

Mandatory seasonal influenza vaccination or masking of British Columbia health care workers: Year 1

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ABSTRACT

OBJECTIVE: The Influenza Prevention Policy (“the Policy”) aims to increase seasonal influenza vaccination coverage among British Columbia (BC) health care workers (HCWs).

PARTICIPANTS: HCWs who work in publicly funded facilities and attend patient care areas.

SETTING: The Policy was announced in August 2012 and took effect province-wide during the 2012/13 flu season.

INTERVENTION: BC HCWs are required to receive seasonal influenza vaccination by the start of the flu season (December 1) or wear a mask while at work until the flu season ends (March 30). Vaccinated HCWs need to wear a green dot on their identification tag. HCWs are expected to report noncompliant coworkers. As initially proposed, continued noncompliance with the Policy could result in termination of employment (ultimately this component was put in abeyance).

OUTCOME: For the 2012/13 flu season, 74% of HCWs (35,889/48,818) at acute care facilities received influenza vaccination compared with 40% (23,375/58,212) in 2011/12 (difference in proportion=0.33, 95% confidence interval [CI]: 0.33-0.34, $p<0.001$). Similarly, staff vaccination rates at residential care facilities increased from 57% (21,535/37,700) for the 2011/12 flu season to 75% (27,617/36,620) in 2012/13 (difference in proportion=0.18, 95% CI: 0.18-0.19, $p<0.001$). Health care unions claimed that the Policy was coercive, and they launched an unsuccessful grievance with the BC Labour Relations Board.

CONCLUSION: Implementation of the Policy was associated with increased HCW vaccination; the Policy was upheld by an independent arbitrator. Further research is required to correlate HCW vaccination coverage rates with changes in influenza incidence and its complications. Continued stakeholder engagement is vital to achieve a collaborative decision-making process.

KEY WORDS: Healthcare worker; vaccination; influenza

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

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Nosocomial (hospital-acquired) influenza is an important cause of morbidity and mortality in the very young, the elderly and the chronically ill. Influenza is the most common infectious cause of death in Canada.¹ The World Health Organization estimates that 10% to 20% of the global population contracts influenza annually.² In acute care facilities, the case fatality rate of nosocomial influenza averages 16% but can reach 60% in organ transplant or intensive care units.³

The economic toll of seasonal influenza is immense, given its associated health care costs and worker absenteeism. The annual estimated cost attributed to influenza-related morbidity and mortality in the United States is \$17 billion.⁴ On a smaller scale, a single influenza outbreak in a French hospital cost US\$3,798 per infected patient as a result of prolongation of stay and treatment.⁵

Health care professionals are at increased risk of acquiring influenza and, once infected, can act as vectors in disease transmission.¹ For instance, a study in the United Kingdom found that 23% of health care workers (HCWs) had serologic evidence of infection despite feeling well.⁶ Furthermore, physicians and nurses often work despite having symptoms of an influenza-like illness.⁷

Four randomized controlled studies in chronic care settings have demonstrated a 20%-40% reduction in patient mortality rates by improving HCW vaccination rates.⁸⁻¹¹ According to the

British Columbia Centre for Disease Control, increasing the proportion of HCWs who receive influenza vaccination by 40% would lower the annual mortality (attributed to influenza) of nursing home residents from 1.3% to 0.5%.¹² There is conflicting evidence specifically demonstrating a reduction in influenza transmission due to HCW vaccination.¹³ However, proponents of vaccination argue that laboratory-proven influenza incidence is a difficult outcome to measure, as not all hospitalized patients with fever and respiratory symptoms are tested for influenza and chronically ill individuals might not mount an antibody response sufficient to be detected by influenza serology.¹²

Randomized clinical trials of HCW vaccination in acute care settings are challenging to perform because of factors such as high patient turnover and variance in non-specific measures

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(e.g., utilization of face masks). Nevertheless, the Association of Medical Microbiology and Infectious Disease Canada asserts that the biologic rationale for influenza vaccination should not vary in different health care settings.¹ Furthermore, mathematical models demonstrate a reduction in the daily hazard of influenza infection among hospitalized patients with increasing proportion of vaccinated HCWs (three HCWs need to be vaccinated to prevent one patient from becoming infected).¹⁴

Seasonal influenza vaccination rates among HCWs have traditionally been low. Despite a national target of 80% in 2008, only 67.8% of HCWs across Canada received the seasonal flu vaccine.¹⁵ Similarly, in British Columbia (BC), 40% of staff at acute care and 57% at residential care facilities received seasonal influenza immunization (2011/12 flu season).^{16,17}

A growing number of US health care facilities have addressed low vaccination coverage rates by declaring influenza vaccination a condition of employment.^{18,19} Virginia Mason Medical Center (VMMC), a 336-bed acute care hospital, was the first hospital to make influenza vaccination mandatory.¹⁸ With the exception of medical or religious contraindications, all non-compliant employees faced termination. In the first year, vaccination rates reached 98% compared with 55% in the previous year. Importantly, the Washington State Nurses Association launched a successful grievance, arguing that vaccination should be voluntary and that the VMMC could not unilaterally alter the collective bargaining agreement. Even though non-unionized nurses are exempt from the policy, vaccination coverage rates have consistently exceeded 98%. BJC HealthCare, a Midwestern health care organization employing 26,000, imposed a mandatory seasonal influenza policy in 2008. Within the first year of implementation, vaccination coverage rates increased from 71% to 98%.¹⁹

In BC, the Influenza Prevention Policy (the Policy) was initiated in August 2012 and aims to increase HCW influenza vaccination rates.²⁰ Target coverage rates for BC HCWs (according to the 2007 *Immunize BC Strategic Framework for Immunization*) are 60% for acute care facilities and 80% for residential care facilities.²¹ However, as shown in Figure 1, the highest coverage rates for seasonal influenza vaccination in the past 8 years were only 46% and 68% for acute and residential care facilities, respectively.^{16,17} According to the Policy, all employees and volunteers working in patient care areas are to receive influenza vaccination annually or wear a mask while at work for the entire flu season.

SETTING

In BC, the Ministry of Health establishes provincial standards and goals for six health authorities (Interior Health, Fraser Health, Vancouver Coastal Health, Vancouver Island Health, Northern Health, and the Provincial Health Services Authority).

POPULATION

The Policy applies to all health authority employees, medical trainees (medical students and residents), staff physicians, administrative and non-patient care staff (i.e., housekeeping or medical records), contractors and vendors (all such individuals collectively referred to as “health care workers”) who attend a patient care area.

A patient care area is defined as either 1) a building or site owned, rented or operated by the health authority where patients or

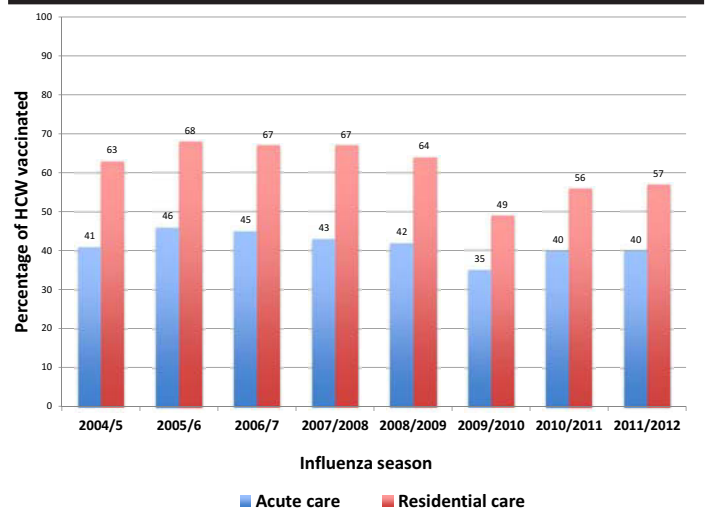


Figure 1. Coverage rates of British Columbia health care workers at acute and residential care facilities, influenza seasons 2004-05 to 2011-12.

Adapted from British Columbia Centre for Disease Control. Available at: http://www.bccdc.ca/NR/rdonlyres/E438A008-6F24-4FOA-9685-5174A4D78CB9/0/FlucoverageacuteHCWs2013_06_13.pdf (Accessed October 10, 2013).

residents receive care or 2) a patient’s or resident’s home or other location where HCWs provide care for the patient or resident. Patient care areas are further classified as either residential or acute care facilities. Acute care facilities are defined as non-profit institutions operated to treat individuals suffering from the acute phase of illness, convalescing from the acute illness, or requiring extended care. Residential care facilities are licensed under the *Hospital Act* and *Community Care and Assisted Living Act* and serve a population primarily older than 65 years of age.

PUBLIC HEALTH INTERVENTION

On August 31, 2012, the BC Ministry of Health announced implementation of the province-wide Influenza Prevention Policy, whose primary objective is to increase vaccination coverage rates of HCWs.

The Policy requires all HCWs to be vaccinated annually against influenza or to wear a surgical mask while in patient care areas for the entire flu season (December 1 to March 30 inclusive). Influenza vaccination (specifically, the trivalent inactivated vaccine) is provided at no charge through onsite clinics and can also be obtained from an individual’s general practitioner or local pharmacy. HCWs are obligated to report their vaccination status annually to Infection Control. Once vaccinated, a HCW must place a green dot on his or her identification tag.

HCWs who witness any colleagues violating the Policy are required to report the incident to their supervisor. As initially designed, non-compliance would result in remedial action; continued violation of the Policy could ultimately result in termination of employment, contract cancellation or revocation of faculty privileges. However, on November 30, 2012, the Ministry of Health placed the disciplinary protocol in abeyance until the 2013/14 flu season.²²

The Policy was extensively communicated to health authority employees. Each health authority provided detailed explanations of policy requirements and rationale on their websites. Several e-mail

Table 1. Influenza vaccination coverage of health care workers in acute care and residential care facilities by health authority and province-wide during the 2012/13 flu season

Health authority	Acute care (% vaccinated)	Residential care (% vaccinated)
Interior Health	76%	69%
Fraser Health	74%	80%
Vancouver Coastal	71%	83%
Vancouver Island	74%	70%
Northern Health	76%	70%
Provincial Health Services Authority	71%	N/A
British Columbia	74%	75%

reminders to be vaccinated by the deadline date were sent to HCWs. Managers were required to ensure that HCWs under their supervision were aware of and compliant with the Policy.

DATA COLLECTION AND ANALYSIS

The BC Centre for Disease Control (BCCDC) collects data annually on HCW influenza vaccination rates and publishes the information on its website.^{16,17} For the 2012/13 flu season, data on influenza coverage rates were collected from two sources: the Workplace Health Indicator Tracking and Evaluation (WHITE) database and a BCCDC web application. The WHITE database is an anonymized individual HCW worker level dataset; it captured people employed by a health authority between December 1, 2012, and March 30, 2013. The WHITE database was preferentially used over the BCCDC web application data. The latter contains aggregate data collected by health authority staff directly from facilities or by using administrative databases. The BCCDC web application identified health care personnel not included in the WHITE database, such as contracted staff, medical students and resident physicians.

The proportion of HCWs from acute and residential care facilities who received influenza vaccination in 2012/13 (first year of implementation of the Policy) was compared with the proportion in 2011/12 using a 2-sample test for equality of proportions without continuity correction.

OUTCOME

For the 2012/13 flu season, data on vaccination coverage were available from 90 of 92 acute care facilities in British Columbia. At acute care facilities, 40% of HCWs (23,375/58,212) received influenza vaccination in 2011/12, whereas coverage rates increased to 74% (35,889/48,818) in 2012/13. The higher proportion of HCWs in acute care facilities who were vaccinated was statistically significant (difference in proportion=0.33, 95% confidence interval[CI]: 0.33-0.34, $p<0.001$). As demonstrated in Table 1, vaccination rates across the health authorities were similar and ranged from 71% to 76%. A greater proportion of acute care facilities (90% or 83/92) met the 60% immunization coverage rate compared with the previous year (9% or 8/89).

For the 2012/13 flu season, data from 93% of BC residential care facilities (332/357) were available. In that season 75% of staff at residential care facilities (27,617/36,620) received seasonal influenza vaccination in 2012/13 compared with 57% (21,535/37,700) in the 2011/12 flu season. The upswing in HCW vaccination coverage at residential care facilities (which was associated with implementation of the Policy) was statistically significant (difference in proportion=0.18, 95% CI: 0.18-0.19, $p<0.001$). As shown in Table 1, vaccination rates across the health authorities ranged from 69%

83%. The proportion of residential care facilities that met the 80% immunization coverage target was higher in 2012/13 (157/332 or 47%) than in 2011/12 (65/334 or 19%).

BC's Influenza Prevention Policy was met with intense opposition by key stakeholders. The three largest health care unions (the BC Nurses Union, the Health Employees Union and the Health Sciences Association) were uniformly hostile to mandatory influenza vaccination or masking. Key arguments voiced by the unions against the former included the following: vaccination should remain an individual decision; mandatory vaccination is unethical because of potential serious adverse effects; the Policy violates the right to security of persons under the *Canadian Charter of Rights and Freedoms*; the requirement to declare one's vaccination status is a violation of privacy rights; and the Policy is punitive.^{22,23} Regarding all-day masking, some HCWs felt it interfered with their job function by reducing vocal and auditory acuity and prevented the establishment of therapeutic rapport.²²

Dr. Tom Jefferson of the Cochrane Acute Respiratory Infections Group was a highly visible critic of the Policy. In 2010, Dr. Jefferson co-authored a systematic review entitled *Vaccines for Preventing Influenza in Healthy Adults*;²⁴ it determined that the risk difference of vaccination to prevent influenza was only 3% (4% in the study arm versus 1% in the placebo arm) when vaccine strains were well matched to circulating virions. Responding to the Policy, he wrote, "So far we have distortion of research findings, evidence-free statements and evidence-free policies supporting coercion of human beings." (ref.25, p. 1)

Many stakeholders opposed to the Policy questioned flu vaccine efficacy. A recent meta-analysis calculated a pooled efficacy rate of 59% for the seasonal flu vaccine, lower than the often quoted level of 70%-90%.²⁶ Indeed, the US Centers for Disease Control and Prevention estimated that vaccine efficacy for the 2012/13 influenza season to prevent laboratory-confirmed influenza was 62% (95% CI: 51%-71%).²⁷ Some opponents of the Policy urged further research to create more consistently reliable vaccines.²⁶

Critics of mandatory vaccination also raised significant methodological concerns with the four cluster randomized controlled trials of influenza vaccination in long-term care facilities.²² For instance, while all-cause mortality was used as the primary outcome in all four trials, it was argued that influenza incidence (laboratory-confirmed) and influenza-specific mortality are more appropriate.⁸⁻¹¹ In fact, a Cochrane Database Systematic Review did not identify an effect of HCW vaccination on laboratory-confirmed influenza or related complications (lower respiratory tract infections and hospitalization) in elderly patients.²⁴ Second, the trials did not explicitly describe important co-interventions (i.e., handwashing, early detection of influenza among patients presenting with an influenza-like illness, and prompt use of antivirals.) Last, it was claimed that the studies are at risk of bias because of the lack of blinding.

The masking component of the Policy was also criticized. In theory, wearing a mask can serve as source control by preventing virus-laden droplets from spreading from an asymptomatic carrier to other individuals.³ However, studies on masking efficacy have been of variable quality and often tested in combination with hand hygiene.²⁸ Furthermore, it is unclear whether N95 respirators or surgical masks are preferred for the prevention of virus transmission.

Ultimately, the Health Sciences Association filed formal grievances with the Health Employers Association of BC (represents the health authorities) in November 2012.²² It contended that a collective bargaining agreement could not be unilaterally modified, that the Policy violated section 7 of the *Canadian Charter of Human Rights and Freedoms* (right to liberty and security of persons) and was coercive, stigmatizing and shaming. Over the course of 12 days, the arbitrator heard from 10 witnesses called by the Union (including medical experts and HCWs) and 7 witnesses from the Ministry of Health. The proceedings were of tremendous significance, as a similar case regarding HCW seasonal influenza vaccination had never been heard before in the Canadian judicial system.

Robert Diebolt (the arbitrator) ultimately sided with the Health Employers Association of BC. First, he reaffirmed that nosocomial influenza is a serious disease that causes devastating morbidity and mortality among the elderly and the chronically ill. On review of the evidence, Mr. Diebolt felt that influenza vaccination is approximately 60% effective in conferring immunity to the recipient and does reduce transmission from infected HCWs to patients. Second, other unilaterally imposed vaccination policies (e.g., vaccination or unpaid leave of HCWs) have already been upheld in Canadian courts with respect to influenza outbreaks. Regarding the masking policy, the arbitrator argued it was not coercive but, rather, was an important patient safety initiative and a way of accommodating HCWs with medical, religious or philosophical objections to influenza vaccination.

DISCUSSION

During the first year of implementation, the Policy was associated with higher HCW seasonal influenza vaccination coverage. In fact, the proportion of immunized HCWs was greater than in the previous eight years. The percentage of acute care facilities meeting the stated 60% immunization coverage target established by the 2007 *Immunize BC Strategic Framework* increased by 83 percentage points compared with the previous year (from 9% in 2011/12 to 92% in 2012/13).¹⁶ The proportion of residential care facilities meeting the 80% seasonal influenza coverage target more than doubled (19% in 2011/12 and 47% in 2012/13).¹⁷ It is important to note that gains in HCW vaccination rates were seen in all six health authorities.

The Policy was established as a patient quality and safety initiative similar to hand hygiene. Multiple governmental and health care organizations, such as the Public Health Agency of Canada, World Health Organization and Centers for Disease Control and Prevention, have long recommended seasonal influenza vaccination for HCWs.^{2,22}

Other attempts in Canada to enact policies of mandatory seasonal influenza vaccination have had limited success. In 2000, the Ontario Ministry of Health and Long-Term Care amended the *Ontario Ambulance Act* to require that paramedics receive annual influenza vaccination.²⁹ Paramedics already needed immunization against tetanus, polio, diphtheria, measles, rubella, hepatitis B and chickenpox. Despite the new legislation, only 9% of Toronto paramedics reported receiving seasonal influenza vaccination, and 50 paramedics in Ontario were suspended without pay. In 2001, Canadian Union of Public Employees Local 416 presented an application to the Ontario Superior Court of Justice declaring compulsory vaccination to be contrary to the *Canadian Charter of Rights and Freedoms*. Ultimately, in 2002, before the issue was

formally addressed in court, the *Ontario Ambulance Act* was altered to allow paramedics to be vaccinated or undertake an educational module on influenza. On the basis of this change, the Canadian Union of Public Employees withdrew its constitutional challenges to the legislation.

The Policy has three great strengths. First, it brought a great deal of public attention to the issue of nosocomial influenza. Second, unlike the *Ontario Ambulance Act* that singled out one group of HCWs, the Policy included all health care professionals who have patient contact. This makes greater biologic sense, as a central goal of any vaccination policy is to surpass a threshold vaccination level (termed “herd immunity”) in a population. Last, the Policy was ultimately successful in increasing influenza vaccination coverage among HCWs after years of prior failures.

A major limitation of the Policy was the sudden suspension of the disciplinary component immediately preceding the flu season. On November 30, 2012, the Deputy Minister of Health announced that the punitive aspect of the Policy was in abeyance in order to facilitate educational efforts and ongoing stakeholder consultations.²² HCW vaccination rates in BC might have been higher had a disciplinary protocol been in effect. Another weakness of the Policy (as initially written) was the failure to include visitors: friends and family of a hospitalized patient are in close contact and are potential sources of disease transmission.

In the spirit of collaborative policy-making, the Ministry of Health has implemented key changes to the Policy for the 2013/14 flu season to address stakeholder concerns. Likely in response to complaints about the confidentiality of medical information, HCWs are no longer required to wear identifiers indicating receipt of the flu shot. Less significant, HCWs are “expected” to report incidents of non-compliance among coworkers, whereas previously they were “required” to do so. Last, visitors to acute and residential care facilities will be obligated to wear masks if not vaccinated.

It is vitally important that data on clinically significant outcomes be prospectively recorded and analyzed. While the stated goal of the Policy is to increase HCW vaccination rates, the ultimate aim is to reduce the incidence of nosocomial influenza and influenza-specific mortality. Furthermore, if a reduction in mortality caused by influenza can be associated with increased HCW vaccination rates, it would provide more support for the Policy.

In summary, institution of the *Influenza Protection Policy* was associated with a higher proportion of BC HCWs being vaccinated. Health care unions and some members of the scientific community questioned vaccine efficacy and considered the Policy coercive. However, a recent arbitration ruling provides support for continued implementation of the Policy. Continued stakeholder engagement is required to ensure that the decision-making process is collaborative and the Policy is not viewed as punitive.

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RÉSUMÉ

OBJECTIF : Une politique de prévention de l'influenza (« la Politique ») vise à accroître la couverture vaccinale contre l'influenza saisonnière chez les travailleurs de la santé (TS) de la Colombie-Britannique.

PARTICIPANTS : Les TS qui travaillent dans des établissements subventionnés par l'État et qui sont présents dans les zones de soins aux patients.

LIEU : La Politique a été annoncée en août 2012; elle est entrée en vigueur à l'échelle de la province durant la saison grippale 2012-2013.

INTERVENTION : Les TS de la Colombie-Britannique sont tenus de recevoir le vaccin contre l'influenza saisonnière avant le début de la saison grippale (le 1^{er} décembre) ou de porter un masque au travail jusqu'à la fin de la saison (le 30 mars). Les TS vaccinés portent une pastille verte sur leur étiquette d'identité. Les TS sont censés dénoncer leurs collègues contrevenants. Selon ce qui était proposé au départ, le non-respect continu de la Politique pouvait entraîner un congédiement (mais cet élément a été mis en suspens).

RÉSULTAT : Pour la saison grippale 2012-2013, 74 % des TS (35 889 sur 48 818) des établissements de soins actifs ont reçu le vaccin contre l'influenza, contre 40 % (23 375 sur 58 212) en 2011-2012 (écart proportionnel=0,33, intervalle de confiance de 95 % [IC] : 0,33-0,34, $p<0,001$). Les taux de vaccination du personnel des établissements de soins résidentiels ont aussi augmenté, passant de 57 % (21 535 sur 37 700) pendant la saison grippale 2011-2012 à 75 % (27 617 sur 36 620) en 2012-2013 (écart proportionnel=0,18, IC de 95 % : 0,18-0,19, $p<0,001$). Les syndicats de travailleurs de la santé ont prétendu que la Politique était coercitive et ont logé un grief auprès de la Commission des relations de travail de la province, qui l'a rejeté.

CONCLUSION : La mise en œuvre de la Politique a été associée à une vaccination accrue des TS; la Politique a été défendue par un arbitre indépendant. Il faudrait pousser la recherche pour corrélérer les taux de couverture vaccinale des TS avec l'évolution de l'incidence de l'influenza et de ses complications. Il est vital de continuer à mobiliser les acteurs pour en arriver à un processus décisionnel concerté.

MOTS CLÉS : personnel sanitaire; vaccination; grippe humaine