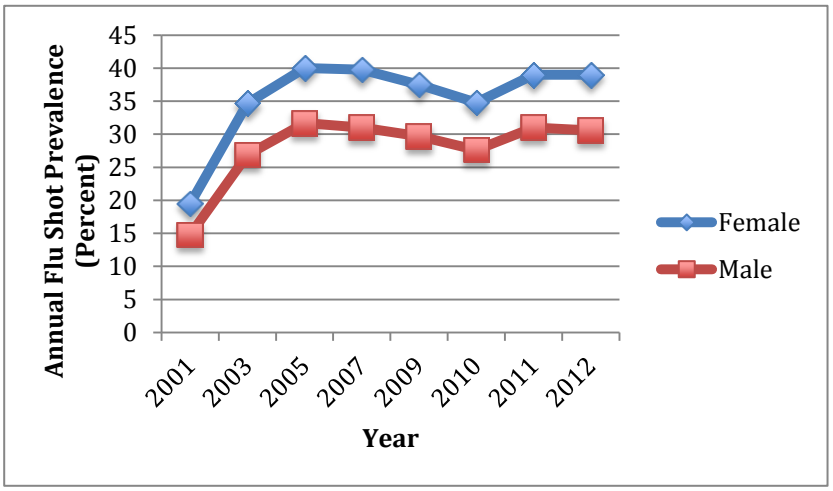

Figure 2: Annual Flu Shot Prevalence (percent) from 2001 to 2012 by gender.

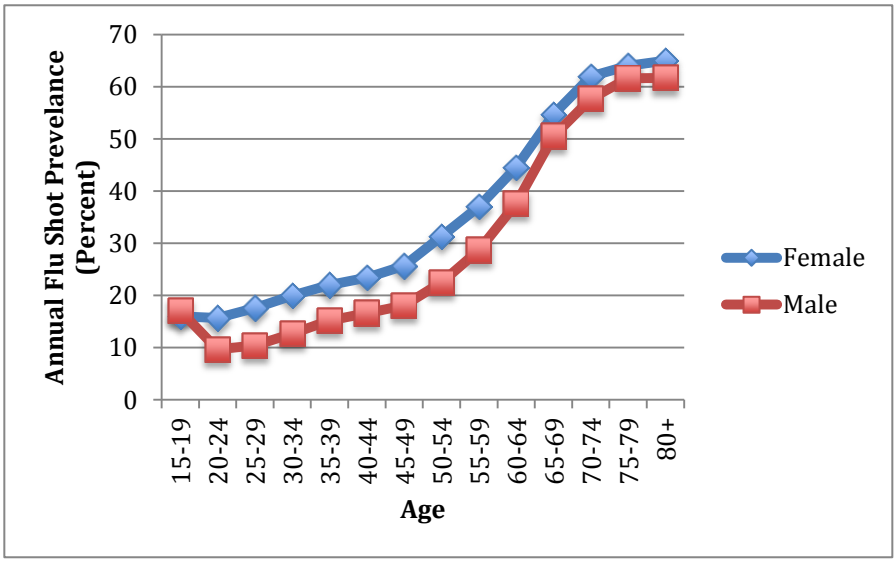

Figure 1: Prevalence of annual flu shot (percent) by age and gender.

Furthermore, the probability of getting a flu shot may depend on some socio-demographic factors such as gender, income, employment status, education level, number of children in a household and time since immigration to Canada.

To control for these attributes, I have created dummy variables. Table 4 shows a full list of variable means.

From the CCHS data, a number of interesting trends regarding flu shots were observed, as shown in Table 4. The first trend in the data of note is that the prevalence of flu shots is higher for females then males for all years observed, as shown in Figure 1. This result is consistent with the finding in Pinkhasov et al. (2010), which suggests that women are more likely to seek out preventative health care. Furthermore as shown in Figure 2, when looking at age, we can see that the prevalence of an annual flu shot increases with age for both men and women. This trend is consistent with the findings of Schmitz and Wübker (2011), which suggest that as an individual gets older, the demand for health care, particularly preventative care increases.

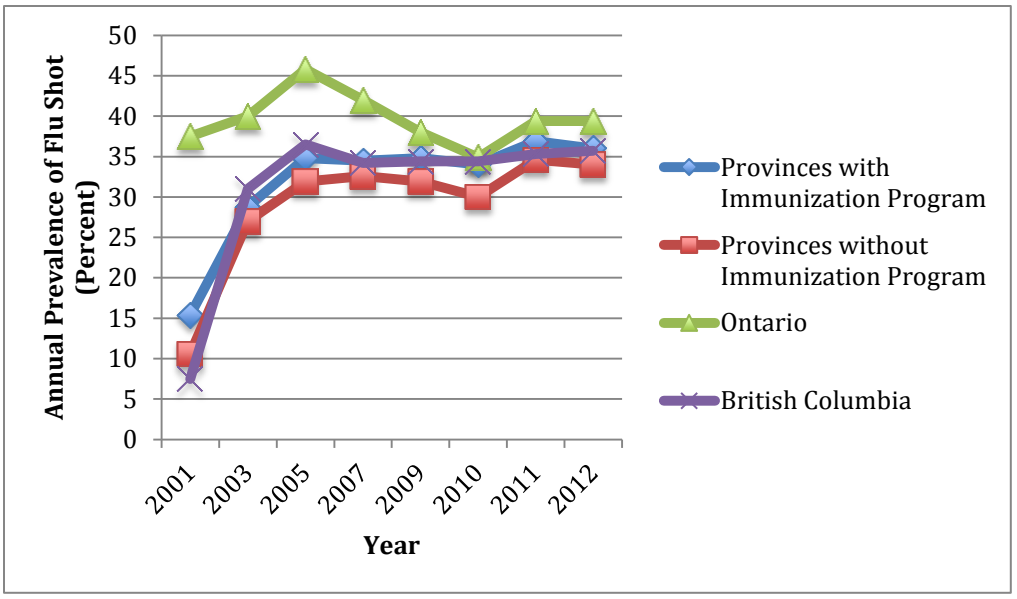

Figure 3: Prevalence of Flu Immunization (percent) over time by provinces with a universal flu immunization program, provinces without a universal immunization program, Ontario and British Columbia Separated.

Another interesting trend is when we compared the flu shot prevalence of across different provinces, as shown in Figure 3. It was shown that provinces with universal immunization programs had greater flu shot propensity then those provinces without a universal program. This is observation is consistent with the

observations found in Ward (2014) as more eligible people are likely to get immunized if it is free. In addition, it was observed that Ontario has the highest flu vaccination rate. This could be explained due to the fact that they have had the longest running universal influenza immunization program, which started in 2000 (Table 1). One interesting result was that British Columbia has a very high flu shot prevalence even though it does not have a universal immunization program. This could be due to regional variation in demand for preventative health care. Another possible reason might be due to the fact that as a province, 17% of its population is over 65.[11] As comparison, in Alberta, 11.4% of the population is over 65. This higher age group may explain the higher prevalence of flu immunization.

Table 4 provides the summary statistics of the CCHS pooled data. Table 4 shows that as self-perceived health status decreases from excellent to poor, the prevalence of flu shot increases. In addition, those who have a regular medical doctor have a higher prevalence of flu immunization. These results are shown to be consistent with Chi and Neuzil (2004), where you are more likely to get a flu shot when you discuss it with a health care professional. Furthermore shown in Table 4, greater prevalence of smoking seems to have a negative impact on the prevalence of flu immunization. This suggests that those who participate in negative health behaviors also might be less likely to demand preventative health care.

[11] Chart 2.7: Proportion of the population aged 65 and over, 2014 Canada's provinces and territories and U.S. States. *Statistics Canada* http://www.statcan.gc.ca/pub/91-215-x/2014000/ct016-eng.htm (accessed: 01/07/15)

Socioeconomic factors have also been shown to effect health care utilization (Dunlop et al., 2000). Table 4 shows that having either very little education or a high level of education are associated with a higher likelihood of vaccination. This result could be explained by the fact that those with lower education have poorer health in general and therefore are more likely to get the flu shot. It is suggested in Dunlop et al. (2000), that those with higher education levels are more likely to express their need for health care and therefore are more likely to demand preventative care.

Furthermore, individuals with very low income and those with high levels of income were more likely to get a flu shot. Finally, individuals with who participated in part-time employment were more likely to get a flu shot relative to full-time employees. This result is similar to what was seen in the Netherlands study by Carman and Mosca (2014), where those who had greater participation in the labour force were less likely to get a flu immunization. This is consistent with the theory that time costs reduce an individual's likelihood of getting and flu immunization.

4. Regression Results

The equation one regression results can be found in Table 5. I discuss the results in four subsections. The first three subsections detail the results of the key independent variable, unemployment rate. These subsections detail how unemployment rate affects the propensity to get a flu immunization by gender, the presence of a universal flu immunization program and then by age group.

The last section will summarize the other determinants that affect an individual's propensity to get a flu shot.

4.1 The Effect of UR on Flu Vaccination Rates:

When looking at the entire sample, increasing UR by one percent has a statistically significant impact on ***reducing*** the probability of flu immunization by 0.45 percentage points. If a typical recession is marked by an increase in unemployment by five percent (Brochu et al. 2012), this would suggest that propensity to get the flu shot would decrease by 2.3 percentage points. Furthermore, when we separate the sample into female and male subsamples we see that estimated effect of UR is very similar: a one percentage point increase in UR is estimated to reduce the probability of flu immunization for women by 0.5 percentage points and for men by 0.4 percentage points, both values statistically significant.

This suggests that when unemployment rate increases, people are less likely to get their flu immunization. These results are consistent with the theory that individuals who are employed will invest more in health behaviors to insure that they do not get sick. As unemployment rate increases, a reduction in flu vaccination would suggest that without employment individuals are less concerned about the opportunity costs of being sick (Mullahy, 1999).

In addition, we can see that women are more likely than men to get a flu vaccination, as consistent with Maurer (2009). However, UR does not seem to have a differential effect by gender.

4.2 The Effect of UR on Flu Vaccination Rates: By Immunization Policy

The next subsample I examine whether there are differences in the effect of UR between provinces with universal influenza immunization policies and those provinces without universal policies. I find there to be little difference, when looking at the provinces with universal immunization policy, when UR increases, the probability of getting the flu immunization significantly decreases by 0.46 percentage points. In provinces without the universal flu immunization policy, increases in UR causes the probability of getting the flu immunization to significantly increase by 0.33 percentage points.

4.3 The Effect of UR on Flu Vaccination Rates: By Age

Finally, I compare how UR affects propensity to get a flu immunization by age subsamples. The three subsamples that I investigate are ages: 15-29, 30-59 and 60 and over. Results show that in the age subsample 15-29 that an increase in the unemployment rate decreased the probability for getting a flu shot by 0.2 percentage points, a significant result. In the age subsample 30-59, an increase in UR decreased the probability of getting a flu shot by 1.4 percentage points. Finally when UR was increased for the 60 and over age subsample, it decreased the probability of getting a flu vaccine significantly by 1.1 percentage points. In the context of a recession, this result would suggest that increased UR by 5 percentage points would results in a 1.0, 7.0 and a 5.5 percentage point decrease in the probability of getting a flu vaccination for the three subsamples.

An increase in UR affects the probability of getting a flu shot most for the working age population (in this study the 30 to 59 age group) makes sense

because this age group is most affected by macroeconomic conditions (Ruhm, 2000). Furthermore, the age subsample 60 and over was shown to have a smaller, but significant effect from UR. This could be due to the fact that this age group is a smaller participant in the labour force and therefore is still affected by changes in UR. Finally, the age subsample 15-29 showed that increases in UR were least likely to affect their propensity to get a flu immunization. This could be explained by the fact that many individuals in this age subpopulation are not yet fully involved in the labor market.

4.4: Other determinants of the flu shot

Self-perceived health is shown to have a significant impact as to whether you were more likely to have a flu shot. In the CCHS, respondents could state their self-perceived health as excellent, very good, good, fair and poor. From the results, shown in Table 5, we can see that, relative to excellent health, when health ranges from good to poor, the probability of getting the flu shot increases from a factor 0.05 to 0.12, all statistically significant results. These results are consistent with the results found in Shahrabani and Benzion (2006), where personal attitudes toward health affect your propensity for preventative medicine, like an annual flu immunization.

In addition to self-perceived health status, having a regular medical doctor increases the probability of getting a flu shot by 11 percentage points relative to not having a regular medical doctor. Again, these results are consistent with Chi and Neuzil (2004), where discussing the flu shot with a health care provider increases your likelihood of getting your annual flu vaccine.

Furthermore, socioeconomic characteristics have a significant effect as to whether or not an individual will get a flu shot. When looking at a respondent's highest attended level of education, it can be shown that those individuals with the post-secondary graduation have the highest probability of getting a flu shot by a factor of 0.04, which is statistically significant. This result is consistent with a wide array of literature that suggests greater education leads to greater health literacy, greater demand for healthcare and better health outcomes (Dunlop et al., 2000).

Employment and household income are also important determinants of annual vaccination. Results are consistent with Ward (2014), suggesting that relative to full-time employees, part time employees are more likely to get a flu shot by a factor of 0.00221, although not statistically significant for the full sample. Furthermore, relative to full time employment, females with part-time employment were less likely to get a flu shot by a significant factor of 0.016. On the other hand, estimates of males with part-time employment were more likely to get a flu shot by a significant factor of 0.023. These results are interesting, as females seem to be consistent with the prediction that illness cost cause people to invest more in preventative health care when they participate more in the labour force. On the other hand, males seem to be consistent with the prediction that that time cost make individuals more likely to participate in preventative health care when they are working less.

Level of income may also have a significant effect on an individual's decision to receive a flu shot. Relative to a household income of $30,000-

$49,000, we can see that as household income increases to $50,000 to $79,000, the probability of getting a flu shot increases by 1.8 percentage points, a statistically significant result. Furthermore, relative to a household income of $30,000 to $49,000, an individual with a household income of less than $29,999 is less likely to get a flu shot by a significant factor of 0.00132, although not a statistically significant result. These results are consistent again with the literature that suggests that greater income would suggest greater participation in preventative medicine (Enrich et al., 2009).

In addition, relative to not having any children, having one or more children increases the probability that an individual will get a flu vaccine by a significant factor of 0.0158. Furthermore, relative to Canadian born individuals, immigrants to Canada who immigrated less than nine years ago are more likely to get a flu immunization by a factor of 0.00389, although not a significant result. If years since immigration increase to more than ten years, relative to Canadian born individuals, immigrants are less likely to get a flu shot by a factor of 0.0219, a significant result. These results are not consistent with the findings of Leburn (2012), which suggest that the longer an immigrate spends in their new country of residence, the more likely they are to get a flu immunization.

Finally, health behaviors were shown to affect an individual's proclivity to getting a flu shot. Relative to being inactive, those individuals who were moderately active and very active were more likely to get a flu immunization by 1.6 and 2.0 percentage points respectively, both of which are highly significant results. In addition, relative to individuals who do not smoke, daily smoking

showed to significantly decrease the likelihood and individual will get a flu shot by 5.2 percentage points. This results are consist with the findings of Yoon Kee et al. (2007), which suggest that individuals that have negative health behaviors are less likely to demand preventative health care, like a flu immunization.

5. Discussion & Conclusion

Using data from the Canadian Community Health Survey as well as employment data from CANSIM, this study investigates the relationship between unemployment rate and the likelihood that an individual gets a flu shot.

It is shown that a 5 percentage point increase in unemployment rate, a characteristic increase during a recessionary period, decreases the likelihood of a flu shot by 2.3 percentage points. When looking at the subsample that makes up most of the working population, ages 30-59, a 5 percentage point increase in the unemployment rate leads to a 7 percentage point decrease in the likelihood an individual will get a flu immunization.

These results contribute to the literature in two distinct ways. First, is that is work furthers our understanding of the determinants of flu vaccination. Second, this work will add to the literature examining the economic relationship between economic conditions and health related behaviors. Unlike studies that show that when the economy worsens, people invest more into time intensive health behaviors (exercise, smoking, sleep) this study shows that as the economy worsens, people are less likely to get immunized.

Some limitations of this study are that for the 2001, 2003 and 2005 CCHS data, I was unable to determine exactly what month an individual had their flu

shot, which was required to be able to assign a monthly UR. To deal with this, the assumption was made that most individuals got there flu shot between October and November and therefore I averaged the unemployment rates of that time period. In the more recent years of the survey (2007, 2009, 2012, 2011 and 2012 CCHS), there is a question asking respondents, “Which month did you have your flu shot?”, so as a robustness check, see Table 6, results were included for only those years that included this new question. Individuals who had their flu shot in October or November were given the value of one in the probit estimation. Results from Table 6 show that for the entire sample increasing UR by one percent increased the likelihood that individuals would get a flu shot by 0.15 percentage points. In addition, compared to the age subsample 30 to 59 in Table 5, Table 6 shows no significant effect of UR on flu vaccination for that age subsample. Further research is required to discuss this further.

In addition, when full-time students are excluded from the sample, shown in Table 7, the age subsample 15 to 29 showed that UR has no significant effect on whether or not an individual gets a flu shot. Furthermore, the age subsample 30 to 59 shows similar results from when full-time students are not excluded from the sample, as shown in Table 5. Finally, Table 8 shows the how socioeconomic and health factors independently effect whether or not UR affects the propensity to get a flu shot. Results from each regression suggest that an increase in UR significantly decreases the propensity of getting a flu shot. Further research is also required to discuss this further.

Understanding what factors influence an individual's decision to get a flu shot is critical for the development and execution of an effective influenza immunization program. In particular, my research may provide insight as to how unemployment rates in Canada effect an individual's decision to get the flu vaccine. This information could potentially aid the development of vaccination programs that target their efforts towards particular groups in the Canadian population. This might include greater efforts in the placement of immunization clinics in proximity to large high traffic workplaces. In addition, modifying flu shot advertising efforts with economic conditions, for example increasing advertising when unemployment rates are high.

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APPENDIX A

Table 1: Provincial Influenza Immunization Programs		
Province	**Universal Coverage[1]**	**Year Implemented[2]**
Ontario	Yes	2000
Alberta	Yes	2009
Manitoba	Yes	2010
Saskatchewan	Yes	2010
Nova Scotia	Yes	2010
Prince Edward Island	Yes	2011
Yukon	Yes	Not reported
Northwest Territories	Yes	Not reported
Nunavut	Yes	Not Reported
British Columbia	No	
New Brunswick	No	
Newfoundland & Labrador	No	
New Brunswick	No	

[1]Influenza vaccination is provided free of charge to all residents over 6 months of age. See PHAC (2014a).

[2]See Alberta Government (2015), New Brunswick Office of the Chief Medical Officer of Health (2015), Department of Health Government of Manitoba (2015), Saskatchewan Ministry of Health (2015), Yukon Health and Social Services (2015), Northwest Territories Health and Social Services (2015), Flighflu.ca (2015), Prince Edward Island Department of Health and Wellness (2015), New Brunswick Office of the Chief Medical Officer of Health (2015), Government of Newfoundland and Labrador Department of Health and Community Services (2015), and Immunize BC (2015).

Table 2: Estimated Vaccine Coverage among adults from 2001 to 2012 for seasonal influenza

Risk Group	2001 Coverage Estimates (%) (95% CI)	2006 Coverage Estimates (%) (95% CI) N=2237	2008 Coverage Estimates (%) (95% CI) N=3597	2010 Coverage Estimates (%) (95% CI) N=2931	2012 Coverage Estimate (%) (95% CI) N=3005	National Targets
General Population	32.7 (31.1-34.3)	**37.3 (35.3-39.2)**	35.8 (34.1-37.6)	**28.1 (26.5-29.7)**	**37.2 (35.4-39.0)**	N/A
65+ years	69.1 (65.0-73.2)	69.9 (65.1-74.7)	66.5 (62.4-70.6)	**52.8 (48.3-57.3)**	**64.9 (61.4-68.4)**	80% by 2010
18-64 years with CMC*	38.4 (35.1-41.8)	38.2 (33.3-43.1)	34.8 (31.1-38.5)	**58.9 (54.2-63.5)**	**37.7 (33.9-41.5)**	80% by 2010
Health care workers**	54.8 (49.0-60.6)	**69.9 (66.6-73.2)**	67.8 (63.3-72.4)	74.0 (69.1-78.9)	68.6 (64.6-72.6)	80% by 2010

*CMC = Chronic Medical Condition includes heart condition, stroke, asthma, other chronic lung conditions, cancer, diabetes, liver cirrhosis, chronic kidney disease, immune disorder/suppression

** Health Care Workers in close contact with patients

Notes: Bolded figures indicate a statistically significant difference with the previous survey cycle.

Source: PHAC Vaccine coverage amongst adult Canadians: Results from the 2012 adult National Immunization Coverage (aNIC) survey, Table 1)

Table 3: Variable Definitions	
Dependent Variable	
flu	=1 if individual had a flu shot in less then one year, otherwise 0
Independent Variables	
_Iage_2	=1 if age is 15-19, otherwise=0 (**reference group**)
_Iage_3	=1 if age is 20-24, otherwise=0
_Iage_4	=1 if age is 25-29, otherwise=0
_Iage_5	=1 if age is 30-34, otherwise=0
_Iage_6	=1 if age is 35-39, otherwise=0
_Iage_7	=1 if age is 40-44, otherwise=0
_Iage_8	=1 if age is 45-49, otherwise=0
_Iage_9	=1 if age is 50-54, otherwise=0
_Iage_10	=1 if age is 55-59, otherwise=0
_Iage_11	=1 if age is 60-64, otherwise=0
_Iage_12	=1 if age is 65-69, otherwise=0
_Iage_13	=1 if age is 70-74, otherwise=0
_Iage_14	=1 if age is 75-79, otherwise=0
_Iage_15	=1 if age 80 or older, otherwise=0
_Iimmeg_0	=1 if length of time in Canada since immigration is not applicable (Canadian born), otherwise=0
_Iimmeg_1	=1 if length of time in Canada since immigration is 0 to 9 years, otherwise=0 (**reference group**)
_Iimmeg_2	=1 if length of time in Canada since immigration is 10 years or more, otherwise=0
_Idoc_0	=1 if respondent does not have a regular medical doctor, otherwise=0 (**reference group**)
_Idoc_1	=1 if respondent has a regular medical doctor, otherwise=0
_Idoc_3	=1 if respondent did not state whether they had a regular medical doctor, otherwise=0
male	=1 if respondent is male, otherwise=0
UR	the average unemployment rate in October and November at the provincial level
_Iprov_10	=1 if respondent live in Newfoundland & Labrador, otherwise=0 (**reference group**)
_Iprov_11	=1 if respondent live in Prince Edward Island, otherwise=0
_Iprov_12	=1 if respondent live in Nova Scotia, otherwise=0
_Iprov_13	=1 if respondent live in New Brunswick, otherwise=0
_Iprov_24	=1 if respondent live in Quebec, otherwise=0
_Iprov_35	=1 if respondent live in Ontario, otherwise=0
_Iprov_46	=1 if respondent live in Manitoba, otherwise=0
_Iprov_47	=1 if respondent live in Saskatchewan, otherwise=0
_Iprov_48	=1 if respondent live in Alberta, otherwise=0

_Iprov_59	=1 if respondent live in British Columbia, otherwise=0
*_Iyear_*2001	=1 for surveyed year is 2001, otherwise 0 (**reference group**)
*_Iyear_*2003	=1 for surveyed year is 2003, otherwise 0
*_Iyear_*2005	=1 for surveyed year is 2005, otherwise 0
*_Iyear_*2007	=1 for surveyed year is 2007, otherwise 0
*_Iyear_*2009	=1 for surveyed year is 2009, otherwise 0
*_Iyear_*2010	=1 for surveyed year is 2010, otherwise 0
*_Iyear_*2011	=1 for surveyed year is 2011, otherwise 0
*_Iyear_*2012	=1 for surveyed year is 2012, otherwise 0
_Ieduc_0	=1 if respondents highest level of education was not stated, otherwise=0
_Ieduc_1	=1 if respondents highest level of education was less then secondary, otherwise=0 (**reference group**)
_Ieduc_2	=1 if respondents highest level of education is secondary graduate school, otherwise=0
_Ieduc_3	=1 if respondents highest level of education is other post secondary, otherwise=0
_Ieduc_4	=1 if respondents highest level of education is post secondary graduate, otherwise=0
_Ismoke_0	=1 if respondent did not state type of smoker, otherwise=0
_Ismoke_1	=1 if respondent considered themselves a daily smoker, otherwise=0 (**reference group**)
_Ismoke_2	=1 if respondent considered themselves an occasional smoker, otherwise=0
_Ismoke_3	=1 if respondent did not smoke at all, otherwise=0
_Iactive_0	= 1 if respondent did not state there physical activity level, otherwise=0
_Iactive_1	=1 if respondent stated their physical activity level was active, otherwise=0 (**reference group**)
_Iactive_2	=1 if respondent stated their physical activity level was moderate, otherwise=0
_Iactive_3	=1 if respondent stated their physical activity level was inactive, otherwise=0
_Ihealth_0	=1 if respondent did not state their self-perceived health, otherwise=0
_Ihealth_1	=1 if respondent stated their self-perceived health as excellent, otherwise=0 (**reference group**)
_Ihealth_2	=1 if respondent stated their self-perceived health as very good, otherwise=0
_Ihealth_3	=1 if respondent stated their self-perceived health as good, otherwise=0
_Ihealth_4	=1 if respondent stated their self-perceived health as fair, otherwise=0
_Ihealth_5	=1 if respondent stated their self-perceived health as poor, otherwise=0
_Ialco_0	=1 if respondent did not state their frequency of drinking alcohol, otherwise=0
_Ialco_1	=1 if respondent's frequency of drinking alcohol was less then once per month, otherwise=0
_Ialco_2	=1 if respondent's frequency of drinking alcohol was once per month, otherwise=0
_Ialco_3	=1 if respondent's frequency of drinking alcohol was 2-3 times per month, otherwise=0
_Ialco_4	=1 if respondent's frequency of drinking alcohol was once per week, otherwise=0
_Ialco_5	=1 if respondent's frequency of drinking alcohol was 2-3 times per week, otherwise=0
_Ialco_6	=1 if respondent's frequency of drinking alcohol was 4-6 times per week, otherwise=0
_Ialco_7	=1 if respondent's frequency of drinking alcohol was everyday, otherwise=0

_Iincome_0	=1 if respondent did not state their total household income, otherwise=0
_Iincome_1	=1 if respondent's total household has no income, otherwise=0 (**reference group**)
_Iincome_2	=1 if respondent's total household income is less than $15,000, otherwise=0
_Iincome_3	=1 if respondent's total household income is $15,000-$29,999, otherwise=0
_Iincome_4	=1 if respondent's total household income is $30,000-$49,999, otherwise=0
_Iincome_5	=1 if respondent's total household income is $50,000-$79,999, otherwise=0
_Iincome_6	=1 if respondent's total household income is $80,000 or more, otherwise=0
_Iemploy_0	=1 if respondent did not state whether full time or part time work, otherwise=0
_Iemploy_1	=1 if respondent worked full-time, otherwise=0 (**reference group**)
_Iemploy_2	=1 if respondent worked part-time, otherwise=0
_Ichild_0	=1 if respondent has no children under 12 in the household, otherwise=0 (**reference group**)
_Ichild_1	=1 if respondent has one or more children under 12 in the household, otherwise=0

Table 4: Factors associated with getting an annual flu shot (means)			
Variable	**All**	**Males**	**Females**
Age			
15-24	0.150	0.140	0.159
25-54	0.201	0.162	0.235
55+	0.504	0.467	0.532
Education			
No high school completed	0.354	0.303	0.399
High school completed	0.292	0.238	0.334
Some post-secondary	0.250	0.219	0.275
Post-secondary completed	0.320	0.284	0.350
Income Levels			
No Income	0.401	0.320	0.441
$15,000-$29,999	0.392	0.297	0.421
$30,000-$79,999	0.276	0.251	0.300
$80,000 or more	0.313	0.254	0.357
Self-perceived health status			
Excellent	0.239	0.205	0.269
Very good	0.290	0.246	0.325
Good	0.345	0.299	0.383
Fair	0.444	0.402	0.478
Poor	0.460	0.430	0.485
Regular Medical Doctor			
No	0.135	0.107	0.176
Yes	0.348	0.314	0.374
Employment			
Full-time	0.219	0.184	0.260
Part-time	0.247	0.239	0.251
Physical Activity			
Active	0.299	0.278	0.319
Moderate	0.328	0.297	0.352
Inactive	0.342	0.289	0.381
Province			
Ontario	0.401	0.613	0.438
Quebec	0.240	0.413	0.268
Maritime	0.317	0.500	0.351
Prairie	0.276	0.505	0.316
British Columbia	0.300	0.555	0.328
Household Smokers			
Daily	0.222	0.178	0.267
Occasional	0.222	0.188	0.255
Not at all	0.349	0.310	0.378
Alcohol Frequency			
<Once/Month	0.337	0.285	0.362
Once/Month	0.294	0.253	0.322

Once/Week	0.261	0.227	0.296
Everyday	0.401	0.371	0.455
Time Since Immigration to Canada			
Canadian born	0.314	0.269	0.350
0 to 9 years	0.194	0.181	0.205
10 years or more	0.395	0.362	0.422
Number of Children under 12			
None	0.348	0.299	0.390
One or more	0.196	0.174	0.214

Table 5: Probit model-Dependent Variable: Flu Shot in the Past Year

VARIABLES	All	Female	Male	Provinces with Universal Flu Immunization Programs	Provinces without Universal Flu Immunization Programs	Ages 15-29	Ages 30-59	Ages 60 and over
UR	-0.0045***	-0.0051***	-0.0039***	-0.0046***	0.0033***	-0.0017***	-0.014***	-0.0113***
	(-0.0005)	(-0.0007)	(-0.0007)	(-0.0007)	(-0.0008)	(-0.0005)	(-0.001)	(-0.001)
Age 20-24	-0.0396***	-0.0068	-0.0599***	-0.0534***	-0.0015	-0.0199***		
	(-0.0047)	(-0.0074)	(-0.0059)	(-0.0062)	(-0.0077)	(-0.0039)		
Age 25-29	-0.0300***	-0.0020	-0.0434***	-0.0471***	0.0154**	-0.0133***		
	(-0.0048)	(-0.0074)	(-0.0061)	(-0.0062)	(-0.0078)	(-0.0043)		
Age 30-34	-0.0373***	-0.0126	-0.0469***	-0.0575***	0.0697***		-0.120***	
	(-0.0058)	(-0.0092)	(-0.0074)	(-0.0077)	(-0.0115)		(-0.0034)	
Age 35-39	-0.0264***	-0.00304	-0.0347***	-0.0418***	0.0728***		-0.113***	
	(-0.0058)	(-0.0091)	(-0.0074)	(-0.0078)	(-0.0112)		(-0.0034)	
Age 40-44	-0.0121**	0.0149	-0.0248***	-0.0258***	0.0895***		-0.104***	
	(-0.0060)	(-0.0094)	(-0.0076)	(-0.0082)	(-0.0113)		(-0.0035)	
Age 45-49	0.0220***	0.0510***	0.0067	0.0136	0.117***		-0.0782***	
	(-0.0066)	(-0.0099)	(-0.0086)	(-0.0089)	(-0.0119)		(-0.0037)	
Age 50-54	0.0641***	0.100***	0.0413***	0.0564***	0.161***		-0.0461***	
	(-0.0068)	(-0.0099)	(-0.0091)	(-0.0089)	(-0.0124)		(-0.0038)	
Age 55-59	0.120***	0.165***	0.0897***	0.119***	0.215***			
	(-0.0072)	(-0.0104)	(-0.0098)	(-0.0096)	(-0.0127)			
Age 60-64	0.205***	0.244***	0.177***	0.199***	0.315***			-0.232***
	(-0.0076)	(-0.0104)	(-0.0108)	(-0.0099)	(-0.0133)			(-0.0060)
Age 65-69	0.336***	0.370***	0.307***	0.335***	0.442***			-0.114***
	(-0.0077)	(-0.0099)	(-0.0115)	(-0.0097)	(-0.0132)			(-0.0058)
Age 70-74	0.421***	0.442***	0.404***	0.418***	0.527***			-0.0308***
	(-0.0074)	(-0.0093)	(-0.0116)	(-0.0091)	(-0.0126)			(-0.0059)
Age 75-79	0.453***	0.461***	0.454***	0.450***	0.558***			
	(-0.0076)	(-0.0095)	(-0.0118)	(-0.0092)	(-0.0124)			
Age 80+	0.480***	0.486***	0.493***	0.471***	0.583***			0.0416***
	(-0.0071)	(-0.0088)	(-0.0111)	(-0.0085)	(-0.0117)			(-0.0061)
immigrant:0-9	0.0039	-0.0125*	0.0229***	0.0153**	-0.0177**	0.0231***	-0.0114*	-0.0431
	(-0.0054)	(-0.0075)	(-0.0077)	(-0.0069)	(-0.0082)	(-0.0064)	(-0.0062)	(-0.0307)
immigrant:10+	-0.0219***	-0.0280***	-0.0157***	-0.0261***	-0.0150***	0.0101	-0.0195***	-0.0498***
	(-0.0028)	(-0.0041)	(-0.0037)	(-0.0036)	(-0.0041)	(-0.0063)	(-0.0038)	(-0.0052)
Regular doctor	0.108***	0.113***	0.0969***	0.124***	0.0845***	0.0524***	0.0926***	0.255***
	(-0.0025)	(-0.0041)	(-0.0031)	(-0.0037)	(-0.0031)	(-0.0032)	(-0.0032)	(-0.0074)
(NS) regular doc	0.0384	0.152**	-0.0291	0.062	0.016	0.0144	0.0379	0.0137
	(-0.0373)	(-0.0714)	(-0.0332)	(-0.0523)	(-0.0497)	(-0.0312)	(-0.0665)	(-0.0728)

male	-0.0409***			-0.0459***	-0.0321***	-0.0261***	-0.0550***	-0.0156***
	(-0.0019)			(-0.0026)	(-0.0026)	(-0.0028)	(-0.0026)	(-0.0039)
PEI	0.0494***	0.0654***	0.0318***	0.0550***		0.0169	0.0283**	0.0254*
	(-0.0080)	(-0.011)	(-0.0113)	(-0.0089)		(-0.0128)	(-0.0116)	(-0.0149)
Nova Scotia	0.129***	0.153***	0.102***	0.139***		0.119***	0.0810***	0.0440***
	(-0.0080)	(-0.0107)	(-0.0116)	(-0.0090)		(-0.0142)	(-0.0123)	(-0.0168)
New Brunswick	0.0607***	0.0711***	0.0498***			0.0912***	0.0134	-0.0181
	(-0.0070)	(-0.0097)	(-0.01)			(-0.0134)	(-0.0103)	(-0.0151)
Quebec	-0.0370***	-0.0413***	-0.0324***		-0.0707***	-0.0256***	-0.0697***	-0.135***
	(-0.0056)	(-0.0078)	(-0.0079)		(-0.0039)	(-0.0080)	(-0.0085)	(-0.0153)
Ontario	0.101***	0.113***	0.0884***	0.107***		0.0884***	0.0290***	0.0559***
	(-0.0064)	(-0.0088)	(-0.0093)	(-0.0072)		(-0.0091)	(-0.0112)	(-0.0175)
Manitoba	-0.0023	-0.0047	0.0005	0.0027		0.0070	-0.0628***	-0.105***
	(-0.0083)	(-0.0116)	(-0.0116)	(-0.0103)		(-0.0115)	(-0.0119)	(-0.02)
Saskatchewan	0.0131*	0.0329***	-0.0066	0.0190*		0.0381***	-0.0486***	-0.114***
	(-0.0079)	(-0.0113)	(-0.0107)	(-0.01)		(-0.0128)	(-0.0115)	(-0.0199)
Alberta	0.0324***	0.0422***	0.0244**	0.0426***		0.0544***	-0.0399***	-0.0826***
	(-0.0082)	(-0.0114)	(-0.0114)	(-0.0102)		(-0.0129)	(-0.0121)	(-0.0198)
British Columbia	0.0327***	0.0391***	0.0266***		3.14E-06	0.0405***	-0.0193*	-0.0747***
	(-0.0071)	(-0.0098)	(-0.01)		(-0.0047)	(-0.0108)	(-0.011)	(-0.0175)
year=2003	0.114***	0.129***	0.0990***	0.0478***	0.287***	0.0436***	0.0815***	0.245***
	(-0.0036)	(-0.0049)	(-0.0051)	(-0.0043)	(-0.0071)	(-0.0059)	(-0.0046)	(-0.0058)
year=2005	0.177***	0.194***	0.159***	0.115***	0.359***	0.0917***	0.142***	0.284***
	(-0.0037)	(-0.0050)	(-0.0054)	(-0.0045)	(-0.0072)	(-0.0063)	(-0.0050)	(-0.0055)
year=2007	0.142***	0.163***	0.118***	0.0638***	0.362***	0.0802***	0.0951***	0.243***
	(-0.0039)	(-0.0054)	(-0.0055)	(-0.0046)	(-0.0080)	(-0.0066)	(-0.0054)	(-0.0061)
year=2009	0.120***	0.141***	0.0956***	0.0441***	0.300***	0.0734***	0.103***	0.216***
	(-0.0039)	(-0.0055)	(-0.0055)	(-0.0049)	(-0.0075)	(-0.0067)	(-0.0054)	(-0.0062)
year=2010	0.0688***	0.0882***	0.0485***	0.0037	0.243***	0.0346***	0.0453***	0.169***
	(-0.0045)	(-0.0065)	(-0.0060)	(-0.0055)	(-0.0088)	(-0.0068)	(-0.0061)	(-0.0076)
year=2011	0.113***	0.136***	0.0876***	0.0355***	0.307***	0.0603***	0.0835***	0.216***
	(-0.0040)	(-0.0055)	(-0.0055)	(-0.0049)	(-0.0076)	(-0.0064)	(-0.0054)	(-0.0064)
year=2012	0.106***	0.132***	0.0772***	0.0252***	0.307***	0.0531***	0.0693***	0.224***
	(-0.0049)	(-0.0068)	(-0.0068)	(-0.0060)	(-0.0091)	(-0.0078)	(-0.0066)	(-0.0074)
(NS) educ	-0.0009	0.0009	-0.0085	-0.0136	0.0098	0.0117	0.0202**	-0.0285***
	(-0.0061)	(-0.0093)	(-0.0078)	(-0.0086)	(-0.0082)	(-0.0107)	(-0.0098)	(-0.0105)
educ=sec grad	0.0059*	0.0030	0.0083**	0.0111***	-0.0031	-0.0166***	0.0081	0.0331***
	(-0.0030)	(-0.0043)	(-0.0042)	(-0.0041)	(-0.0043)	(-0.0040)	(-0.0050)	(-0.0057)
educ=other grad	0.0014	-0.0036	0.0030	0.00201	0.0007	-0.0129***	0.0030	0.0322***
	(-0.0039)	(-0.0056)	(-0.0052)	(-0.0054)	(-0.0052)	(-0.0044)	(-0.0064)	(-0.0090)
educ=post sec	0.0388***	0.0404***	0.0311***	0.0446***	0.0278***	0.0185***	0.0409***	0.0401***
	(-0.0026)	(-0.0038)	(-0.0034)	(-0.0035)	(-0.0035)	(-0.0046)	(-0.0042)	(-0.0046)
(NS) smoke	0.015	0.022	0.0036	0.0535**	-0.0568***	-0.0030	-0.024	0.0732**

	(-0.0167)	(-0.0249)	(-0.0213)	(-0.0218)	(-0.0207)	(-0.0243)	(-0.0197)	(-0.0327)
smoke=daily	-0.0524***	-0.0420***	-0.0591***	-0.0630***	-0.0355***	-0.0219***	-0.0454***	-0.0896***
	(-0.0023)	(-0.0034)	(-0.0030)	(-0.0031)	(-0.0033)	(-0.0036)	(-0.0029)	(-0.0057)
smoke=occas	-0.0248***	-0.0298***	-0.0198***	-0.0298***	-0.0159***	-0.0111**	-0.0174***	-0.0473***
	(-0.0043)	(-0.0066)	(-0.0056)	(-0.0060)	(-0.0058)	(-0.0046)	(-0.0059)	(-0.0128)
(NS) active	-0.254***	-0.288***	-0.219***	-0.293***	-0.192***	-0.131***	-0.197***	-0.557***
	(-0.0010)	(-0.0015)	(-0.0014)	(-0.0014)	(-0.0015)	(-0.0018)	(-0.0024)	(-0.0021)
active=active	0.0191***	0.0095***	0.0237***	0.0239***	0.0124***	0.0260***	0.0135***	0.0117**
	(-0.0023)	(-0.0035)	(-0.0031)	(-0.0032)	(-0.0032)	(-0.0032)	(-0.0032)	(-0.0048)
active=moderate	0.0161***	0.0072**	0.0230***	0.0178***	0.0131***	0.0129***	0.0172***	0.0112**
	(-0.0023)	(-0.0032)	(-0.0032)	(-0.0031)	(-0.0031)	(-0.0037)	(-0.0031)	(-0.0046)
(NS) health	0.016	0.0472	-0.0105	-0.0040	0.0596	0.0372	-0.0308	0.129***
	(-0.0305)	(-0.0398)	(-0.0371)	(-0.038)	(-0.0415)	(-0.0811)	(-0.0398)	(-0.0371)
health=v. good	0.0230***	0.0305***	0.0156***	0.0237***	0.0224***	0.0008	0.0216***	0.0659***
	(-0.0026)	(-0.0038)	(-0.0035)	(-0.0035)	(-0.0037)	(-0.0033)	(-0.0034)	(-0.0058)
health=good	0.0505***	0.0614***	0.0404***	0.0543***	0.0457***	0.0040	0.0513***	0.112***
	(-0.0029)	(-0.0042)	(-0.0038)	(-0.0039)	(-0.0039)	(-0.0038)	(-0.0039)	(-0.0059)
health=fair	0.0927***	0.103***	0.0805***	0.0941***	0.0913***	0.0142**	0.106***	0.147***
	(-0.0041)	(-0.0059)	(-0.0056)	(-0.0055)	(-0.0061)	(-0.0067)	(-0.0064)	(-0.0066)
health=poor	0.116***	0.112***	0.117***	0.116***	0.116***	0.0114	0.160***	0.143***
	(-0.0064)	(-0.0085)	(-0.0097)	(-0.0085)	(-0.0096)	(-0.0137)	(-0.0105)	(-0.0086)
(NS) alco	0.0009	-0.0007	0.0079*	0.0029	-0.0026	0.0115***	0.0101**	-0.0214***
	(-0.0030)	(-0.0040)	(-0.0046)	(-0.0040)	(-0.0042)	(-0.0044)	(-0.0044)	(-0.0057)
alco=1/month	0.0073*	0.0111**	0.0039	0.0076	0.0069	0.0157***	0.0035	-0.0075
	(-0.0038)	(-0.0051)	(-0.0058)	(-0.0051)	(-0.0053)	(-0.0053)	(-0.0051)	(-0.0080)
alco=2-3/month	-0.0045	-0.0108**	0.0044	-0.0024	-0.0071	0.0074	-0.0133***	0.0003
	(-0.0034)	(-0.0046)	(-0.0053)	(-0.0046)	(-0.0048)	(-0.0047)	(-0.0045)	(-0.0080)
alco=1/week	-0.0153***	-0.0168***	-0.0105**	-0.0107**	-0.0215***	-0.0043	-0.0201***	-0.0109
	(-0.0031)	(-0.0044)	(-0.0046)	(-0.0043)	(-0.0042)	(-0.0043)	(-0.0041)	(-0.0074)
alco=2-3/week	-0.0143***	-0.0136***	-0.0092**	-0.0121***	-0.0191***	-0.0134***	-0.0185***	0.0028
	(-0.0031)	(-0.0047)	(-0.0044)	(-0.0044)	(-0.0042)	(-0.0046)	(-0.0041)	(-0.0069)
alco=4-6/week	-0.0215***	-0.0231***	-0.0140**	-0.0123*	-0.0333***	-0.0203**	-0.0304***	0.0022
	(-0.0043)	(-0.0068)	(-0.0056)	(-0.0063)	(-0.0052)	(-0.0083)	(-0.0055)	(-0.0090)
alco=everyday	-0.0186***	-0.0179***	-0.0160***	-0.0171***	-0.0228***	-0.0306***	-0.0354***	-0.0065
	(-0.0036)	(-0.0061)	(-0.0046)	(-0.0051)	(-0.0047)	(-0.0096)	(-0.0051)	(-0.0067)
(NS) income	-0.0205***	-0.0149	-0.0204**	-0.014	-0.0446***	0.0093	-0.0137	-0.0401***
	(-0.0069)	(-0.0095)	(-0.0102)	(-0.0092)	(-0.0098)	(-0.0109)	(-0.0096)	(-0.0133)
income=0	-0.0145***	-0.0101*	-0.0182***	-0.0086	-0.0257***	0.0039	0.0102	-0.0769***
	(-0.0040)	(-0.0056)	(-0.0059)	(-0.0058)	(-0.0048)	(-0.0067)	(-0.0065)	(-0.0078)
income<15K	-0.00517	0.00281	-0.0164***	0.00383	-0.0181***	-0.000483	-0.00432	-0.0330***
	(-0.0032)	(-0.0047)	(-0.0042)	(-0.0046)	(-0.0040)	(-0.0051)	(-0.0049)	(-0.0065)
income=15-29K	-0.0013	-0.0014	-0.0026	0.0008	-0.0042	0.0046	-0.0041	-0.0156**
	(-0.0031)	(-0.0044)	(-0.0043)	(-0.0043)	(-0.0041)	(-0.0050)	(-0.0042)	(-0.0065)

income=50-79K	0.0177***	0.0153***	0.0217***	0.0124***	0.0279***	0.0032	0.0272***	0.0088
	(-0.0028)	(-0.0042)	(-0.0038)	(-0.0038)	(-0.0041)	(-0.0041)	(-0.0035)	(-0.0077)
income=80K+	0.0036	0.0021	0.0081*	-3.64E-05	-0.0004	0.0045	0.0100**	-0.0304***
	(-0.0033)	(-0.0048)	(-0.0047)	(-0.0044)	(-0.0048)	(-0.0047)	(-0.0047)	(-0.0076)
(NS) employ	0.0136***	-0.0107***	0.0386***	0.0189***	0.0087**	0.0138***	-0.0176***	0.0863***
	(-0.0026)	(-0.0037)	(-0.0037)	(-0.0036)	(-0.0036)	(-0.0039)	(-0.0034)	(-0.0071)
empl=part-time	0.0022	-0.0159***	0.0229***	0.0038	-0.0007	0.0120***	-0.0136***	0.0424***
	(-0.0033)	(-0.0043)	(-0.0053)	(-0.0044)	(-0.0047)	(-0.0040)	(-0.0043)	(-0.0098)
1 or more children	0.0158***	0.0127***	0.0206***	0.0099***	0.0238***	0.0157***	0.0175***	-0.0648***
	(-0.0028)	(-0.0042)	(-0.0039)	(-0.0037)	(-0.0043)	(-0.0034)	(-0.0032)	(-0.019)
Observations	841,741	461,360	380,381	538,084	303,657	170,396	397,077	274,268

Notes: This table reports weighted marginal effects with robust standard errors in parentheses. This table notes (NS) when survey answer was not stated or inapplicable. Provinces with universal flu immunization programs include: Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Prince Edward Island and Newfoundland & Labrador. Provinces without universal flu immunization programs include: Quebec, British Columbia and New Brunswick

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Source: Author calculations, data from CCHS 2001, 2003, 2005, 2007, 2009, 2010, 2011, 2012 and CANSIM.

Table 6: Probit model-Dependent Variable: Flu Shot in October or November

VARIABLES	All	Female	Male	Provinces with Universal Flu Immunization Programs[1]	Provinces without Universal Flu Immunization Programs[2]	Ages 15-29	Ages 30-59	Ages 60 and over
UR	0.0015**	0.0019**	0.0011	0.0008	0.0034***	0.0005	0.0012	0.0113***
	(-0.0007)	(-0.001)	(-0.0009)	(-0.0009)	(-0.001)	(-0.0005)	(-0.0017)	(-0.0018)
Age 20-24	-0.0065	0.0219**	-0.0259***	-0.0091	0.0010	-0.0049		
	(-0.0067)	(-0.0105)	(-0.0082)	(-0.0087)	(-0.0104)	(-0.0044)		
Age 25-29	0.0196***	0.0489***	0.0021	0.0181**	0.0252**	0.0074		
	(-0.0068)	(-0.0104)	(-0.009)	(-0.0090)	(-0.0104)	(-0.0049)		
Age 30-34	0.0560***	0.0887***	0.0350***	0.0383***	0.0952***		-0.0967***	
	(-0.0094)	(-0.0142)	(-0.0121)	(-0.0117)	(-0.016)		(-0.004)	
Age 35-39	0.0695***	0.102***	0.0498***	0.0633***	0.0899***		-0.0898***	
	(-0.0094)	(-0.0142)	(-0.0122)	(-0.0122)	(-0.0152)		(-0.0041)	
Age 40-44	0.0815***	0.117***	0.0584***	0.0759***	0.101***		-0.0834***	
	(-0.0095)	(-0.0143)	(-0.0123)	(-0.0124)	(-0.0153)		(-0.0042)	
Age 45-49	0.114***	0.152***	0.0883***	0.108***	0.134***		-0.0640***	
	(-0.0103)	(-0.0151)	(-0.0138)	(-0.0136)	(-0.0159)		(-0.0044)	
Age 50-54	0.155***	0.208***	0.112***	0.150***	0.173***		-0.0389***	
	(-0.0102)	(-0.0146)	(-0.0137)	(-0.0134)	(-0.0159)		(-0.0044)	
Age 55-59	0.211***	0.269***	0.165***	0.208***	0.229***			
	(-0.0107)	(-0.015)	(-0.0146)	(-0.0141)	(-0.0166)			
Age 60-64	0.288***	0.330***	0.255***	0.287***	0.302***			-0.233***
	(-0.0108)	(-0.0145)	(-0.0157)	(-0.0143)	(-0.0168)			(-0.0069)
Age 65-69	0.423***	0.473***	0.372***	0.424***	0.435***			-0.120***
	(-0.0108)	(-0.0137)	-0.0166	-0.014	-0.0172			-0.0069
Age 70-74	0.498***	0.522***	0.476***	0.499***	0.511***			-0.0570***
	(-0.0102)	(-0.0126)	(-0.016)	(-0.0127)	(-0.0168)			(-0.0071)
Age 75-79	0.535***	0.553***	0.517***	0.535***	0.550***			-0.0180**
	(-0.0102)	(-0.0125)	(-0.0163)	(-0.0127)	(-0.0169)			(-0.0075)
Age 80+	0.547***	0.560***	0.547***	0.543***	0.565***			
	(-0.0098)	(-0.012)	(-0.0155)	(-0.0121)	(-0.0163)			
immigrant:0-9	-0.0335***	-0.0491***	-0.0142*	-0.0320***	-0.0387***	-0.0052	-0.0366***	-0.149***
	(-0.0062)	(-0.0091)	(-0.0086)	(-0.008)	(-0.0097)	(-0.0065)	(-0.0071)	(-0.0337)
immigrant:10+	-0.0270***	-0.0299***	-0.0241***	-0.0334***	-0.0174***	-0.0039	-0.0229***	-0.0597***
	(-0.0032)	(-0.0049)	(-0.0040)	(-0.0041)	(-0.0051)	(-0.0066)	(-0.0046)	(-0.0062)
regular doctor	0.0853***	0.0910***	0.0746***	0.0938***	0.0757***	0.0379***	0.0725***	0.216***
	(-0.0031)	(-0.0051)	(-0.0037)	(-0.0045)	(-0.0040)	(-0.0036)	(-0.0040)	(-0.0076)
(NS) regular doc	-0.0125	0.0894	-0.0677***	0.0376	-0.0663**	-0.0315*	-0.017	0.0921
	(-0.0346)	(-0.0712)	(-0.0235)	(-0.0552)	(-0.0285)	(-0.0181)	(-0.056)	(-0.083)

male	-0.0452***			-0.0478***	-0.0403***	-0.0241***	-0.0578***	-0.0299***
	(-0.0023)			(-0.0031)	(-0.0033)	(-0.0032)	(-0.0032)	(-0.0048)
PEI	0.0648***	0.0915***	0.0372***	0.0673***		0.0043	0.0842***	0.116***
	(-0.01)	(-0.0142)	(-0.0135)	(-0.0108)		(-0.0131)	(-0.0156)	(-0.0197)
Nova Scotia	0.178***	0.219***	0.133***	0.182***		0.131***	0.173***	0.272***
	(-0.0104)	(-0.0141)	(-0.0149)	(-0.0115)		(-0.019)	(-0.0159)	(-0.0194)
New Brunswick	0.117***	0.142***	0.0913***			0.0981***	0.112***	0.181***
	(-0.0096)	(-0.0135)	(-0.0132)			(-0.0179)	(-0.0144)	(-0.0186)
Quebec	-0.0053	-0.0028	-0.0072		-0.0944***	-0.0080	0.006	0.0345*
	(-0.0067)	(-0.0096)	(-0.0093)		(-0.0048)	(-0.0092)	(-0.0108)	(-0.0192)
Ontario	0.0784***	0.0904***	0.0665***	0.0775***		0.0448***	0.0646***	0.216***
	(-0.0071)	(-0.01)	(-0.01)	(-0.0076)		(-0.0095)	(-0.0116)	(-0.0197)
Manitoba	0.0696***	0.0838***	0.0556***	0.0681***		0.0226*	0.0755***	0.194***
	(-0.0114)	(-0.0161)	(-0.0158)	(-0.0135)		(-0.0137)	(-0.0206)	(-0.0261)
Saskatchewan	0.0867***	0.122***	0.0509***	0.0863***		0.0661***	0.0866***	0.191***
	(-0.0113)	(-0.0161)	(-0.0149)	(-0.0134)		(-0.0176)	(-0.0195)	(-0.0255)
Alberta	0.0866***	0.109***	0.0659***	0.0883***		0.0611***	0.0816***	0.197***
	(-0.0105)	(-0.0148)	(-0.0146)	(-0.0124)		(-0.015)	(-0.018)	(-0.0251)
British Columbia	0.0779***	0.0950***	0.0611***		-0.0224***	0.0467***	0.0776***	0.178***
	(-0.0089)	(-0.0127)	(-0.0124)		(-0.0052)	(-0.0127)	(-0.0154)	(-0.0218)
2007				0.0434***	0.0630***		0.0451***	0.115***
				(-0.0046)	(-0.0054)		(-0.0059)	(-0.0069)
2009	-0.0459***	-0.0530***	-0.0388***			-0.0149***		
	(-0.0029)	(-0.0042)	(-0.0038)			(-0.0039)		
2010	-0.0938***	-0.107***	-0.0805***	-0.0436***	-0.0677***	-0.0417***	-0.0523***	-0.0716***
	(-0.0028)	(-0.0043)	(-0.0036)	(-0.0043)	(-0.0045)	(-0.0038)	(-0.0046)	(-0.0070)
2011	-0.0387***	-0.0379***	-0.0382***	0.0021	0.0157***	-0.0204***	0.0076	0.0333***
	(-0.0028)	(-0.0041)	(-0.0036)	(-0.0041)	(-0.0046)	(-0.0037)	(-0.0047)	(-0.0063)
2012	-0.0399***	-0.0374***	-0.0412***	-0.0024	0.0205***	-0.0213***	0.0047	0.0381***
	(-0.0033)	(-0.0049)	(-0.0044)	(-0.0050)	(-0.0057)	(-0.0045)	(-0.0056)	(-0.0075)
(NS) educ	-0.0198***	-0.0221**	-0.0229***	-0.0278***	-0.0108	-0.006	0.0108	-0.0680***
	(-0.0064)	(-0.0098)	(-0.0079)	(-0.0090)	(-0.0087)	(-0.0087)	(-0.0119)	(-0.0113)
educ=sec grad	0.0023	0.0001	0.0036	0.0065	-0.0043	-0.0088*	-5.60E-05	0.0213***
	(-0.0038)	(-0.0055)	(-0.0051)	(-0.0050)	(-0.0055)	(-0.0046)	(-0.0068)	(-0.0073)
educ=other grad	0.0047	-0.0018	0.0073	0.0044	0.0043	0.0023	-0.0061	0.0333***
	(-0.0050)	(-0.0073)	(-0.0067)	(-0.0071)	-0.0068	-0.0054	-0.0083	-0.0117
educ=post sec	0.0306***	0.0313***	0.0244***	0.0361***	0.0221***	0.0228***	0.0299***	0.0267***
	(-0.0032)	(-0.0049)	(-0.0040)	(-0.0043)	(-0.0045)	(-0.0052)	(-0.0057)	(-0.0058)
(NS) smoke	-0.0307**	-0.0401*	-0.0211	-0.0169	-0.0653***	-0.0408***	-0.0568***	0.0222
	(-0.015)	(-0.0224)	(-0.019)	(-0.0196)	(-0.021)	(-0.0127)	(-0.0192)	(-0.0366)
smoke=daily	-0.0413***	-0.0344***	-0.0451***	-0.0535***	-0.0230***	-0.0086*	-0.0372***	-0.0802***
	(-0.0029)	(-0.0044)	(-0.0037)	(-0.0038)	(-0.0045)	(-0.0044)	(-0.0037)	(-0.0072)
smoke=occas	-0.0364***	-0.0412***	-0.0311***	-0.0446***	-0.0231***	-0.0139***	-0.0310***	-0.0702***

	(-0.0051)	(-0.0078)	(-0.0065)	(-0.0069)	(-0.0071)	(-0.0051)	(-0.0069)	(-0.0144)
(NS) active	-0.193***	-0.227***	-0.160***	-0.215***	-0.161***	-0.0854***	-0.154***	-0.455***
	(-0.0013)	(-0.0019)	(-0.0017)	(-0.0017)	(-0.0019)	(-0.0018)	(-0.0029)	(-0.0025)
active=active	0.0039	-0.0049	0.0084**	0.0010	0.0093**	0.0056	-9.01E-05	0.0097
	(-0.0027)	(-0.0041)	(-0.0035)	(-0.0036)	(-0.004)	(-0.0035)	(-0.0038)	(-0.0059)
active=moderate	0.0095***	0.0010	0.0161***	0.0114***	0.0073*	0.0040	0.0117***	0.0064
	(-0.0027)	(-0.0039)	(-0.0038)	(-0.0037)	(-0.0039)	(-0.0040)	(-0.0038)	(-0.0056)
(NS) health	-0.0027	0.0331	-0.0312	-0.0161	0.0226	-0.0412	0.0049	0.0308
	(-0.0277)	(-0.0406)	(-0.0293)	(-0.0328)	(-0.0474)	(-0.0331)	(-0.0447)	(-0.0463)
health=v. good	0.0193***	0.0272***	0.0110***	0.0187***	0.0209***	0.0003	0.0151***	0.0638***
	(-0.0032)	(-0.0047)	(-0.0041)	(-0.0042)	(-0.0046)	(-0.0037)	(-0.0043)	(-0.0074)
health=good	0.0394***	0.0480***	0.0304***	0.0419***	0.0371***	0.0027	0.0386***	0.0949***
	(-0.0035)	(-0.0052)	(-0.0046)	(-0.0048)	(-0.0050)	(-0.0042)	(-0.0049)	(-0.0076)
health=fair	0.0724***	0.0814***	0.0607***	0.0723***	0.0728***	0.0118	0.0849***	0.123***
	(-0.0051)	(-0.0076)	(-0.0067)	(-0.0068)	(-0.0076)	(-0.0076)	(-0.0083)	(-0.0089)
health=poor	0.0834***	0.0829***	0.0798***	0.0844***	0.0799***	0.0020	0.117***	0.116***
	(-0.0081)	(-0.0105)	(-0.0121)	(-0.0108)	(-0.0115)	(-0.0142)	(-0.014)	(-0.0119)
(NS) alco	-0.0058*	-0.0087*	0.0014	-0.0019	-0.0142***	0.0071	0.0038	-0.0324***
	(-0.0036)	(-0.0049)	(-0.0054)	(-0.0047)	(-0.0052)	(-0.0049)	(-0.0055)	(-0.0071)
alco=1/month	0.0045	0.0153**	-0.0069	0.0093	-0.0026	0.0148**	0.0037	-0.0209**
	(-0.0046)	(-0.0064)	(-0.0066)	(-0.0061)	(-0.0066)	(-0.0061)	(-0.0063)	(-0.0097)
alco=2-3/month	-0.0042	-0.0149***	0.0099	0.0002	-0.0102*	0.0053	-0.0124**	0.0001
	(-0.0041)	(-0.0055)	(-0.0064)	(-0.0056)	(-0.0059)	(-0.0053)	(-0.0055)	(-0.0010)
alco=1/week	-0.0135***	-0.0161***	-0.0075	-0.0078	-0.0213***	-0.0071	-0.0157***	-0.0131
	(-0.0038)	(-0.0054)	(-0.0054)	(-0.0052)	(-0.0053)	(-0.0047)	(-0.0051)	(-0.0089)
alco=2-3/week	-0.0124***	-0.0183***	-0.0027	-0.0093*	-0.0189***	-0.0135***	-0.0144***	-0.005
	(-0.0037)	(-0.0054)	(-0.0053)	(-0.0051)	(-0.0051)	(-0.0048)	(-0.0051)	(-0.0085)
alco=4-6/week	-0.0204***	-0.0257***	-0.0109*	-0.0096	-0.0343***	-0.0241***	-0.0279***	-0.0016
	(-0.0048)	(-0.0075)	(-0.0063)	(-0.0071)	(-0.006)	(-0.0084)	(-0.0063)	(-0.011)
alco=everyday	-0.0141***	-0.0213***	-0.0070	-0.0114**	-0.0191***	-0.0175	-0.0276***	-0.0118
	(-0.0042)	(-0.0070)	(-0.0054)	(-0.0058)	(-0.0058)	(-0.0108)	(-0.0062)	(-0.0084)
(NS) income	-0.0203***	-0.0194***	-0.0193***	-0.0106	-0.0284***	-0.00164	0.00566	-0.0713***
	(-0.0044)	(-0.0064)	(-0.0060)	(-0.0065)	(-0.0055)	(-0.0064)	(-0.0074)	(-0.0093)
income=0	-0.0053	-0.0005	-0.0125***	0.0028	-0.0136***	-6.54E-05	-0.0012	-0.0299***
	(-0.0038)	(-0.0057)	(-0.0048)	(-0.0055)	(-0.0050)	(-0.0056)	(-0.0059)	(-0.0081)
income<15K	0.0053	0.0061	0.0034	0.0084	0.0016	0.0179***	-0.0026	-0.0067
	(-0.0040)	(-0.0058)	(-0.0053)	(-0.0055)	(-0.0055)	(-0.0065)	(-0.0055)	(-0.0086)
income=15-29K	0.0206***	0.0198***	0.0228***	0.0130***	0.0349***	0.0129***	0.0268***	0.0174*
	(-0.0036)	(-0.0054)	(-0.0046)	(-0.0047)	(-0.0054)	(-0.0049)	(-0.0046)	(-0.0095)
income=50-79K	-0.0116**	-0.0157**	-0.0033	-0.0181***	-0.0022	0.0003	0.0004	-0.0473***
	(-0.0045)	(-0.0065)	(-0.0063)	(-0.0060)	(-0.0068)	(-0.0059)	(-0.0072)	(-0.0097)
income=80K+	0.0073**	-0.0160***	0.0298***	0.0118***	0.0009	0.0032	-0.0215***	0.0769***
	(-0.0031)	(-0.0045)	(-0.0042)	(-0.0042)	(-0.0044)	(-0.0041)	(-0.0041)	(-0.0082)

(NS) employ	-0.0007	-0.0208***	0.0232***	-0.0019	-0.0002	0.0032	-0.0122**	0.0387***
	(-0.0041)	(-0.0054)	(-0.0067)	(-0.0055)	(-0.0060)	(-0.0046)	(-0.0054)	(-0.0116)
empl=part-time	0.0103***	0.0102*	0.0126***	0.0028	0.0222***	0.0141***	0.0130***	-0.100***
	(-0.0035)	(-0.0053)	(-0.0047)	(-0.0045)	(-0.0056)	(-0.0039)	(-0.004)	(-0.022)
Observations	471,838	260,068	211,770	304,853	166,985	91,655	211,325	168,858

Notes: This table reports weighted marginal effects with robust standard errors in parentheses. The dependent variable flu takes the value of one if the individual has their annual flu shot during the month of October or November. This table notes (NS) when survey answer was not stated or inapplicable. Provinces with universal flu immunization programs include: Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Prince Edward Island and Newfoundland & Labrador. Provinces without universal flu immunization programs include: Quebec, British Columbia and New Brunswick

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: Author calculations, data from CCHS 2001, 2003, 2005, 2007, 2009, 2010, 2011, 2012 and CANSIM.

Table 7: Probit model-Dependent Variable: Flu shot this year

VARIABLES	All	Female	Male	Provinces with Universal Flu Immunization Programs	Provinces without Universal Flu Immunization Programs	Ages 15-29	Ages 30-59	Ages 60 and over
UR	-0.0053***	-0.0062***	-0.0042***	-0.0046***	0.0036***	0.0002	-0.0138***	-0.0113***
	(-0.0006)	(-0.0009)	(-0.0009)	(-0.0009)	(-0.0009)	(-0.0006)	(-0.0013)	(-0.0014)
Age 20-24	-0.0379***	-0.0117	-0.0514***	-0.0475***	-0.0136	-0.0236***		
	(-0.0076)	(-0.0123)	(-0.0089)	(-0.01)	(-0.0117)	(-0.0050)		
Age 25-29	-0.0194***	0.0062	-0.0295***	-0.0312***	0.0116	-0.0136**		
	(-0.0074)	(-0.0119)	(-0.0091)	(-0.0098)	(-0.0115)	(-0.0053)		
Age 30-34	-0.0313***	-0.0125	-0.0345***	-0.0405***	0.0681***			
	(-0.0083)	(-0.0133)	(-0.0103)	(-0.0112)	(-0.0156)			
Age 35-39	-0.0170**	0.0032	-0.0215**	-0.0206*	0.0737***		0.0142***	
	(-0.0084)	(-0.0134)	(-0.0105)	(-0.0114)	(-0.0154)		(-0.0044)	
Age 40-44	-0.0032	0.0209	-0.0124	-0.0047	0.0891***		0.0267***	
	(-0.0086)	(-0.0137)	(-0.0107)	(-0.0118)	(-0.0155)		(-0.0046)	
Age 45-49	0.0321***	0.0571***	0.0220*	0.0366***	0.116***		0.0615***	
	(-0.0093)	(-0.0144)	(-0.0118)	(-0.0125)	(-0.0162)		(-0.0053)	
Age 50-54	0.0758***	0.108***	0.0575***	0.0810***	0.162***		0.104***	
	(-0.0096)	(-0.0145)	(-0.0124)	(-0.0127)	(-0.0168)		(-0.0056)	
Age 55-59	0.133***	0.174***	0.107***	0.145***	0.216***		0.162***	
	(-0.0102)	(-0.0151)	(-0.0133)	(-0.0135)	(-0.0175)		(-0.0059)	
Age 60-64	0.221***	0.256***	0.197***	0.227***	0.319***			-0.270***
	(-0.0107)	(-0.0151)	(-0.0146)	(-0.0138)	(-0.0183)			(-0.0059)
Age 65-69	0.352***	0.381***	0.327***	0.363***	0.445***			-0.155***
	(-0.0106)	(-0.0142)	(-0.0154)	(-0.0132)	(-0.018)			(-0.0057)
Age 70-74	0.437***	0.451***	0.424***	0.444***	0.529***			-0.0719***
	(-0.0101)	(-0.0131)	(-0.0152)	(-0.0121)	(-0.0169)			(-0.0058)
Age 75-79	0.467***	0.468***	0.472***	0.473***	0.559***			-0.0416***
	(-0.01)	(-0.013)	(-0.0151)	(-0.0118)	(-0.0164)			(-0.0061)
Age 80+	0.492***	0.493***	0.510***	0.493***	0.583***			
	(-0.0095)	(-0.0122)	(-0.0142)	(-0.0111)	(-0.0155)			
immigrant:0-9	0.0005	-0.0215***	0.0271***	0.0145*	-0.0253***	0.0305***	-0.0127**	-0.0337
	(-0.0062)	(-0.0083)	(-0.0092)	(-0.008)	(-0.0093)	(-0.0087)	(-0.0064)	(-0.0307)
immigrant:10+	-0.0238***	-0.0304***	-0.0170***	-0.0282***	-0.0170***	0.012	-0.0200***	-0.0496***
	(-0.0029)	(-0.0043)	(-0.0038)	(-0.0038)	(-0.0044)	(-0.0077)	(-0.0038)	(-0.0052)
regular doctor	0.117***	0.122***	0.105***	0.136***	0.0914***	0.0574***	0.0923***	0.254***
	(-0.0027)	(-0.0046)	(-0.0033)	(-0.004)	(-0.0035)	(-0.0037)	(-0.0033)	(-0.0074)
(NS) regular doc	0.0137	0.0839	-0.0267	0.0647	-0.0305	-0.0342	0.0376	0.013
	(-0.0456)	(-0.0798)	(-0.0484)	(-0.0685)	(-0.0533)	(-0.0297)	(-0.0665)	(-0.0727)
male	-0.0449***			-0.0503***	-0.0358***	-0.0334***	-0.0547***	-0.0160***
	(-0.0021)			(-0.0028)	(-0.0029)	(-0.0036)	(-0.0027)	(-0.0039)

PEI	0.0509***	0.0676***	0.0330***	0.0600***		0.0302*	0.0265**	0.0257*
	(-0.0085)	(-0.0118)	(-0.0121)	(-0.0096)		(-0.0167)	(-0.0116)	(-0.0149)
Nova Scotia	0.125***	0.148***	0.101***	0.140***		0.127***	0.0810***	0.0443***
	(-0.0087)	(-0.0116)	(-0.0127)	(-0.0102)		(-0.0172)	(-0.0124)	(-0.0168)
New Brunswick	0.0495***	0.0572***	0.0422***			0.0698***	0.0125	-0.0178
	(-0.0075)	(-0.0104)	(-0.0107)			(-0.0144)	(-0.0103)	(-0.0151)
Quebec	-0.0399***	-0.0473***	-0.0316***		-0.0650***	0.0014	-0.0705***	-0.134***
	(-0.0063)	(-0.0088)	(-0.0089)		(-0.0042)	(-0.0102)	(-0.0086)	(-0.0153)
Ontario	0.0936***	0.101***	0.0860***	0.106***		0.0830***	0.0278**	0.0564***
	(-0.0074)	(-0.0101)	(-0.0106)	(-0.0087)		(-0.0108)	(-0.0113)	(-0.0175)
Manitoba	-0.0073	-0.0137	0.0004	0.0061		0.0331**	-0.0629***	-0.105***
	(-0.0092)	(-0.013)	(-0.0131)	(-0.0121)		(-0.0154)	(-0.0119)	(-0.02)
Saskatchewan	0.0035	0.0191	-0.0116	0.0174		0.0563***	-0.0498***	-0.114***
	(-0.0088)	(-0.0126)	(-0.012)	(-0.0117)		(-0.0161)	(-0.0115)	(-0.0199)
Alberta	0.0237***	0.0311**	0.0193	0.0425***		0.0755***	-0.0409***	-0.0823***
	(-0.0091)	(-0.0127)	(-0.0127)	(-0.0119)		(-0.0161)	(-0.0121)	(-0.0198)
British Columbia	0.0251***	0.0283***	0.0233**		0.0043	0.0488***	-0.0203*	-0.0743***
	(-0.0079)	(-0.0109)	(-0.0112)		(-0.0052)	(-0.013)	(-0.011)	(-0.0175)
year=2003	0.122***	0.138***	0.105***	0.0509***	0.300***	0.0445***	0.0825***	0.245***
	(-0.0038)	(-0.0052)	(-0.0055)	(-0.0046)	(-0.0074)	(-0.0078)	(-0.0046)	(-0.0058)
year=2005	0.186***	0.205***	0.165***	0.120***	0.371***	0.0932***	0.143***	0.284***
	(-0.0039)	(-0.0053)	(-0.0058)	(-0.0048)	(-0.0075)	(-0.0082)	(-0.0050)	(-0.0055)
year=2007	0.147***	0.169***	0.122***	0.0670***	0.369***	0.0858***	0.0944***	0.243***
	(-0.0042)	(-0.0057)	(-0.006)	(-0.0049)	(-0.0084)	(-0.0086)	(-0.0054)	(-0.0061)
year=2009	0.124***	0.151***	0.0943***	0.0446***	0.305***	0.0675***	0.103***	0.217***
	(-0.0042)	(-0.0058)	(-0.0058)	(-0.0052)	(-0.0078)	(-0.0080)	(-0.0055)	(-0.0062)
year=2010	0.0725***	0.0957***	0.0480***	0.0045	0.248***	0.0328***	0.0458***	0.169***
	(-0.0048)	(-0.0069)	(-0.0065)	(-0.0059)	(-0.0093)	(-0.0085)	(-0.0061)	(-0.0075)
year=2011	0.117***	0.143***	0.0885***	0.0367***	0.314***	0.0583***	0.0829***	0.216***
	(-0.0042)	(-0.0059)	(-0.0059)	(-0.0052)	(-0.008)	(-0.0081)	(-0.0054)	(-0.0064)
year=2012	0.110***	0.140***	0.0790***	0.0262***	0.314***	0.0511***	0.0685***	0.224***
	(-0.0052)	(-0.0072)	(-0.0073)	(-0.0064)	(-0.0095)	(-0.0097)	(-0.0067)	(-0.0074)
(NS) educ	0.0068	0.009	-0.0046	-0.0044	0.0143	0.0370***	0.0201**	-0.0286***
	(-0.0066)	(-0.0098)	(-0.0084)	(-0.0092)	(-0.0088)	(-0.0132)	(-0.0098)	(-0.0105)
educ=sec grad	0.0130***	0.0087*	0.0156***	0.0186***	0.0014	-0.0059	0.0097*	0.0330***
	(-0.0033)	(-0.0047)	(-0.0047)	(-0.0045)	(-0.0047)	(-0.0056)	(-0.005)	(-0.0057)
educ=other grad	0.0093**	0.0008	0.0125**	0.0093	0.0064	-0.0027	0.0027	0.0317***
	(-0.0047)	(-0.0067)	(-0.0063)	(-0.0065)	(-0.0062)	(-0.0074)	(-0.0064)	(-0.009)
educ=post sec	0.0460***	0.0466***	0.0381***	0.0518***	0.0337***	0.0296***	0.0430***	0.0401***
	(-0.0027)	(-0.004)	(-0.0036)	(-0.0038)	(-0.0037)	(-0.0058)	(-0.0041)	(-0.0046)
(NS) smoke	0.018	0.0243	0.0059	0.0577**	-0.0604***	0.0002	-0.0239	0.0733**
	(-0.0174)	(-0.0257)	(-0.0222)	(-0.0224)	(-0.022)	(-0.0234)	(-0.0197)	(-0.0327)
smoke=daily	-0.0552***	-0.0447***	-0.0623***	-0.0653***	-0.0392***	-0.0194***	-0.0459***	-0.0898***

	(-0.0025)	(-0.0036)	(-0.0032)	(-0.0033)	(-0.0036)	(-0.0041)	(-0.003)	(-0.0057)
smoke=occas	-0.0252***	-0.0308***	-0.0201***	-0.0308***	-0.0163**	-0.0087	-0.0182***	-0.0439***
	(-0.0048)	(-0.0073)	(-0.0063)	(-0.0067)	(-0.0066)	(-0.0056)	(-0.0059)	(-0.0126)
(NS) active	-0.266***	-0.304***	-0.228***	-0.304***	-0.207***	-0.116***	-0.197***	-0.558***
	(-0.0011)	(-0.0016)	(-0.0015)	(-0.0015)	(-0.0016)	(-0.0025)	(-0.0025)	(-0.0021)
active=active	0.0164***	0.0074*	0.0209***	0.0224***	0.0086**	0.0197***	0.0141***	0.0120**
	(-0.0025)	(-0.0038)	(-0.0033)	(-0.0035)	(-0.0035)	(-0.0040)	(-0.0033)	(-0.0048)
active=moderate	0.0165***	0.0069**	0.0236***	0.0178***	0.0141***	0.0095**	0.0179***	0.0115**
	(-0.0024)	(-0.0034)	(-0.0034)	(-0.0033)	(-0.0034)	(-0.0044)	(-0.0031)	(-0.0046)
(NS) health	0.0216	0.0507	-0.0036	-0.0001	0.0693	0.0176	-0.0292	0.129***
	(-0.0316)	(-0.0411)	(-0.039)	(-0.0389)	(-0.0442)	(-0.0963)	(-0.0402)	(-0.0371)
health=v. good	0.0267***	0.0357***	0.0171***	0.0288***	0.0243***	0.0020	0.0217***	0.0660***
	(-0.0029)	(-0.0041)	(-0.0039)	(-0.0039)	(-0.0040)	(-0.0042)	(-0.0035)	(-0.0058)
health=good	0.0572***	0.0692***	0.0448***	0.0624***	0.0506***	0.0034	0.0518***	0.112***
	(-0.0031)	(-0.0045)	(-0.0042)	(-0.0042)	(-0.0043)	(-0.0046)	(-0.0039)	(-0.0059)
health=fair	0.103***	0.113***	0.0902***	0.106***	0.0993***	0.0186**	0.107***	0.148***
	(-0.0044)	(-0.0062)	(-0.0060)	(-0.0058)	(-0.0065)	(-0.0078)	(-0.0064)	(-0.0066)
health=poor	0.126***	0.123***	0.124***	0.127***	0.124***	0.0152	0.161***	0.143***
	(-0.0067)	(-0.0088)	(-0.0101)	(-0.0089)	(-0.01)	(-0.0152)	(-0.0105)	(-0.0086)
(NS) alco	-0.0013	-0.0034	0.0075	-0.0001	-0.0034	0.0101*	0.0105**	-0.0218***
	(-0.0033)	(-0.0043)	(-0.0052)	(-0.0044)	(-0.0047)	(-0.0061)	(-0.0045)	(-0.0057)
alco=1/month	0.0057	0.0102*	0.0009	0.0056	0.0057	0.0155**	0.0029	-0.0077
	(-0.0042)	(-0.0055)	(-0.0064)	(-0.0056)	(-0.0059)	(-0.0067)	(-0.0052)	(-0.0080)
alco=2-3/month	-0.0092**	-0.0155***	-0.0008	-0.0073	-0.0114**	-0.002	-0.0137***	-9.64E-05
	(-0.0037)	(-0.005)	(-0.0057)	(-0.005)	(-0.0053)	(-0.0056)	(-0.0045)	(-0.0080)
alco=1/week	-0.0173***	-0.0198***	-0.0119**	-0.0121**	-0.0245***	-0.0071	-0.0202***	-0.0113
	(-0.0034)	(-0.0047)	(-0.005)	(-0.0047)	(-0.0045)	(-0.0052)	(-0.0041)	(-0.0074)
alco=2-3/week	-0.0150***	-0.0152***	-0.0098**	-0.0117**	-0.0207***	-0.0140***	-0.0179***	0.0023
	(-0.0034)	(-0.005)	(-0.0048)	(-0.0047)	(-0.0045)	(-0.0054)	(-0.0041)	(-0.0069)
alco=4-6/week	-0.0232***	-0.0219***	-0.0178***	-0.0130**	-0.0364***	-0.0220**	-0.0305***	0.0019
	(-0.0046)	(-0.0072)	(-0.0059)	(-0.0066)	(-0.0056)	(-0.0091)	(-0.0055)	(-0.009)
alco=everyday	-0.0196***	-0.0198***	-0.0174***	-0.0177***	-0.0240***	-0.0278***	-0.0350***	-0.0069
	(-0.0038)	(-0.0064)	(-0.0049)	(-0.0053)	(-0.0050)	(-0.0101)	(-0.0051)	(-0.0067)
(NS) income	-0.0245***	-0.0186*	-0.0236**	-0.0163	-0.0469***	0.0213	-0.0126	-0.0397***
	(-0.0075)	(-0.0103)	(-0.0113)	(-0.0101)	(-0.0108)	(-0.016)	(-0.0098)	(-0.0134)
income=0	-0.0173***	-0.0149**	-0.0186***	-0.0143**	-0.0260***	0.0072	0.0087	-0.0772***
	(-0.0043)	(-0.0059)	(-0.0064)	(-0.0062)	(-0.0053)	(-0.0088)	(-0.0065)	(-0.0078)
income<15K	-0.0043	0.0032	-0.0157***	0.0040	-0.0168***	0.0053	-0.0038	-0.0331***
	(-0.0034)	(-0.005)	(-0.0045)	(-0.0049)	(-0.0044)	(-0.0062)	(-0.0049)	(-0.0065)
income=15-29K	-0.0015	-0.0004	-0.0043	0.0004	-0.0042	0.0053	-0.0039	-0.0157**
	(-0.0033)	(-0.0047)	(-0.0045)	(-0.0046)	(-0.0044)	(-0.0058)	(-0.0043)	(-0.0065)
income=50-79K	0.0203***	0.0177***	0.0249***	0.0141***	0.0321***	0.0063	0.0270***	0.0094
	(-0.0031)	(-0.0045)	(-0.0041)	(-0.0041)	(-0.0045)	(-0.0051)	(-0.0036)	(-0.0077)

income=80K+	0.0029	0.0007	0.0077	-0.0026	-2.21E-05	0.0007	0.0106**	-0.0304***
	(-0.0037)	(-0.0052)	(-0.0051)	(-0.0049)	(-0.0053)	(-0.0060)	(-0.0048)	(-0.0076)
(NS) employ	0.0120***	-0.0146***	0.0427***	0.0172***	0.0076*	0.0032	-0.0169***	0.0865***
	(-0.0029)	(-0.0040)	(-0.0042)	(-0.0039)	(-0.004)	(-0.0050)	(-0.0034)	(-0.0070)
empl=part-time	-0.0019	-0.0222***	0.0248***	-0.0009	-0.0034	0.0081	-0.0154***	0.0424***
	(-0.0038)	(-0.0049)	(-0.0063)	(-0.0051)	(-0.0053)	(-0.0055)	(-0.0043)	(-0.0098)
child=child+	0.0161***	0.0142***	0.0209***	0.0096**	0.0252***	0.0172***	0.0176***	-0.0666***
	(-0.0031)	(-0.0046)	(-0.0043)	(-0.0041)	(-0.0048)	(-0.0042)	(-0.0033)	(-0.019)
Observations	769,485	423,028	346,457	491,273	278,212	103,240	392,078	274,167

Notes: This table reports weighted marginal effects with robust standard errors in parentheses. The dependent variable flu takes the value of one if the individual has had their annual flu shot during the past year. All individuals who have identified themselves as full-time students are excluded from the sample. This table notes (NS) when survey answer was not stated or inapplicable. Provinces with universal flu immunization programs include: Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Prince Edward Island and Newfoundland & Labrador. Provinces without universal flu immunization programs include: Quebec, British Columbia and New Brunswick

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: Author calculations, data from CCHS 2001, 2003, 2005, 2007, 2009, 2010, 2011, 2012 and CANSIM.

Table 8: Flu Shot this year, regressions separated by socioeconomic and health factors

VARIABLE	Socioeconomic Factors	Health Factors
UR	-0.0038***	-0.0183***
	(-0.0005)	(-0.0002)
Observations	841,803	841,741

Notes: This table reports weighted marginal effects of UR on an individual's getting a flu shot in the last year with robust standard errors in parentheses. The dependent variable flu takes the value of one if the individual has had their annual flu shot during the past year. The first regression only takes into account socioeconomic factors such as age, gender, education, employment and income. The second regression takes into account health factors such as self-perceived health, having a regular medical doctor, smoking, alcohol consumption, activity levels, whether they are a new immigrant and whether an individual has children.

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Source: Author calculations, data from CCHS 2001, 2003, 2005, 2007, 2009, 2010, 2011, 2012 and CANSIM.