Consultation with Health Care Professionals and Influenza Immunization among Women in Contact with Young Children

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ABSTRACT

Objective: Primary health providers serve an important role in providing and promoting annual influenza immunization to high-risk groups and their close contacts. The purpose of this analysis was to determine whether consultation with a medical professional increases the likelihood of receiving a flu shot among women who have given birth in the past five years and to determine whether this association differs by type of medical professional.

Methods: Data were obtained from the Canadian Community Health Survey (2005), Cycle 3.1. Logistic regression was used to examine the association between receiving a flu shot in the past 12 months and consulting with family doctors, specialists, nurses, chiropractors, or homeopaths/naturopaths.

Results: Among the 6,925 women included in our sample, 1,847 (28.4%) reported receiving a flu shot in the past 12 months. After adjustment for socio-demographic characteristics and province of residence, women who received flu shots in the past 12 months were significantly more likely to consult with a family doctor (AOR 1.56, 95% CI 1.34-1.83) and significantly less likely to consult with a chiropractor (AOR 0.76, 95% CI 0.64-0.90) or a homeopath/naturopath (AOR 0.72, 95% CI 0.54-0.97) over the same time period.

Conclusion: Consultation with family doctors was found to have the strongest association with annual flu shots among women in contact with young children, whereas consultation with alternative care providers was found to have an independent inverse association. Given the influenza-associated health risks for young children, medical professionals should promote immunization at the time of consultation for household contacts of young children, including pregnant women.

Key words: Influenza; human; immunization; women; health care; utilization

La traduction du résumé se trouve à la fin de l'article.

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Annual influenza immunization, more commonly known as the "flu shot", can prevent serious complications and mortality associated with infection, especially among individuals at high risk for these outcomes. One particular high-risk group is children 6 to 23 months of age.[1,2] The influenza-attributed hospitalization rate among this age group was estimated at 200 per 100,000 per year for the 3 most severe influenza seasons between 1996/1997 and 1999/2000.[3] During the 2005/2006 influenza season, 20.7% of laboratory-confirmed influenza cases occurred in children <5 years old.[4] Pregnant women also represent a high-risk group. In Canada, the annual influenza-associated hospitalization rate is 104 per 100,000 for healthy pregnant women compared to 6 per 100,000 for non-pregnant women.[5]

During the 2004/2005 influenza season, the National Advisory Committee on Immunization (NACI) in Canada introduced recommendations for immunization of children aged 6 to 23 months.[6-8] Annual influenza immunization is also recommended for individuals considered capable of transmitting influenza to those at high risk of influenza-related complications, for example household contacts of children less than 23 months and pregnant women.[2,6] NACI extended its recommendation to include immunization for all pregnant women in 2007.[2,5,9] Despite the benefits, seasonal vaccination rates among pregnant women remain low, ranging between 0% and 20%.[9-13] Recent investigations into the H1N1 pandemic suggest an increased risk for influenza-associated complications in pregnant women and support improved vaccination coverage among this high-risk group.[14]

Primary health providers offer an important mechanism through which high-risk groups access the health care system and receive recommendations regarding annual flu shots.[15-17] Our analysis aims to determine whether consultation with a medical professional increases the likelihood of having a flu shot among women in contact with young children, controlling for covariates and potential confounders, and to determine whether this association differs by type of medical professional.

METHODS

Data were obtained from the Canadian Community Health Survey (CCHS) Cycle 3.1, January to December 2005. The CCHS represents a national, cross-sectional survey aimed at obtaining information about health status, health services utilization and health determinants for the Canadian population.[18] Data were collected from a representative sample of 132,221 individuals aged 12 or older from

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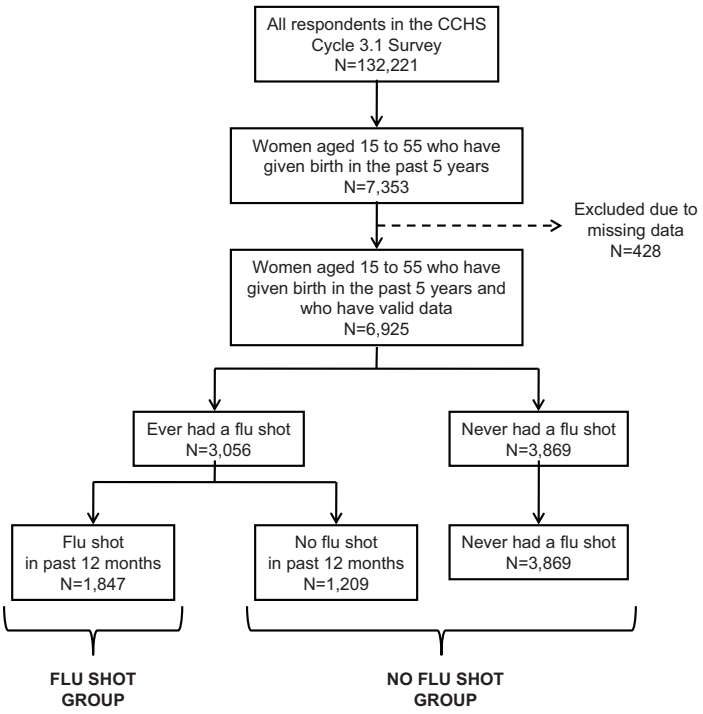
Figure 1. Number of respondents (unweighted) in each stage of study sample selection



all 10 provinces and 3 territories in Canada. Individuals living on Indian Reserves and on Crown Lands, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions were excluded from the sampling frame.

The analysis was restricted to females aged 15 to 55 who have given birth in the past five years. Women who reported a stillbirth or who did not provide a valid response to the childbirth question were excluded. The outcome variable for this analysis was having a flu shot in the past 12 months (Figure 1). The primary explanatory variables, available as individual variables in the CCHS survey, were having at least one consultation in the past 12 months with: a family doctor, a specialist, a nurse, a chiropractor, or a homeopath/naturopath. Consultations referred to the respondents' own health-seeking behaviour, rather than consultations regarding their children's health. Each type of medical professional consulted was entered as an individual explanatory variable in the analysis as these were not mutually exclusive. Women in the sample may have consulted more than one type of medical professional in the past 12 months.

Previous research suggests that older individuals, individuals with lower socio-economic status, non-smokers, non-immigrants, inactive individuals, and individuals with underlying chronic conditions were more likely to receive influenza immunizations.[19-21] These variables were entered as covariates in the multivariate regression models. Household education level was used as a proxy measure for socio-economic status. In addition to these variables, the multivariate analyses were adjusted for province of residence since influenza immunization rates differed geographically according to province (Table 1), partially due to universal influenza immunization coverage offered in Ontario.[19]

Women in the sample who had a flu shot in the past 12 months and women who did not were compared using chi-square tests. Unadjusted odds ratios and their corresponding 95% confidence intervals (CI) were calculated for each explanatory variable and all covariates using logistic regression. Variables that reached significance at the p=0.10 level in the bivariate analyses were entered into a single multivariate logistic regression model to calculate final adjusted odds ratios (AOR). Probability sampling weights were

Table 1. Proportion of Women Aged 15 to 55 Who Have Given Birth in the Past Five Years Who Report Having a Flu Shot (n=1847) and Those Who Report Not Having a Flu Shot in the Past 12 Months (n=5078) by Covariates, Canadian Community Health Survey (2005)

Covariate	Unweighted n	Flu Shot %*	No Flu Shot %*	Chi-square p-value
Age group (years)				
<20	95	19.2	80.8	<0.0001
20-29	2498	22.4	77.6	
30-39	3799	31.0	69.0	
40-49	531	32.8	67.2	
≥50	2	41.1	58.9	
Highest household education level				
Less than secondary	412	19.5	80.6	<0.0001
Secondary graduate	743	22.9	77.2	
Some post-secondary	447	19.7	80.3	
Post-secondary graduate	5323	30.1	69.9	
Current smoking status				
Non-smoker	5130	30.3	69.7	<0.0001
Smoker	1795	20.9	79.1	
Immigrant status				
Non-immigrant	5984	27.8	72.2	0.0407
Immigrant	941	30.5	69.5	
Physical activity level				
Inactive	3576	27.7	72.3	0.1386
Active	3349	29.3	70.7	
Has a chronic condition				
No	4433	25.1	74.9	<0.0001
Yes	2492	30.4	69.6	
Province of residence				
Newfoundland/Labrador	206	13.6	86.4	<0.0001
Prince Edward Island	106	19.2	80.8	
Nova Scotia	263	37.9	62.1	
New Brunswick	244	13.3	86.7	
Quebec	1344	20.8	79.2	
Ontario	2256	35.2	64.8	
Manitoba	410	15.2	84.8	
Saskatchewan	448	14.8	85.2	
Alberta	690	29.2	70.8	
British Columbia	763	29.5	70.6	
Yukon/Northwest/Nunavut	195	36.8	63.2	

* Percentages weighted to Canadian population to account for CCHS multistage stratified sampling strategy

Table 2. Reasons Why Women Aged 15 to 55 Who Have Given Birth in the Past Five Years Have Not Had a Flu Shot in the Past 12 Months (n=5078)*

Reason†	Unweighted n	%‡
Respondent did not think it was necessary	3220	64.2
Have not gotten around to it	746	13.4
Fear	185	3.5
Bad reaction to previous shot	168	3.1
Doctor did not think it was necessary	118	2.3
Cost	85	1.6
Did not know where to go	41	0.8
Personal or family responsibilities	41	0.7
Not available when required	36	0.7
Waiting time was too long	18	0.4
Unable to leave house because of health problem	7	0.3
Not available in area	9	0.1
Transportation problems	3	0.1
Language problems	1	0.0
Other	762	16.4

* Valid responses were available for 5045 women.
† Categories are not mutually exclusive; respondents could select more than one option.
‡ Percentages are weighted to Canadian population in order to account for CCHS multistage stratified sampling strategy.

Table 3. Crude and Adjusted Odds Ratios (OR) and Corresponding 95% Confidence Intervals (CI) Comparing Women Aged 15 to 55 Who Have Given Birth in the Past Five Years Who Report Having a Flu Shot (n=1847) to Those Who Report Not Having a Flu Shot in the Past 12 Months (n=5078) by Type of Medical Professional Consulted in the Past 12 Months

Type of Medical Professional Consulted	Unweighted n	Flu Shot %*	No Flu Shot %*	Crude OR (95% CI)	Adjusted OR† (95% CI)
Family doctor					
No	1202	20.4	79.6	1.00	1.00
Yes	5723	30.2	69.8	1.69 (1.45-1.96)	1.56 (1.34-1.83)
Specialist					
No	4426	27.8	72.2	1.00	1.00
Yes	2499	29.5	70.5	1.09 (0.98-1.21)	1.03 (0.91-1.15)
Nurse					
No	5226	28.2	71.8	1.00	1.00
Yes	1699	29.1	70.9	1.04 (0.92-1.18)	1.06 (0.93-1.21)
Chiropractor					
No	6020	29.0	71.0	1.00	1.00
Yes	905	24.9	75.1	0.81 (0.69-0.96)	0.76 (0.64-0.90)
Homeopath/Naturopath					
No	6667	28.7	71.4	1.00	1.00
Yes	258	23.4	76.7	0.76 (0.57-1.00)	0.72 (0.54-0.97)

* Percentages are weighted to Canadian population in order to account for CCHS multistage stratified sampling strategy.
† Odds ratio adjusted for age group (5-year interval), highest household education level, current smoking status, immigrant status, concurrent chronic conditions, and province of residence.

applied to all analyses to account for multistage stratified sampling methodology.[22] Descriptive statistics and logistic regression analyses were performed using SAS 9.1 for Windows (SAS Institute, Cary, NC).

RESULTS

A total of 7,353 females (5.6% of all female respondents) aged 15 to 55 had given birth in the past five years. Of these, 428 women were excluded due to unstated or unknown responses or refusal to answer, resulting in a final sample size of 6,925 women (Figure 1). Excluded respondents were significantly more likely to be older (p=0.003), be immigrants (p<0.0001), have a concurrent chronic condition (p=0.023), and have consulted a chiropractor in the past 12 months (p=0.035). Demographic characteristics of women included in the sample are presented in Table 1.

Among women who had given birth in the past five years, 3,056 (44.9%) report ever having a flu shot, with 1,847 (63.4%) of these women having a flu shot within the past 12 months (Figure 1). Vaccination rates did not significantly differ between women who had given birth in the past five years (28.4%) and women who had not (27.4%) (p=0.1582). The most common reasons cited for not getting a flu shot were that the respondent did not think it was necessary (64.2%) or the respondent had not gotten around to it (13.4%) (Table 2). Few women cited difficulties accessing the health care system (e.g., waiting times, cost, and availability) as reasons why they never received a flu shot.

Among women in the sample, 82.3% of women reported consulting with a family doctor, 38.6% with a specialist, 23.4% with a nurse, 12.9% with a chiropractor, and 4.1% with a homeopath/naturopath in the 12 months prior to the survey. After adjustment for covariates and potential confounders, women who had flu shots in the past 12 months were significantly more likely to have consulted a family doctor and significantly less likely to have consulted either a chiropractor or a homeopath/naturopath (Table 3). No statistically significant effect was observed for consultation with a specialist or a nurse.

Individuals typically consult alternative health care providers in conjunction with conventional care providers, such as family doctors, rather than as an alternative to conventional providers.[23,24] In our sample, women who consulted a family doctor were also more likely to consult a chiropractor (AOR 1.38, 95% CI 1.10-1.72) or a homeopath/naturopath (AOR 1.74, 95% CI 1.16-2.60) in the past 12 months. Women who consulted alternative care providers in conjunction with family doctors in the past 12 months were marginally less likely to receive flu shots in comparison to women who consulted only family doctors (chiropractors: AOR 0.76, 95% CI 0.64-0.91; naturopaths/homeopaths: AOR 0.79, 95% CI 0.59-1.06).

DISCUSSION

Among a sample of women who have recently given birth, consultation with a family doctor was associated with an increased likelihood of receiving a flu shot. In contrast, consultation with alternative care providers, limited to chiropractors or homeopaths/naturopaths in the current study, was associated with a decreased likelihood. Previous research suggests that individuals with regular medical doctors are more likely to receive annual influenza immunization.[19,20] Our findings support this association and suggest that consultation with family doctors on an annual basis is significantly associated with receiving influenza immunization.

Family doctors offer an important means through which individuals access the health care system and obtain annual flu shots;[15-17] consequently, consultation with a family doctor in the past year may be necessary for women to obtain their annual flu shots. As well, family doctors are a primary source of information for preventive medicine and may encourage women to seek flu shots either through their family physician or public health clinic. Recent changes to the NACI advisory statements on immunization to include infants ages 6 to 23 months, pregnant women, and their household contacts resulted in the expansion of publicly-funded immunization programs and increased awareness of flu shot campaigns for these high-risk groups.[2,6] Findings from material care provider surveys suggest that physicians who are aware of the NACI guidelines are more likely to recommend influenza immunization to their pregnant patients.[17] However, the same study found that less than two thirds of physicians were aware of the NACI recommendations and two fifths did not know that pregnant women were at increased risk, suggesting further efforts are required to educate health care providers and improve vaccination coverage among high-risk groups.[17]

A novel aspect of our analysis was the ability to investigate the role of alternative health care providers in public health promotion. Individuals in our sample who consulted their family doctors were more likely to have also consulted a homeopath/naturopath or a chiropractor, suggesting that alternative care is used in conjunction with conventional medicine. Previous research conducted between 1996 and 2002 has shown that individuals who consult both conventional and alternative care providers in comparison to individuals who consult only conventional health care providers were more likely to receive flu shots.[23-25] In contrast, our analysis demonstrated that consultation with alternative care providers decreased the likelihood of receiving a flu shot independent of consultation with conventional providers. These contradictory findings may result from differences in the comparison groups; however, when we performed our analyses using the same comparison groups as previous studies and adjusted for covariates, the inverse association between alternative care providers and flu shots remained.

Although the CCHS data offer several advantages, including a large, national sampling methodology, certain limitations should also be considered. Although female respondents were asked during the interview if they were currently pregnant, this variable was not available from the public use file. Annual influenza vaccination is offered free of charge to health care workers in most provinces and is considered part of standard patient care;[2,26] however, we were unable to control for the respondents' profession. The analysis does not account for seasonality. Doctors may be more likely to recommend or give flu shots and women may be more likely to recall receiving flu shots and be cognizant of annual public health campaigns if consultation occurred during the months immediately prior to or during peak flu season. We were unable to determine whether women consulted their family physicians in order to obtain flu shots or whether women consulted with multiple health care providers (for example, doctors and nurses) at any one visit. Although we are relying on self-reported data, prior studies involving elderly populations suggest that self-reported influenza immunization status is relatively accurate with high sensitivity and specificity.[27-29] Excluded respondents were more likely to be older and have underlying chronic conditions, which may cause our prevalence rates to be underestimated.

In conclusion, this analysis suggests that family doctors provide an important means through which individuals receive recommendation and/or administration of annual influenza immunization. However, despite the positive association between consulting with a family doctor and receiving a flu shot, the public health impact remains low. Only 28.4% of women in our sample report receiving a flu shot in the past 12 months and the majority of women who did not receive a flu shot did not feel it was necessary. Given the considerable influenza-associated health risks to young children and pregnant women as well as the recent emergence of a pandemic H1N1 influenza strain,[30] health care professionals should further their efforts to promote annual influenza immunization in this population. Our finding that the vaccination rate for women with young children does not significantly differ from their same-age peers further supports our recommendation that health care providers should promote immunization among high-risk groups, such as household contacts of young children. Further research is required to determine the type and quality of information available from alternative care providers. Subsequent research should investigate the consistency of public health messaging by different types of health care professionals and examine how this messaging impacts women's belief systems as well as health care professionals' approaches around influenza immunization.

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RÉSUMÉ

Objectifs : Les dispensateurs de soins de santé primaires jouent un rôle important dans la promotion du vaccin annuel contre la grippe et son administration aux groupes très à risque et à leurs proches. Nous avons cherché à déterminer si le fait de consulter un professionnel de la santé augmentait la probabilité de se faire vacciner contre la grippe pour les femmes ayant accouché au cours des cinq années précédentes, et si cette association différait selon le type de professionnel de la santé.

Méthode : Nos données proviennent de l'Enquête sur la santé dans les collectivités canadiennes (2005), Cycle 3.1. Par régression logistique, nous avons analysé l'association entre la vaccination contre la grippe au cours des 12 mois précédents et la consultation d'un médecin de famille, d'un spécialiste, d'une infirmière, d'un chiropraticien ou d'un homéopathe/naturopathe.

Résultats : Sur les 6 925 femmes de l'échantillon, 1 847 (28,4 %) ont dit avoir reçu le vaccin contre la grippe au cours des 12 mois précédents. En tenant compte du profil sociodémographique et de la province de résidence, les femmes vaccinées contre la grippe au cours des 12 mois précédents étaient de manière significative plus susceptibles d'avoir consulté un médecin de famille (RCa 1,56, IC 95% 1,34-1,83) et significativement moins susceptibles d'avoir consulté un chiropraticien (RCa 0,76, IC 95% 0,64-0,90) ou un homéopathe/naturopathe (RCa 0,72, IC 95% 0,54-0,97) durant la même période.

Conclusion : La consultation d'un médecin de famille présentait la plus forte association avec le vaccin annuel contre la grippe chez les femmes en contact avec de jeunes enfants, tandis que la consultation de praticiens de médecines parallèles présentait une association inverse indépendante. Étant donné les risques associés à la grippe chez les jeunes enfants, les professionnels de la santé devraient promouvoir la vaccination lors des consultations avec les contacts familiaux de jeunes enfants, y compris les femmes enceintes.

Mots clés : grippe; humain; immunisation; femmes; utilisation des soins de santé

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santé publique a besoin de porte-parole éloquents, persuasifs et vigoureux qui ont la volonté et la capacité de s'engager politiquement aux paliers national, provincial et local pour que nous soyons mieux en mesure de relever ces défis. La population canadienne, y compris au moins quelques-uns de nos élus, se soucient de la santé. Leurs préoccupations pourraient aider à soulever l'opinion publique et celle de la classe politique. Si nous pouvions présenter les faits sur les impacts des changements climatiques pour la santé et les mesures à prendre pour réduire ces impacts, si nous pouvions clairement expliquer aux parlementaires et autres représentants la nature des forces sociales et culturelles associées aux changements démographiques en cours au Canada, et si nous pouvions présenter des arguments en faveur d'un soutien financier et matériel adéquat au personnel et aux infrastructures, notre influence sur les politiques publiques s'étendrait bien au-delà du secteur de la santé.

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   Pour en savoir plus sur les impacts au Canada, voir J. Seguin, éd., *Santé et changements climatiques : Évaluation des vulnérabilités et de la capacité d'adaptation au Canada*, Ottawa, Ministre de la Santé, 2008. Ce rapport a été exécuté à la demande du gouvernement Chrétien; sa publication a été retardée de quelques mois par le gouvernement Harper, mais on a fini par le rendre public tard un vendredi soir, la veille d'une longue fin de semaine de congé.

   Pour un compte rendu bref mais complet des façons de nous attaquer à la crise des changements climatiques, voir Lancet et University College London Institute for the Global Health Commission, « Managing the health effects of climate change », *Lancet* vol. 373 (2009), p. 1693-1733.
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