Original Research

Immunization Programs: The Role of Pharmacists in British Columbia, Canada

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Abstract

Purpose: In 2009, pharmacists in British Columbia were given the right to become certified in vaccine administration. As many pharmacists have chosen to get certified, there is a need to better understand the current and expected involvement of pharmacists in immunization activities. Our objective was to identify pharmacist and pharmacy characteristics associated with being certified to immunize.

Methods: A cover letter and web link to a 42-item survey was emailed to British Columbia Pharmacy Association (BCPhA)-registered pharmacists. Consent was provided electronically. Respondents' demographics and practice site characteristics were summarized with descriptive statistics. Multivariate logistic regression was used to examine pharmacist and pharmacy characteristics associated with being certified to administer.

Findings: The current analysis was restricted to community pharmacists (n=551) of the 663 pharmacists who responded. Overall, 71.3% of respondents were certified to administer vaccines. The most commonly provided vaccine was influenza (n=464 [84.4%]). The majority (n=445 [80.8%]) of respondents were also interested in administering non-vaccine injectables. Pharmacists who had been in practice for more than 20 years were less likely to be certified as compared to those who had been in practice for 5 or less. Job position was related to certification; both managers and owners were more likely than staff to be certified. With respect to pharmacy type, chain and foodstore pharmacies were both more likely than independent pharmacies to employ certified pharmacists.

Conclusion: Many community pharmacists are involved in immunizations and there is an interest to continue expanding the provision of vaccine and non-vaccine injectables. There are also important pharmacist and pharmacy characteristics correlated with being more likely to provide vaccinations: having been in practice for fewer years, being in a position of influence, and being a larger pharmacy. This information can be used to encourage more pharmacists to become immunizers.

Tags: Pharmacists, vaccination, primary prevention, community health services.

Introduction

With the rise of chronic disease, an aging population, and the proliferation of clinical practice guidelines, the Canadian primary care system is increasingly challenged to cope with escalating patient demands while controlling costs (1,2,3). The gap between limited resources and demand can be at least partially reconciled by turning to other highly trained primary health care professionals, including community pharmacists. One area in which pharmacists can potentially have an important impact is adult immunization (4). Canadian adults consistently fail to meet immunization targets for most recommended vaccines, despite the merits of vaccination and endorsements by the National Advisory Committee on Immunization (NACI) and other health organizations (5). For instance, despite the fact that the flu is responsible for approximately 4,000-5,000 hospitalizations and 300 deaths every year in Canada, influenza vaccination rates for the most susceptible are sub-optimal (64.9% for those over 65 and 37.7% for those with a chronic medical condition under 65, with a target of over 80%) (6, 7). Furthermore, in comparison to the relatively well-publicized flu shot discussed above, pneumococcal vaccination rates are 38% and 19% in those over 65 and those with a chronic medical condition, respectively, with the target also being 80% (6). In addition to chronic care, the recent Ebola outbreak highlights the importance of having the necessary infrastructure available to vaccinate an entire population quickly. Pharmacists have already expressed a willingness to be actively involved in emergency preparedness and response (8) and believe it to be within their scope of practice.

Pharmacists are well-positioned to address the most pressing barriers to vaccination among Canadians, such as a lack of awareness of the benefit of vaccinations and the necessity for a highly accessible venue to administer vaccinations (9). In-pharmacy services can raise awareness through advertising and counseling at the time of medication dispensing and their more extensive hours of operation and shorter wait times can also facilitate easier access than physician offices. This idea was put into practice in British Columbia (BC) in 2009, providing a unique Canadian setting in which to study the question. In 2016, except in Quebec and the territories, pharmacists can administer at least the flu shot, and more often any vaccination or injectable drug (10). Pharmacists in Quebec have not yet shown much interest in immunizing (11).

The need for widespread immunization against the H1N1 virus in 2009 created pressure for the BC Ministry of Health Services to change the regulations governing the scope of practice for pharmacists to include administering certain injections, including vaccinations (13). By November 2013, nearly half (~2,700) of all pharmacists had received certification to administer injections in the province (14). Initially, pharmacists only had access to the public supply of pandemic H1N1, seasonal influenza, and polysaccharide pneumococcal vaccines. The success of these initial programs, however, led the BC

Immunization Committee to further expand pharmacists' access to publicly funded vaccines in February 2013. Prior to this date, pharmacists were required to order vaccines from private suppliers and charge patients or third party payers for the cost of the vaccine and its administration. Pharmacists now have access to and are remunerated for the administration of additional publicly funded vaccines, including Td (tetanus diphtheria), MMR (measles, mumps, and rubella) and HPV-Cervarix (14). Pharmacists also have the authority to administer some other publicly-funded vaccines by special request (14). What remains unclear is whether pharmacists identify with the role of immunizer and how different characteristics of the pharmacy might impact this.

The objective of this study was to describe current and expected pharmacist involvement in immunization activities and to identify pharmacist and pharmacy characteristics associated with being certified to immunize.

Methods

Study design: This study used secondary data collected from a survey to create a cohort of community pharmacists.

Data source: The University of British Columbia partnered with the BCPhA and Ipsos Reid to conduct a survey of BC pharmacists in order to describe and better understand pharmacist-administered immunization practices in the province. The content was based on previous surveys conducted in BC and elsewhere (12, 14). Ipsos sent an email to all pharmacists registered with the BCPhA, inviting them to participate in the online survey. Consent was provided electronically prior to survey administration. The survey took approximately 15 minutes to complete. It was comprised of 42 questions and was open from July 6 to November 21, 2012. It contained questions pertaining to demographics, certification status, types of vaccines being provided, barriers to in-pharmacy immunization, available pharmacy and fridge space, thoughts on non-immunization related injections and travel vaccines, and the future of immunization in BC. The BCPhA's contact list contained valid email addresses for 3,910 pharmacists out of a total of 4,197 in the province at the time the survey was administered. Among them, 51 were on Ipsos Reid's 'do not contact list' and 12 opted out of the survey, for a final denominator of 3,847.

Additionally, pharmacy owners and managers were sent an endorsement letter from the BCPhA highlighting the importance of obtaining feedback from the pharmacists in their stores. Finally, efforts were made to contact pharmacists who started but did not complete the online survey by sending out a reminder email. The electronic format required all questions to be answered (with no option to decline) in order for a survey to be considered complete, so there was no missing data.

Statistical methods: Frequency counts and descriptive statistics were generated for respondents' demographic information and pharmacy characteristics. A two-sided significance level of 0.05 was used for all statistical tests. Multivariate logistic regression models were used to examine pharmacist and pharmacy characteristics associated with being certified to administer vaccinations. The model included relevant pharmacist- and pharmacy-level variables which were specified a priori. At the pharmacist level, gender, years in practice, position, and decision-making influence were included in the model. Pharmacy-level variables included location of the pharmacy (health authority and rural or urban setting), pharmacy type, number of patient services provided, and number of registered patients over 65. All analyses were conducted using SPSS 21.0 software. Ethics approval for the study was obtained from the UBC Behavioural Ethics Committee.

Results

Demographics

Pharmacist-related demographics

Response rate: Of the 3,847 pharmacists that received the survey, a total of 663 pharmacists responded (response rate of 17.2%) (Table 1). This analysis included only the community pharmacists (n=551 [83.1%]). The remaining respondents (n=112 [20.3%]) were excluded because they self-identified as hospital pharmacists or 'other', or because they worked at a non-community pharmacy site (head office position, hospital, other).

Among the respondents, 71.3% (n=393) of community pharmacists were authorized to administer injections. Half of the respondents were women and most pharmacists had been working between 20-30 years. Pharmacists identified as either staff, managers, or owners, with the majority being staff.

Pharmacy-related demographics

Pharmacies were located in all 5 of the province's health authorities with only a small number coming

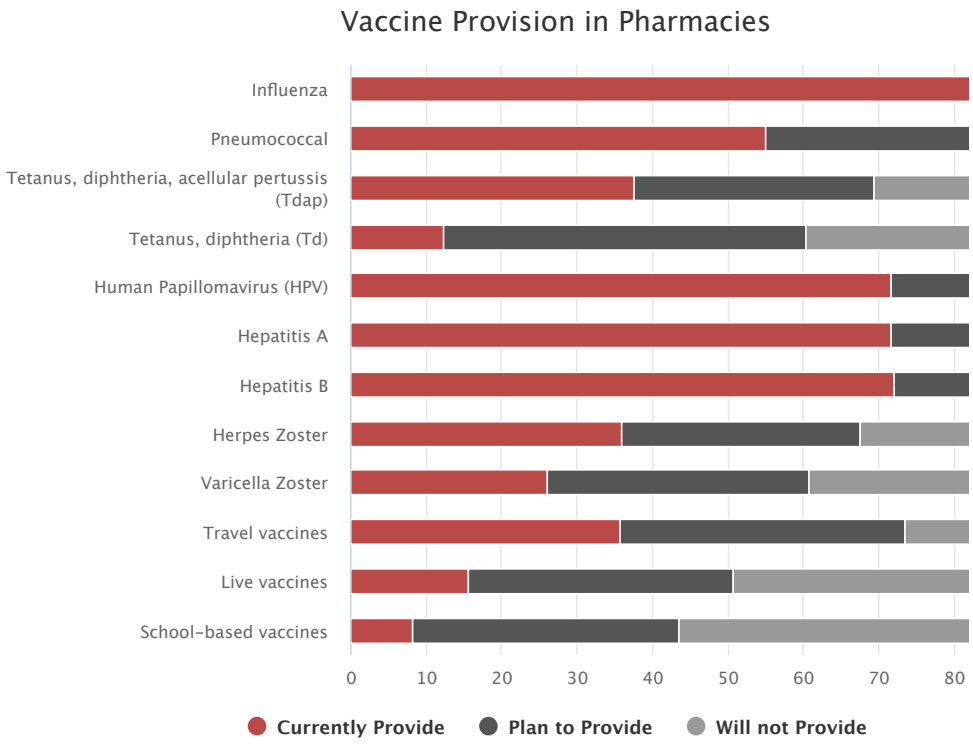
from rural locations (Table 2). It should be noted that the analysis of pharmacy-related demographics was conducted at the individual pharmacist level. Examination of the postal codes of respondents showed that most of the responding pharmacists came from different pharmacies. Only three were represented by more than one pharmacist (with a maximum of four pharmacists per pharmacy).

On average, the pharmacies served between 1,000-5,000 patients over the age of 65. Pharmacies were classified as either independent, banner/franchise/chain (referred to in the rest of the text as 'chain'), foodstore, or mass merchandiser. Almost half (n=256) of pharmacies provided six or more non-dispensing patient services from a list of nine on the survey. The vast majority of pharmacies provided pharmacist-administered vaccinations. Collinearity was assessed using the Pearson correlation and variance inflation factors and it was determined to not be a factor.

Current and expected involvement in immunization

Currently available immunizations

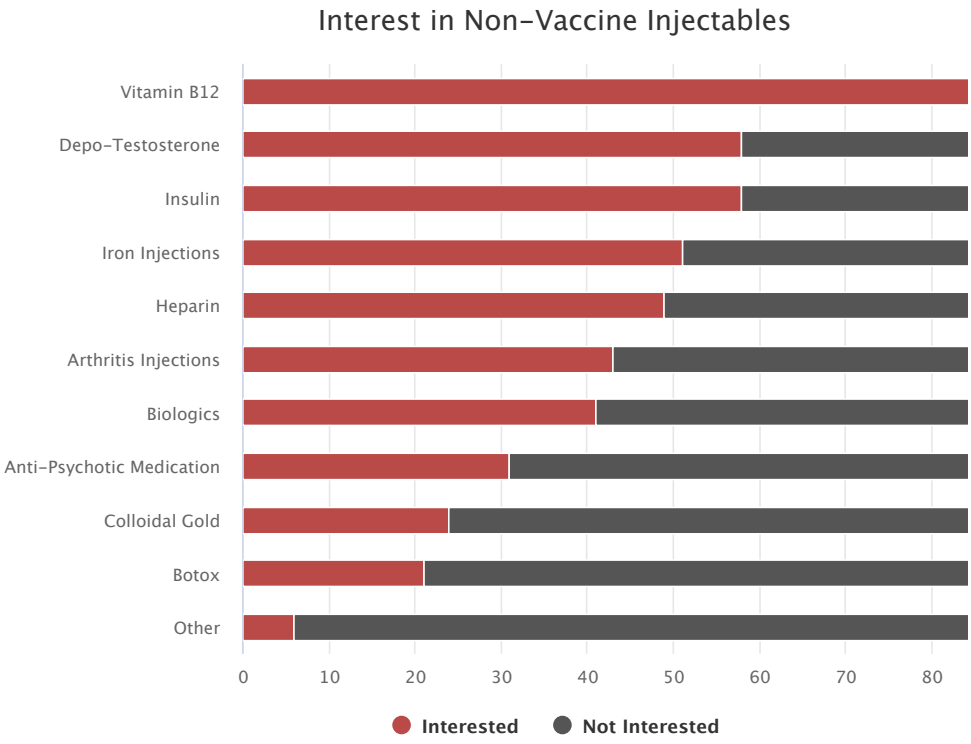
Pharmacists were asked to identify which vaccines were provided at the pharmacy at which they work (Figure 1). The most commonly provided vaccines were influenza, hepatitis B, hepatitis A, and HPV. Far fewer pharmacists offered live vaccines or school-based vaccines. The majority of pharmacists (n=365 [77.5%]) provided these vaccines on either an appointment and/or walk-in basis, with a fifth (n=90 [19%]) offering services on evenings and/or weekends. When asked their preferences, 82.3% (n=428) of pharmacists responded that they would like to provide appointment-based vaccinations, while only 48.4% (n=321) would want to provide walk-in appointments. 16.1% (n=107) pharmacists responded that they would want to provide vaccinations on the evenings and/or weekends.



Among pharmacists who described themselves as either very or somewhat willing to administer medications by injection, 94.6% (n=402) are willing to vaccinate patients 18 years of age or older. This percentage changed as patient age decreased; only 10.2% (n=45) of respondents said they would be willing to vaccinate children under 5 years of age. Only 19.3% (n=85) stated that they were comfortable with providing vaccination services to special populations (i.e. renal transplant, immuno-compromised, HIV patients, etc.).

Non-vaccine injectables and travel vaccines

The majority of pharmacists (n=517 [93.8%]) did not use the option of employing nurses to administer non-vaccine injectables in their pharmacy (Figure 2). However, 80.8% (n=445) of pharmacists were either very interested or somewhat interested in administering non-vaccine injectables themselves. Among those, there was most interest in administering B12, insulin, and depo-testosterone. There was less interest in injecting anti-psychotic medication, botox, and colloidal gold.



The pharmacists were also asked about travel vaccines. Currently, 37.7% of pharmacists provide travel vaccines. Although only 8.7% of pharmacists currently held travel clinics, 41.4% expected to do so in the future. Additionally, compared with other pharmacy-provided services, for which an average of 30.1% of pharmacists charge fees, 70.8% of pharmacists charge fees for travel clinics. Of those pharmacists who were interested in administering non-vaccine injectables, 88.3% thought that further training on travel vaccine topics would be beneficial.

Pharmacist and pharmacy characteristics associated with being certified to immunize

Pharmacist characteristics associated with being certified to immunize

Several pharmacist characteristics were statistically significantly associated with being certified to administer vaccines in multivariate logistic regression models (Table 1). As the length of time spent as a pharmacist increased, the likelihood of being certified to immunize decreased. Pharmacist position was also significantly associated with certification; managers and owners were both more likely to be certified than staff. Being in a position to influence decisions made at the pharmacy was also significantly associated with being certified to administer. Collinearity was not a factor.

Table 1: Binary logistic regression analysis of pharmacist characteristics associated with being certified to administer vaccines

Variable	Total Sample% (n=551)	Certified to administer % (n=393)	Crude OR (95% CI)	Adjusted OR (95% CI)
Gender				
Male	49.4 (272)	70.3 (196)	-	-

Female	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
Length of time as a pharmacist*				
Less than 5 years	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
5-9 years	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
10-19 years	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
20-30 years*	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
Greater than 30 years*	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
Title/position*				
Community pharmacist (staff)	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
Community pharmacy* manager	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
Community pharmacy owner*	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
Influence*				
Does not influence decisions at practice site	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
Influences decisions*	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
* Significant correlation ($p < 0.05$)				

Pharmacy characteristics associated with being certified to immunize

Table 2 summarizes the pharmacy characteristics that were assessed. Pharmacy type influenced the likelihood of having certified pharmacists. Compared to independent pharmacies, chain pharmacies and foodstores were both more likely to have certified pharmacists. The number of registered patients over 65 years old was a significant factor as well; larger pharmacies (> 10,000 patients over 65) were more likely than their smaller counterparts to employ certified pharmacists.

Table 2: Binary logistic regression analysis of pharmacist characteristics associated with being certified to administer vaccines

Variable	Total Sample% (n=551)	Certified to administer % (n=393)	Crude OR (95% CI)	Adjusted OR (95% CI)
Gender				
Male	49.4 (272)	70.3 (196)	-	-
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Influence*				
Does not influence decisions at practice site	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
Influences decisions*	50.6 (279)	72.4 (197)	0.90 (0.62-1.30	0.98 (0.62-1.52)
* Significant correlation ($p < 0.05$)				

Discussion

This study assessed the delivery of immunization services being provided by pharmacists in BC. Our results show that community pharmacists are involved in the delivery of immunization services with a certification rate of 71.3%. In this survey, we have also shown that the majority of pharmacists indicated

that they intend to increase the types of vaccines provided. There was also significant interest in administering non-vaccine injectables.

According to our study, certified pharmacists tend to have been in practice for fewer years on average and they are also more likely to be managers and owners than staff. Previous research indicates that pharmacists who have been in practice for fewer years have consistently been more likely to be certified or to be more supportive of administering vaccines (12, 15, 16). In contrast, results regarding the influence of position (i.e. staff, manager, owner) vary somewhat. A study by Kamal et al. based on a cross-sectional mail survey in the US found that managers and owners were more likely than staff to provide immunizations (14). In comparison, a study by Crawford et al. found no such associations, however their cross-sectional survey was based on a survey among Expanded Syringe Access Program pharmacies (17).

The trend for pharmacists having been in practice for fewer years to be certified contrasts with the influence of position as the managers or owners tend to be older. One explanation could be that although younger pharmacists are more likely to be certified than older pharmacists in general, pharmacy owners and managers are exceptions because they are more motivated than the average pharmacist to be certified. In the case of our results, there are more certified managers and owners than expected who had been practicing for 10 to 19 years, supporting this hypothesis. Another explanation could be that managers and owners feel they need to be certified so that they can be available as a clinical resource if staff members decide to get certified. Interestingly, although patients have been show to appreciate the increased accessibility the pharmacists offer (18), pharmacists themselves are less interested in providing vaccinations during extended service hours.

With regards to pharmacy characteristics, our results indicated that chain and foodstore pharmacies are more likely to employ certified pharmacists than independents and mass merchandisers. This is in contrast to previous studies which have shown that independent pharmacies tended to be most likely to offer immunization services (14, 16, 19). One possible explanation is the 'early adopter' effect. Research by Doucette et al. theorized that implementing interventions in independent pharmacies is more manageable and independent owners are more interested in expanding practices (20). This could be because independent pharmacy owners, in order to compete with larger chains, are more entrepreneurial and thus more willing to offer 'innovative' patient services (21).

These factors indicate that independents are more likely to be early adopters. Westrick et al. has previously described the 'earlier (sustainer) and later (new) adopter' effect with respect to immunization services (16). In the previous studies, immunization by pharmacists might still have been considered 'innovative'. The BC government, however, only implemented the policy in 2009 once significant amounts of research supporting the practice had already been produced in the U.S. As such, it is possible that there were not as many perceived 'risks' associated with the service. This might very well be the case in BC given that the first group to step forward and adopt the practice was Safeway, a large foodstore pharmacy. As soon as the legislation was passed, Safeway implemented their U.S. training program in BC. London Drugs, a large Canadian chain pharmacy, also produced their own training session soon after. Pharmacies with between 5,000 and 10,000 registered patients over 65 years of age were most likely to provide immunizations. Other categories within number of registered patients over 65 revealed no trends so this finding is still speculative.

Another frontier for pharmacists is travel medicine. Although the practice is not yet widely engaged in, according to our results many pharmacists in BC expect to hold travel clinics and provide travel vaccines in the future, and are very interested by the prospect of receiving further training on the topic. Comprehensive pre-travel clinics have operated successfully in the U.S. for years now (22, 23). In the U.S. cases, pharmacists were responsible for providing necessary travel information and administering the vaccine and the process was coupled to close communication with the patients' physicians. With international travel on the rise, travel medicine provided in collaboration with physicians may be an important avenue for evolving pharmacy practice.

In addition to immunization, we also found a significant interest in the delivery of non-vaccine injectables, an activity in which Alberta pharmacists are already engaged (14). Technically, the legislation enacted in 2009 that allowed pharmacists to inject includes all intramuscular and intradermal injections, which encompasses non-vaccines. Despite this, the College of Pharmacists of BC has limited the activity to "injections for the purpose of preventing disease, disorders or conditions such as immunizations and travel clinics" under the Standards Limits and Conditions (25). Nevertheless, this study indicates that BC pharmacists are ready to take the next step.

This study has many of the limitations associated with cross-sectional surveys. As is typical of surveys among health care professionals, the response rate was low, which could compromise representativeness. Despite the low response rate, when our respondents are compared to the population of pharmacists in BC, both the gender and age distribution of our sample was approximately

equivalent to the population distribution (26). Urban and rural pharmacist representation is also similar to the provincial average (26). Pharmacist staff are under-represented (39.8% compared to a provincial average of 64.2%) and managers and owners are over-represented (50.4%), as together they represent only 29.8% of the community pharmacist workforce (26). Most importantly, our sample is significantly more likely to be authorized to administer injections (71.3%) than the provincial average of around 40% at the time of the survey (27). This last point could have resulted in an over-estimation of immunization activities currently being conducted in pharmacies as well as pharmacist interest in expanding the scope of immunization practices.

In conclusion, pharmacists are very involved in immunization in BC. Several pharmacist and pharmacy characteristics are associated with certification status. This information can be used to develop targeted programs to encourage more pharmacists to become certified or to help with the planning of public health immunization strategies. Further, pharmacists have expressed a clear interest in expanding their role as immunizers and this should provide impetus to the BC College of Pharmacists to review the limitations set and allow pharmacists to provide non-immunization injections, as set out by the legislation. An important next step will be to determine the impact of this strategy on public health outcomes in the population.

Competing Interests

The authors declare that they have no competing interests.

Author's Contribution

FM and JK were responsible for organizing the creation and dissemination of the survey. They also provided guidance for the appropriate methodology to be used in AF's analysis, and have done draft review of the manuscript to improve its coherence. GB provided methodology support and draft review. With help from the co-authors, AF was responsible for creating the research objectives, conducting the analysis and writing the majority of the article. All authors read and approved the final manuscript.

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