Pharmacists as immunizers, their pharmacies and immunization services: A survey of Ontario community pharmacists

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Now that Ontario pharmacists have had several seasons of administering the influenza vaccine, we felt it was important to examine their perspectives about this new role, in order to provide benchmark data and direction for maintaining and expanding future immunization services.

Après plusieurs saisons à administrer le vaccin contre la grippe, les pharmaciens de l'Ontario ont acquis un nouveau rôle, et nous estimions important d'examiner les perspectives reliées à ce rôle, afin de fournir des données de référence et des orientations quant au maintien et au développement des services de vaccination futurs.

ABSTRACT

Background: To improve patient access to the influenza vaccine in Ontario, pharmacists have been authorized to administer the vaccine since 2012. A survey was conducted to describe pharmacist immunizers, their pharmacies and immunization services.

Methods: Ontario community pharmacists completed an anonymous online survey regarding influenza immunization. Descriptive, comparative and multivariate statistics were used to analyze data on pharmacists' personal demographics, current workplace characteristics, immunization certification status and past and anticipated experience vaccinating.

Results: Of the 4307 community pharmacists contacted, 18.4% ($n = 780$) completed the survey. Most (81.3%, $n = 603$) were certified to administer vaccines, with those practising in urban pharmacies twice as likely to be certified compared to pharmacists practising in rural pharmacies (odds

ratio = 2.04; 95% confidence interval, 1.04 to 4.01, $p = 0.04$). In the past influenza season, 70% of pharmacists had administered over 50 vaccines and 37% worked at pharmacies that had administered more than 300 vaccines. Respondent-provided profiles of immunization services described partnerships with public health, a variety of approaches for in-pharmacy and external advertising and patient vaccine access mainly through walk-in.

Discussion: Ontario community pharmacists demonstrate strong engagement with this expanded scope and there is further capacity for immunization service provision through engaging rural pharmacies, addition of other vaccines and leveraging the positive relationship with public health. Patients and the public benefit from easy access to the service and the additional in-store and external promotion of influenza vaccination that is provided by pharmacists and pharmacies.

Conclusion: These provincial benchmarking data provide direction for maintaining and expanding community pharmacist-provided influenza immunization. *Can Pharm J (Ott)* 2018;151:263-273.

Introduction

Annual vaccination against the influenza virus is the most effective method of preventing influenza-related illness and serious complications, including pneumonia, hospitalization and death.^{1,2} Implemented in 2000, Ontario was

the first province to offer a Universal Influenza Immunization Program (UIIP) with free influenza vaccinations to all residents 6 months of age and older.^{2,3} The program resulted in an increase of Ontario's influenza vaccine coverage from 18% in 1996/1997 to 42% in 2005.³ More

KNOWLEDGE INTO PRACTICE

- Ontario pharmacists were granted influenza immunization authority in 2012, with 3 other provinces having authority prior to this date, 5 since then and 1 province and 3 territories with no authority at this time.
- In just 2 years postimmunization authority, pharmacists have demonstrated strong engagement with this new public health role by becoming injection certified, providing a considerable number of vaccines in an influenza season and promoting influenza vaccination in-store and to the general public.
- Further capacity exists for service expansion, particularly in rural areas, and pharmacy services are being provided in an accessible manner to patients.
- This early implementation provincial-level survey provides benchmark data and direction for maintaining and expanding community pharmacist-provided influenza immunization.

recent Canadian numbers show a similar 40.3% influenza vaccination rate.⁴ While this is a significant improvement in protection, the 80% influenza vaccination rate target set by the National Consensus Conference for Vaccine-Preventable Diseases in Canada in 2008 for those ≥ 65 years of age and those less than 65 with high-risk conditions is still not being met.^{2,5}

Pharmacist-administered influenza vaccination is considered an important strategy to improve overall vaccination rates. While slower than the United States to embrace and legislatively allow this expanded role, various Canadian provinces have recently enabled pharmacists to provide influenza immunization, once they have completed specific certification requirements.⁶ Community pharmacists also play an important role as influenza vaccine advocates, due to their training as patient educators, their ability to build trusting relationships with patients, the ease and convenience for patients to access their community pharmacies and their ability to partner with nurse and physician immunizers. Several recent systematic reviews and meta-analyses^{7,8} and predictive analyses of large public surveillance surveys in Canada⁹ and the United States¹⁰ have identified an increased likelihood of an individual being vaccinated and a modest increase in overall immunization coverage if you live in a state or province where pharmacists can vaccinate. Most, but not all, of these data were related to influenza immunization.

Only a few studies have examined Canadian pharmacists' perspectives on providing

immunization services.¹¹⁻¹⁴ Many of these surveys were intended to capture pharmacists' opinions about pharmacists-as-immunizers in general and therefore included many respondents who had little or no experience in administering vaccines or providing direct patient care. A survey of community pharmacists in Quebec, where pharmacists currently do not have authorization to vaccinate,¹¹ demonstrated that half of the 1102 respondents reported that, if permitted to do so, they would be willing to administer vaccinations. Similar results were found in a Canada-wide survey,¹³ where 51% of the participating 495 community pharmacists reported willingness to incorporate vaccine administration into their own practice. Surveys in non-Canadian jurisdictions had similar limitations regarding the number of actively immunizing pharmacists included in the surveys.¹⁵⁻¹⁸ Therefore, the pharmacist survey work that has been conducted has been descriptive only and often captures opinions of pharmacists who are not immunizing.

Ontario pharmacists have been permitted to administer the influenza vaccine since 2012. During the 2015/2016 influenza season, over 867,700 individuals were vaccinated against influenza by pharmacists.¹⁹ To better understand the pharmacists who are engaged in this new scope of practice, as well as the specifics of the pharmacist-provided influenza vaccination services in the province, a survey of Ontario pharmacists was conducted. The results from our survey can provide a benchmark to inform decisions regarding current practices, can facilitate further capacity in delivering this service and inform expansion to additional vaccines, both for provinces already providing this service and those anticipating expanded scope of practice.

Material and methods

A survey was developed by researchers from the Ontario Pharmacy Evidence Network (OPEN) to measure community pharmacists' perceptions of and current practices regarding the administration of the influenza immunization. In 2014, the anonymous, online survey was distributed via email to all pharmacists listed in the Ontario College of Pharmacists register who had previously agreed to be contacted to participate in research. The email invitation to participants included an overview of the study purpose and objectives, as well as a link to the electronic

survey delivered using Qualtrics online survey software (Provo, UT), and described a participation incentive (a draw for 1 of 4 fitness watches valued at \$150 CDN each). A paper version of the survey was made available at participants' request. It was anticipated that the survey would take approximately 10 minutes to complete. The survey was active for 6 weeks from the date of invitation, with reminders sent to invitees at the end of weeks 2 and 4.

Survey questions were developed based on existing survey tools from the literature, then pilot tested on several pharmacists and nonpharmacists and then revised accordingly. A screening question was included at the start of the survey to ensure that all participants were currently working full- or part-time in a community pharmacy. Survey questions can be found in online Appendix 1 and included demographics, job satisfaction, the respondents' opinion on additional vaccines that pharmacists should be permitted to administer and the type of community pharmacy where the respondent practised, including details related to staffing and questions related to the pharmacy's vaccination delivery service. Pharmacy rurality was determined using the first 3 characters of the pharmacy's postal code and the Statistics Canada Postal Code Conversion File (Statistics Canada, 2006 Census Dictionary [catalogue 92-153-XCB], April 2007).

Only respondents who answered the question as to whether they were certified to immunize were included in the final analysis. For those who were certified to immunize, details regarding their certification process, whether they had administered the vaccine and further details about the delivery and advertising of influenza vaccine in the pharmacy were asked. Those not certified were asked whether they were planning to become certified. Apart from the screening question, individuals were permitted to skip any question they preferred not to answer. The survey received approval from the human research ethics boards of the Universities of Waterloo and Toronto.

Analyses

Survey results were analyzed using SAS 9.4 (SAS Institute, Cary, NC). Responses to survey questions were reported descriptively using means, standard deviations and frequencies. Chi-square tests were used to assess differences in

MISE EN PRATIQUE DES CONNAISSANCES

- Les pharmaciens de l'Ontario ont obtenu l'autorisation de fournir des services de vaccination contre l'influenza en 2012; à ce moment-là, trois autres provinces avaient accordé cette autorisation, cinq l'ont fait depuis, une province et trois territoires ne l'ayant toujours pas fait à ce jour.
- Deux ans seulement après avoir reçu l'autorisation d'administrer le vaccin, les pharmaciens ont fait preuve d'un engagement fort à l'égard de ce nouveau rôle de santé publique en obtenant l'attestation nécessaire leur permettant d'administrer des médicaments par injection, en fournissant un nombre considérable de vaccins pendant la saison grippale et en faisant la promotion de la vaccination antigrippale en magasin et auprès du public.
- Les pharmaciens ont la capacité nécessaire pour étendre les services, en particulier dans les zones rurales, et les services de pharmacie sont accessibles aux patients.
- La première étape de ce sondage provincial fournit des données de référence et des orientations relativement au maintien et à l'élargissement de la vaccination contre l'influenza offerte par les pharmaciens communautaires.

the frequency distributions of the pharmacists, pharmacy and immunization service characteristics between those certified and those not certified to immunize, as well as, for those pharmacists not certified to vaccinate, between those planning and not planning to become certified. Multivariate analysis was performed using a logistic regression model to assess the effects of all basic characteristics on certification status. Only covariates that led both to a p -value of less than 0.05 on the Wald's t test and to an increase in model fit as judged by the Akaike information criterion (AIC) were retained in the final model.²⁰

Results

Response rate

The survey was sent to 4307 pharmacists who were registered with the Ontario College of Pharmacists and had given their permission to be contacted for potential participation in research studies. Of the 780 (18.4%) pharmacists who completed the survey, 742 (95.1%) respondents answered the question about whether they were certified to administer vaccines. Figure 1 illustrates survey response rate, pharmacist injection certification and whether they had vaccinated or not.

FIGURE 1 Survey response, injection certification and experience

Pharmacist characteristics

Pharmacist demographics are reported in Table 1. The average age of the 742 respondents was 47 years, 383 (51.6%) were female, 126 (30.5%) had practised for less than 10 years and 352 (47.4%) had practised for more than 20 years. Staff pharmacists (full-time, part-time and relief) numbered 404 (54.5%); 422 (56.8%) worked in banner, chain or franchise pharmacies; 170 (22.9%) worked in independent pharmacies; and 601 (81%) worked in urban pharmacies. The majority ($n = 541$, 72.9%) were satisfied or very satisfied with their job.

Most pharmacists in our sample ($n = 603$, 81.3%) reported that they were certified to administer the influenza vaccine. In comparison to noncertified pharmacists, certified pharmacists were significantly younger, were more likely to work in pharmacies in urban areas that were chain or franchise pharmacies, more likely to identify themselves as nonstaff (i.e., manager, owner, or other) and were more likely to work a greater number of hours per week. In the multivariate analysis, only geographic location of the community pharmacy was associated with being certified; specifically, pharmacists who practised in community pharmacies located in an urban area had double the odds of being certified to administer vaccinations compared to pharmacists who practised in community pharmacies located

in rural areas (odds ratio [OR] = 2.04; 95% confidence interval [CI], 1.04 to 4.01; $p = 0.04$).

Immunization experience

Of those pharmacists certified to administer, 512 (84.9%) pharmacists indicated they had in fact administered the influenza vaccine, with many administering the vaccine in the most recent (2013/2014) influenza season ($n = 483$, 94.3%). Of those who had administered the influenza vaccine, 240 (39.8%) had administered more than 100 immunizations, 180 (29.8%) administered 51 to 100, 73 (12.1%) administered 26 to 50 and 60 (10.0%) administered fewer than 25 vaccinations.

Certification

Most pharmacists received their certification in 2013 ($n = 274$, 45.4%) and 2012 ($n = 249$, 41.3%), and almost all pharmacists received their certification from a Canadian-based program ($n = 599$, 99.3%). Most ($n = 442$, 73.3%) received their certification via the Ontario Pharmacists Association's program, whereas 4.9% received their certification from universities and 21.7% from other training sites such as Pear Health (www.pearhealthcare.com) and RxBriefCase (www.rxbriefcase.com).

Among the 139 noncertified pharmacists, 51 (36.7%) indicated that they were planning to become certified, 51 (36.7%) indicated they were

TABLE 1 Comparison of characteristics of vaccine-certified and not certified pharmacists and their community pharmacies

	Currently certified to administer vaccines						<i>p</i> -value
	No (<i>n</i> = 139)		Yes (<i>n</i> = 603)		All (<i>N</i> = 742)		
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	
Pharmacist characteristics							
Age (years): mean (SD)	53.0	(11.7)	46.0	(11.3)	47.0	(11.7)	<0.01
Age groups (years)							<0.01
<26	1	(0.7)	7	(1.2)	8	(1.1)	
26-40	19	(13.7)	183	(30.3)	202	(27.2)	
41-55	52	(37.4)	261	(43.3)	313	(42.2)	
56-64	35	(25.2)	102	(16.9)	137	(18.5)	
≥65	24	(17.3)	20	(3.3)	44	(5.9)	
Missing	8	(5.8)	30	(5.0)	38	(5.1)	
Gender							0.35
Female	64	(46.0)	319	(52.9)	383	(51.6)	
Male	73	(52.5)	280	(46.4)	353	(47.6)	
Missing	1	(0.7)	3	(0.5)	4	(0.5)	
Other (e.g., trans)	1	(0.7)	1	(0.2)	2	(0.3)	
Other degrees (PharmD, Master's) or formal training (residency/fellowship) in addition to bachelor in pharmacy							0.90
Yes	14	(10.1)	63	(10.4)	77	(10.4)	
No	125	(89.9)	540	(89.6)	665	(89.6)	
Years of being a registered pharmacist							<0.01
Less than 5 years	12	(8.6)	111	(18.4)	123	(16.6)	
5-10 years	7	(5.0)	96	(15.9)	103	(13.9)	
11-15 years	9	(6.5)	74	(12.3)	83	(11.2)	
16-20 years	14	(10.1)	67	(11.1)	81	(10.9)	
More than 20 years	97	(69.8)	255	(42.3)	352	(47.4)	
Role in community pharmacy where survey respondent most often works							<0.01
Full-time staff	26	(18.7)	200	(33.2)	226	(30.5)	
Part-time staff	35	(25.2)	88	(14.6)	123	(16.6)	
Freelance/relief	26	(18.7)	29	(4.8)	55	(7.4)	
Manager	23	(16.5)	116	(19.2)	139	(18.7)	
Owner	14	(10.1)	96	(15.9)	110	(14.8)	
Other	15	(10.8)	71	(11.8)	86	(11.6)	

(continued)

TABLE 1 (continued)

	Currently certified to administer vaccines						<i>p</i> -value
	No (<i>n</i> = 139)		Yes (<i>n</i> = 603)		All (<i>N</i> = 742)		
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	
Missing	0	0	3	(0.5)	3	(0.4)	
Number of hours per week in the community pharmacy where the survey respondent most often works							<0.01
Less than 8 hours	19	(13.7)	17	(2.8)	36	(4.9)	
From 8 to 24 hours	32	(23.0)	81	(13.4)	113	(15.2)	
From 25 to 40 hours	61	(43.9)	355	(58.9)	416	(56.1)	
More than 40 hours	24	(17.3)	144	(23.9)	168	(22.6)	
Other/missing	3	(2.2)	6	(1.0)	9	(1.2)	
Other practice settings where survey respondent works							<0.01
Hospital pharmacy	2	(1.4)	7	(1.2)	9	(1.2)	
Family health team	4	(2.9)	8	(1.3)	12	(1.6)	
Ambulatory care clinic pharmacy	0	0	5	(0.8)	5	(0.7)	
Long-term care pharmacy	3	(2.2)	14	(2.3)	17	(2.3)	
Other settings (including academia and government)	11	(7.9)	9	(1.5)	20	(2.7)	
None	119	(85.6)	560	(92.9)	679	(91.5)	
Level of satisfaction with current job/practice of pharmacy							0.28
Very satisfied	39	(28.1)	121	(20.1)	160	(21.6)	
Satisfied	71	(51.1)	310	(51.4)	381	(51.3)	
Neutral	15	(10.8)	92	(15.3)	107	(14.4)	
Dissatisfied	7	(5.0)	40	(6.6)	47	(6.3)	
Very dissatisfied	7	(5.0)	37	(6.1)	44	(5.9)	
Missing	0	0	3	(0.5)	3	(0.4)	
Characteristics of the community pharmacy where survey respondent most often works							
Type of community pharmacy							<0.01
Banner (e.g., IDA, Guardian, Pharmasave)	21	(15.1)	74	(12.3)	95	(12.8)	
Chain (more than 6 stores with one owner, e.g., Rexall, PharmaPlus)	7	(5.0)	106	(17.6)	113	(15.2)	
Franchise (e.g., Shoppers Drug Mart, Medicine Shoppe)	19	(13.7)	195	(32.3)	214	(28.8)	
Independent (one owner up to 6 stores)	65	(46.8)	105	(17.4)	170	(22.9)	
Mass merchandiser/food store (e.g., Loblaws, Walmart)	15	(10.8)	84	(13.9)	99	(13.3)	
More than one type of community pharmacy practice	8	(5.8)	33	(5.5)	41	(5.5)	
Other practice (e.g., consultant)	4	(2.9)	6	(1.0)	10	(1.3)	

(continued)

TABLE 1 (continued)

	Currently certified to administer vaccines						<i>p</i> -value
	No (<i>n</i> = 139)		Yes (<i>n</i> = 603)		All (<i>N</i> = 742)		
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	
Geographic location							<0.01
Urban	100	(71.9)	501	(83.1)	601	(81.0)	
Rural	24	(17.3)	49	(8.1)	73	(9.8)	
Missing	15	(10.8)	53	(8.8)	68	(9.2)	
Community pharmacies' involvement in influenza immunization							
Pharmacy's involvement with influenza immunization							<0.01
Staff pharmacists (one or more) administer the vaccine	56	(40.3)	525	(87.1)	581	(78.3)	
Nurses/nursing agencies contracted by the pharmacy administer the vaccine	7	(5.0)	4	(0.7)	11	(1.5)	
No current involvement but planning to participate in the future	30	(21.6)	44	(7.3)	74	(10.0)	
No current involvement and no immediate plans for involvement in the future	36	(25.9)	15	(2.5)	51	(6.9)	
Other/missing	10	(7.2)	15	(2.5)	25	(3.4)	

not planning to become certified and 38 (27.3%) were unsure. Those who were planning to become certified were significantly more likely to have had fewer years of work experience and practised within a mass merchandizer pharmacy versus a franchise or independent pharmacy.

Pharmacist-administered vaccination services

High patient uptake, defined as more than 400 administered influenza vaccines at the community pharmacy during one influenza season, was reported by just over a quarter (*n* = 160, 26.5%) of respondents. The remainder of pharmacies reported uptake as follows: vaccination services provided to 301 to 400 individuals: *n* = 62, 10.3%; 201 to 300: *n* = 77, 12.8%; and fewer than 200 individuals: *n* = 149, 24.7%.

Certified pharmacists reported that influenza vaccination services were available in their community pharmacies mostly on a walk-in basis (*n* = 428, 71.0%) or by appointment (*n* = 171, 28.4%) any time during the operating hours of the pharmacy. Designated vaccination hours were less common, with only 12.4% (*n* = 75) reporting that vaccinations were offered only

during specific walk-in times, with 14.3% (*n* = 86) being offered by appointment only.

Marketing of immunization services

In-store signage was the most commonly reported form of advertisement for pharmacy influenza immunization services (*n* = 481, 79.8%). Other forms of advertisement included in-store announcement (*n* = 241, 40%), flyers in prescription bags (*n* = 212, 35.2%), radio announcements (*n* = 175, 29%) and information in the newspaper (*n* = 144, 24%) and via the Internet (*n* = 146, 24.2%). Two-thirds of certified pharmacists (*n* = 401, 66.5%) indicated no plans to change the strategy for advertising the availability of influenza vaccination in their community pharmacy.

Partnerships in providing immunization services

Over two-thirds of the immunization-certified participants engaged a partner in establishing the influenza program at their community pharmacy (*n* = 434, 70.8%). Most of them (*n* = 356, 82%) partnered with public health. Most respondents who engaged in any partnership (*n* = 350, 80.6%) reported that it was beneficial.

TABLE 2 Additional vaccines pharmacists should be allowed to administer

	Currently certified to administer vaccines				All (N = 742)		p-value
	No (n = 139)		Yes (n = 603)				
	N	(%)	N	(%)	N	(%)	
Other vaccines pharmacists should be allowed to administer							<0.01
Travel vaccines	54	(38.8)	354	(58.7)	408	(55.0)	
Herpes zoster (shingles)	62	(44.6)	345	(57.2)	407	(54.9)	
Hepatitis B	63	(45.3)	324	(53.7)	387	(52.2)	
Hepatitis A	63	(45.3)	283	(46.9)	346	(46.6)	
Pneumococcal vaccine	31	(22.3)	133	(22.1)	164	(22.1)	
Human papillomavirus (HPV)	24	(17.3)	127	(21.1)	151	(20.4)	
Tetanus	15	(10.8)	67	(11.1)	82	(11.1)	
Varicella (chicken pox)	8	(5.8)	26	(4.3)	34	(4.6)	
Meningococcal vaccine	8	(5.8)	20	(3.3)	28	(3.8)	
Measles, mumps, rubella	7	(5.0)	15	(2.5)	22	(3.0)	
Pertussis	5	(3.6)	7	(1.2)	12	(1.6)	
Diphtheria	4	(2.9)	8	(1.3)	12	(1.6)	
Other (all vaccines)	1	(0.7)	4	(0.7)	5	(0.7)	
Other (intramuscular injection such as B12 or testosterone, or subcutaneous injections)	1	(0.7)	4	(0.7)	5	(0.7)	

Additional vaccines

When both certified and noncertified respondents were asked which additional vaccines pharmacists should be allowed to administer, most identified travel vaccines, shingles vaccine and hepatitis vaccine (both types A and B). Other vaccines, including those for human papillomavirus (HPV) and chicken pox, were suggested by fewer participants. Certified pharmacists were significantly more likely than noncertified pharmacists to indicate additional vaccines that pharmacists should be allowed to administer. Table 2 provides data on the additional vaccines.

Discussion

This survey of Ontario community pharmacists provides provincial-level benchmark information about pharmacists and pharmacist-provided immunization services in the first 3 years after policy implementation and can guide future promotion of this service by pharmacists and pharmacies.

Our sample includes pharmacists with a broad range of years of experience and from diverse geographic locations and types of community pharmacy workplaces, including chains, independents and so on. Of the 603 (81.3%) respondents who reported that they were certified to administer the influenza vaccination, the majority ($n = 512$, 84.9%) were active immunizers. The literature describes pharmacist surveys conducted in jurisdictions where pharmacists could not immunize or national surveys often capturing fewer than 150 immunizing pharmacists.¹⁵⁻¹⁷ Therefore, this survey provides a needed overview of the immunizing pharmacists, their pharmacies and immunization services.

The only significant predictor of being certified to immunize was those pharmacists practising in an urban setting (OR = 2.04; 95% CI, 1.04-4.01, $p = 0.04$). One US study found that practising in an urban setting increased the odds of involvement in immunization promotion but not necessarily vaccine distribution

or administration.²¹ One explanation for our study's finding is higher client demand for vaccinations in more populous areas, as residents of urban areas have a higher vaccination rate compared to rural areas.^{22,23} Other studies have used univariate analysis to examine the relationship of age, gender, years in practice, job title, type of pharmacy and so on to willingness to administer vaccinations, and while at times factors were found to be significant, there was little consistency between studies.^{15,16,24} This may be because, as shown with this study, the variables tested were not independent of each other, so, for example, the type of pharmacy (banners, chain, independent, etc.) is linked to urban/rural status and therefore falls out of the multivariate model.

In our study, 4 in 10 Ontario pharmacists who responded to our survey indicated they had vaccinated over 100 patients annually, and 7 out of 10 had vaccinated over 50 patients annually. These numbers are impressive, considering the survey was conducted only 2 years into this new scope of practice. Both Edwards et al.¹³ and Kamal et al.¹⁶ saw higher numbers (median 275 and average 374 vaccinations/pharmacist, respectively) in states where authority to immunize was more established. It is hoped that these numbers will increase in Ontario over the next several years due to continued pharmacist interest in participating and patient demand for this service. Indeed, 64% of pharmacists in our survey who were not immunization certified were either planning on becoming certified or were unsure (and could possibly be convinced). Those interested in becoming certified were younger and more likely to work with mass retailers. These variables may be linked, but due to a small sample size, multivariate analysis was not conducted.

One of the central reasons influenza vaccine administration was extended to pharmacists was the convenience of the community pharmacy to patients. Our study found that the most common access to vaccination was as a walk-in or by appointment during the pharmacy's operating hours. This is important, as it has been demonstrated that patients do take advantage of community pharmacy immunization services that operate outside of usual working hours.²⁵ Therefore, pharmacies should maintain this flexibility in service provision, as it provides a high level of convenience for their patients.

One area often not commented on is the additional advertising that pharmacies are now

providing to promote influenza vaccination. This is apparent from our survey, where radio (29%), newspaper (24%) and Internet (24%) were external advertising modalities used to increase public awareness, in addition to other in-store mechanisms. The literature has found that approximately 55% to 60% of adults indicate that they would get vaccinated if a health care professional recommended it.²⁶ This additional advertising may be seen as pharmacists endorsing influenza vaccination, will augment efforts of public health and the rest of the health care system to increase vaccination and is a value-add of including pharmacists and pharmacies in the vaccination circle of care.

Pharmacists are taking on expanding public health roles,^{27,28} due in part to their presence in the community, the trust placed in them by the public, their communication training and experience acquired through their practice and their knowledge of preventive care. It is heartening to see in this survey that pharmacists are frequently partnering with public health and finding the relationship beneficial.

Both certified and uncertified pharmacists were proponents for additional vaccines to be administered by Ontario pharmacists. Most often listed were vaccines for travel, shingles and hepatitis (both A and B). With 6 provinces and the majority of the US states having authority to administer these vaccines, Ontario pharmacists' interest matches policy elsewhere and, in fact, as of October 2016, Ontario regulations expanded to include an additional 13 vaccines.²⁹

Limitations

Our study depended on self-reported data. This makes it prone to the disadvantages of recall and desirability biases. In addition, the injection certification rate among our sample is higher than the rate for all pharmacists in Ontario. This might indicate a selection bias of certified pharmacists in our sample and needs to be taken into consideration when generalizing our findings. Other limitations include an unvalidated survey instrument and applicability to Ontario only.

Further research

Several questions were not included in the survey, including whether adverse vaccine reactions were observed or reported and what additional community pharmacy-based immunization activities, such as advocacy and nurse-

administered vaccines, are occurring in Ontario. In addition, important work by Westrick^{30,31} examining sustainers, new adopters and abandoners of immunization services suggests that a follow-up survey in a couple of years is important to track service delivery.

Conclusions

Although community pharmacy-based influenza immunization services were in the early implementation stages in Ontario at the time of our

survey, we found strong engagement with a high percentage of pharmacists certified to administer the influenza vaccine and more planning to do so. There exists further capacity for immunization service provision by engaging rural pharmacies, adding other vaccines and leveraging the positive relationship with public health that has been achieved. The important role that pharmacists and pharmacies play in advertising the value and availability of accessible, free influenza vaccine should be recognized. ■

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