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Pharmacist as Immunization Provider in Manitoba, Canada

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Abstract

Background: In 2014, Manitoba introduced legislation authorizing pharmacists to administer four publicly funded vaccines to patients seven years of age and older. As part of an expanded scope of practice initiative, pharmacists could administer the Human Papilloma Virus (HPV) vaccine, Tetanus-diphtheria-acellular pertussis (Tdap) vaccine, Pneumococcal Polysaccharide (PPV23) vaccine, and seasonal influenza (FLU) vaccine. Pharmacists began administering the four vaccines as of September 1, 2014, three weeks before the influenza immunization campaign began. This study assesses the initial impact that pharmacists had on the population uptake of the seasonal influenza vaccine as well as the other three publicly funded vaccines.

Methods: The data for this study were obtained from Manitoba Immunization Monitoring System (MIMS), the population-based and province-wide immunization registry. We analyzed immunizations of the four publicly funded vaccines administered by all immunization providers in Manitoba during two periods: September 1, 2013 to January 31, 2014 (2013-2014) and September 1, 2014 to January 31, 2015 (2014-2015).

Results: Between September 1, 2014 and January 31, 2015, within the first few months after pharmacists in Manitoba began immunizing patients, they administered 44,220 doses of HPV, Tdap, PPV23 and FLU in total. They contributed significantly to the FLU immunization program, and were the third largest provider, especially for urban residents and patients aged 45 and older. Overall, they administered 43,638 FLU doses (15% of the provincial total). The number of FLU immunizations provided by physicians decreased by 32,573 doses; however, physicians administered more immunizations to the six months to five years age group in 2014-2015 (12,445) than in 2013-2014 (11,969).

Conclusion: Pharmacists' participation in Manitoba's publicly funded immunization program has been well accepted in Manitoba. However, the provider expansion did not increase the uptake of the FLU vaccine in the 2014-2015 season. Regardless, the participation of pharmacists in the provincial immunization program increases access to immunizations, and could reduce pressure on other primary care providers. This could potentially decrease wait times and increase availability of appointments for patients with more serious medical issues. Further studies are required.

Introduction

Influenza viruses circulate around the world. They cause infections and complications, and are associated with significant morbidity and mortality. The World Health Organization (WHO) has estimated that around one billion seasonal influenza infections occur each year, with around 3-5 million cases of severe illness, and 300,000-500,000 deaths [1]. The burden of influenza on society is significant. In the United States, cost estimates resulting from influenza have been reported to be over $10.4 billion a year for direct medical costs and $87.1 billion in total annual economic burden [2]. In Canada, influenza and pneumonia together are ranked as the eighth leading cause of death [3]. During each influenza season, approximately 12,200 hospitalizations and 3,500 deaths are associated with influenza infections in Canada [4]. The severe illness most often occurs among young children (<2 years), the elderly (>65 years), and people with high-risk medical conditions [5,6].

Immunization against influenza serves as the primary public health intervention for both prevention and control [7]. The National Advisory Committee on Immunizations (NACI), a Canadian national committee of experts, recommends that all Canadians six months of age and older be immunized every year [8]. Success of the influenza vaccination program requires a high coverage rate. In Canada, the influenza vaccine coverage rate is relatively high and it is increasing according to the Canadian Community Health Survey. Within the 12 months prior to responding to the survey, nearly a third of Canadians over the age of 12 years were immunized in the 2013-2014 season [9]. However, the coverage rate was still below the NACI target of 80%, especially among two high risk groups: 64% among those over 65 years and 32% among those under 65 years with one or more chronic conditions (heart disease, effects of stroke, asthma, diabetes, cancer, emphysema, bronchitis, chronic obstructive pulmonary disease and obesity at a high level).

To increase access to immunizations, over the last few years, pharmacists' practice has been expanded to include the administration of vaccines across Canada. In provinces that have implemented

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Table 1: Immunization by provider type, 2013-2014 and 2014-2015, Manitoba.

		Public Health Nurse		Physician		Pharmacist		Other		Total
Vaccine	Period	Doses	(%)	Doses	(%)	Doses	(%)	Doses	(%)	Doses
FLU	2013-2014	123,335	(41.8)	139,354	(47.3)	13	(0.0)	32,252	(10.9)	294,954
	2014-2015	109,360	(38.7)	106,781	(37.8)	43,638	(15.5)	22,686	(8.0)	282,465
HPV	2013-2014	10,548	(66.8)	4,685	(29.7)	<5	(0.0)	<500	(3.5)	15,783
	2014-2015	8,219	(76.2)	2,310	(21.4)	32	(0.3)	232	(2.2)	10,793
PPV23	2013-2014	3,706	(35.4)	6,099	(58.2)	0	(0.0)	670	(6.4)	10,475
	2014-2015	3,217	(33.7)	5,197	(54.5)	450	(4.7)	677	(7.1)	9,541
Tdap	2013-2014	5,880	(41.6)	5,610	(39.7)	0	(0.0)	2,656	(18.8)	14,146
	2014-2015	5,306	(38.9)	5,826	(42.7)	100	(0.7)	2,426	(17.8)	13,658
Total	2013-2014	143,469	(42.8)	155,748	(46.4)	14	(0.0)	36,127	(10.8)	335,358
	2014-2015	126,102	(39.8)	120,114	(38.0)	44,220	(14.0)	26,021	(8.2)	316,457

this practice, the publicly funded influenza vaccine has been accessible from pharmacists. The minimum age that pharmacists are authorized to immunize differs between provinces, typically ranging between 5 and 9 years. The addition of pharmacists as immunization service providers is expected to create multiple immunization access points, provide flexible access to services through extended hours and days of the week, and remove barriers to immunization. For example, rural and northern pharmacies can provide additional locations to underserviced and remote communities. This expansion of practice could also bring other benefits to primary care delivery by reducing the pressure on physicians and nurse practitioners. Reduced patient contact time devoted to immunizations could allow these primary care providers to see patients with more serious medical conditions.

Pharmacist-administered immunization has become well accepted by patients and will probably increase vaccination rates [10-13]. In the 2009-2010 influenza season, when pharmacists were first given the authority to administer injections to residents in British Columbia, they only administered 30,000 doses of the influenza vaccine. In the 2014-2015 influenza season, pharmacists administered nearly half a million doses [14]. After Ontario pharmacists were given the authority to administer influenza vaccines in 2012, they administered 247,000 doses in the first year [15] and more than 765,000 in the second year [16]. A study in the United States suggests that higher immunization rates are present in states where pharmacists can administer vaccines [17]. Additionally, surveys indicate that the satisfaction of pharmacist-administered immunizations is high [18].

Pharmacists might have been preferred over physicians and public health nurses. In Alberta, it was reported that pharmacies were about to outpace public health clinics for influenza immunization. According to Alberta Health, in the 2010-2011 season, only 45,353 influenza immunizations were received in pharmacies compared to 528,753 in public health clinics. However, in the 2014-2015 season, 485,669 immunizations were received in pharmacies, similar to the number, 496,220, in public health clinics [19]. The increased access and extended hours provided by over 1,000 pharmacies compared with around 200 public health clinics probably contributed the most to this trend.

On January 1, 2014, Manitoba introduced legislation under the Manitoba Pharmaceutical Act that authorizes certified pharmacists to administer immunizations to patients seven years of age and older including four publicly funded vaccines: Human Papilloma Virus (HPV), Tetanus-diphtheria-acellular pertussis (Tdap), Pneumococcal Polysaccharide (PPV23), and seasonal influenza (FLU). Manitoba has offered publicly funded influenza vaccines to all Manitobans six months of age and older since 2010. It was expected that this addition of pharmacists as immunization providers would increase public access to immunization services for all Manitobans and increase population coverage. After implementing safety measures, inventory management, distribution logistics, and reporting mechanisms, qualified pharmacists began administering publicly funded vaccines on September 1, 2014, three weeks before the regular influenza immunization campaign began. They were required to report all immunizations to the provincial immunization registry, Manitoba Immunization Monitoring System (MIMS).

To evaluate the acceptability of pharmacist-administered immunizations and the impact on the uptake of vaccines, especially FLU, in February 2015, a study was conducted for the Provincial Vaccine Advisory Committee of Manitoba using data from MIMS. In this study, the immunizations of the four publicly funded vaccines (HPV, Tdap, PPV23, and FLU) administered by all providers including pharmacists before and after the program expansion were analyzed. It was anticipated that the addition of pharmacists as immunization service providers would be well accepted in Manitoba. In addition, we hypothesized that pharmacists would increase vaccine uptake, especially the uptake of the FLU vaccine, among residents in the province.

Methods

Data for this study were extracted from MIMS, the population-based and province-wide immunization registry that has been implemented since 1988. MIMS provides monitoring and reminders to help ensure that recommended immunizations are received [20]. Information pertaining to all immunizations administered to Manitobans who are registered for health services in the province is entered into this system including the type of vaccine administered, service date, and provider information. The use of MIMS data for monitoring, evaluation, and research purposes has been explained in a number of studies [21-24].

In this study, the four publicly funded vaccines that pharmacists were authorized to administer were analyzed: FLU, HPV, PPV23, and Tdap. For comparison, the immunizations administered during two time periods were analyzed: September 1, 2013 to January 31, 2014 (2013-2014) and September 1, 2014 to January 31, 2015 (2014-2015). Service providers considered in this report included public health nurses, physicians, pharmacists, and others. The other category included all other types of providers reported in MIMS, such as publicly funded health facilities (usually a hospital), private health care providers, occupational health providers, and unknown providers.

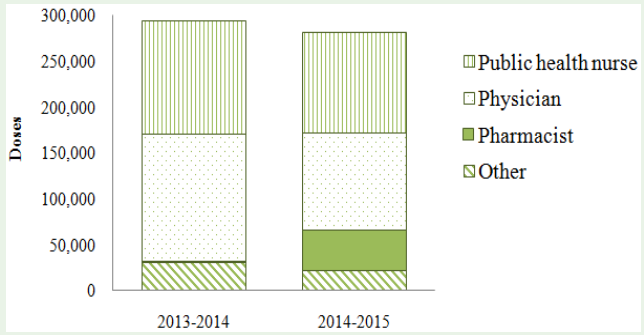

Figure 1: FLU immunization by provider type, 2013-2014 and 2014-2015, Manitoba.

Results

Overall

Immunizations for the four vaccines are reported in Table 1. A total of 335,358 doses in 2013-2014 and 316,457 doses in 2014-2015 for the four vaccines were delivered by all providers. During both periods, over 85% of the service was for FLU.

The fact that there were more HPV immunizations in 2013-2014 (15,783) than in 2014-2015 (10,793) was likely due to the high-risk HPV program implemented between November 2012 and March 2014. This program targeted females aged between 9 and 26 years who were at higher risk for HPV infections. For the school-based HPV program, the number of immunized patients from the target birth cohorts (2002 birth cohort in 2013-2014 vs. 2003 birth cohort in 2014-2015) was similar, over 4,700, during both periods. Most noticeably, the number of FLU immunizations administered decreased by 12,489 from 2013-2014 to 2014-2015. This change was probably due to a spike in demand in 2013-2014 from a perceived supply shortage and the increased influenza A (H1N1) incidence across Canada.

HPV, PPV23, and Tdap immunizations by provider type

For the immunization of HPV, PPV23, and Tdap, public health nurses and physicians were the two major service providers (Table 1). Together, they delivered over 95% of the HPV immunizations, 90% of the PPV23 immunizations, and 80% of the Tdap immunizations during both study periods.

The addition of pharmacists in the late fall of 2014 had little impact on the immunization of HPV and Tdap (32 doses for HPV and 100 doses for Tdap). This is not unexpected. The HPV vaccine is mostly administered as part of the school immunization program (Grade 6) by public health nurses. The Tdap vaccine is mostly provided by physicians to young children below the age of seven or administered as part of the school immunization program (Grade 8/9).

There were a small number of PPV23 immunizations (450) administered by pharmacists in 2014-2015, accounting for almost 5% of the total doses administered. Once Manitobans turn 65, they become eligible for one dose of PPV23. Letters of eligibility are sent to all Manitobans who turned 65 in the previous year and who have not already received a dose of PPV23. This mail out is conducted in parallel with the influenza season. In previous years, the letters advised people to contact their physicians while in 2014-2015, the letter included pharmacists as well.

FLU immunization by provider type

Public health nurses and physicians were major providers of the FLU immunization during both 2013-2014 and 2014-2015. Pharmacists also administered a significant number of FLU doses in the first year they were authorized to administer this publicly funded vaccine. In 2013-2014, public health nurses and physicians administered nearly 90% of the total FLU immunizations. In 2014-2015, they administered just over 75% and pharmacists administered over 15% (Figure 1).

In 2014-2015, physicians and public health nurses both administered fewer FLU doses than in 2013-2014. The number of physician-administered immunizations decreased by 32,573 (106,781 in 2014-2015 vs. 139,354 in 2013-2014). Public health nurse-administered doses decreased less. However, decreases in physician- and public health nurse-administered doses were largely offset by the pharmacist-administered doses.

FLU immunization by patient residency

More than 60% of Manitoba residents are concentrated in Manitoba's capital, Winnipeg, and the second largest city, Brandon. In this study, Winnipeg and Brandon were defined as urban and all other communities were defined as rural [25-27]. The FLU immunizations received by residents from rural and urban areas and administered by different service providers in 2013-2014 and 2014-2015 are presented in Figure 2.

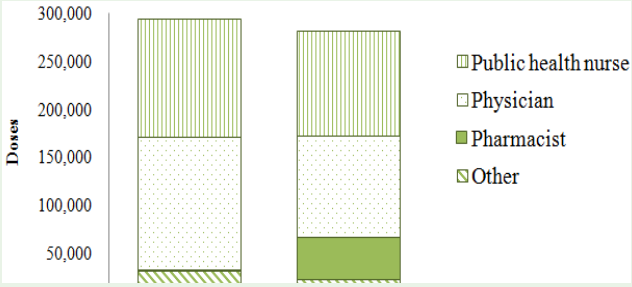

Figure 2: FLU immunization by patient residency and provider type, 2013–2014 and 2014–2015, Manitoba.

Residents in rural areas rely on public health nurses' provision of immunizations. During both study periods, public health nurses administered approximately 70% of the immunizations to residents in rural areas. Residents in urban areas, however, rely mostly on physicians. In 2013-2014, physicians administered 61% of all immunizations to residents in urban areas, but, in 2014-2015, they only administered 48% of all immunizations to urban residents. During this period, pharmacists administered 35,501 immunizations to urban residents, which accounted for nearly 19% of the FLU doses urban residents received. In comparison, in rural areas, pharmacists administered less than 9% of the doses.

FLU immunization by month

The FLU immunizations administered by different service providers by month in 2013-2014 and 2014-2015 are presented in Figure 3. In Manitoba, the annual influenza immunization campaign normally launches in the third week of September. Accordingly, most

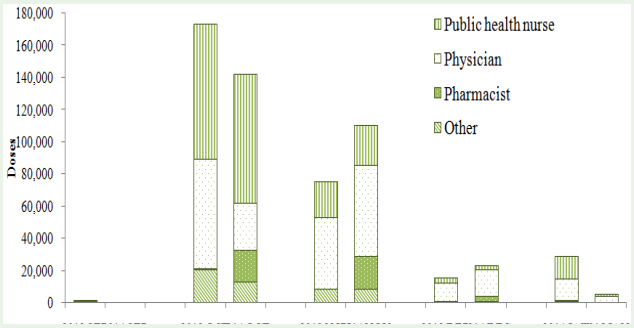

Figure 3: FLU immunization by provider type and month, 2013-2014 and 2014-2015, Manitoba.

FLU doses were administered in October and November during both study periods.

In January 2015, only 5,491 FLU doses were administered, a decrease of almost 23,000 from January 2014, which probably contributed to the overall decrease in the FLU uptake in 2014-2015. The difference was most likely due to a surge in demand for FLU in January 2014 that Manitoba and every province/territory experienced as a result of a perception of limited FLU supply and concerns over the circulating influenza A (H1N1) strain. In January 2015, the demand for FLU returned to the similar level as in previous four seasons.

In either 2013-2014 or 2014-2015, the monthly immunizations of FLU were different among different service providers. Public health nurses administered a similar number of doses in October of 2013 and 2014, 83,955 and 80,205 doses respectively, which accounted for 70% of their total service. They also administered a smaller and similar number of doses in November of 2013 and 2014, 22,382 and 24,640 respectively. Public health nurses run their mass FLU immunization clinics during these months each year. Physicians administered different amounts in October and November, which also varied between 2013 and 2014. Compared with 2013, physicians delivered almost 39,000 fewer doses in October 2014 but 13,000 more in November 2014. Pharmacists administered the FLU doses predominantly in October and November in 2014, around 20,000 in each month. There were delays in the delivery of FLU vaccines from manufacturers in the 2014-2015 season. This is probably the reason that more FLU immunizations were administered in November and December of 2014 compared with 2013.

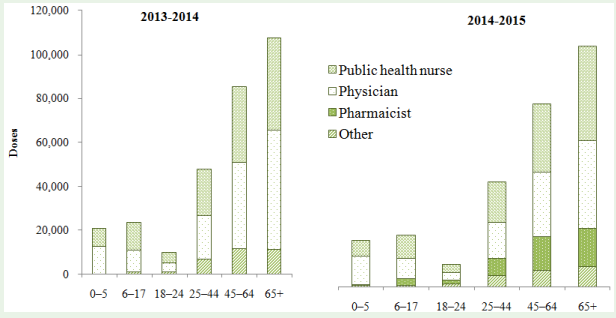

Figure 4: FLU immunization by patient age group and provider type, 2013–2014 and 2014–2015, Manitoba.

FLU immunization by patient age group

Further analysis of the FLU uptake was conducted to investigate which age groups were served by pharmacists. The FLU immunizations by different service providers among different age groups of patients in 2014-2015 were compared to those in 2013-2014 (Figure 4).

As expected, public health nurses and physicians were the major immunization providers for all age groups during both study periods. Since September 2014, pharmacists also contributed significantly to the FLU immunization among all age groups except young children six months to five years of age. This was expected since pharmacists are only permitted to immunize patients at least seven years of age. Over 70% of pharmacist-administered FLU immunizations were to people aged 45 years and older. Among that age group, almost 17% of the uptake was administered by pharmacists. Over this period, public health nurses and physicians decreased their immunization service in almost every age group. Most noticeably, physicians administered 28,129 immunizations to the 45-64 age group in 2014-2015, a decrease of over 11,000 from one year prior (39,352). There was one exception. Physicians delivered nearly 500 more immunizations among the six months to five years age group in 2014-2015 (12,445) than in 2013-2014 (11,969).

Discussion

In this study, we found that pharmacists have been accepted as immunization providers in Manitoba. Within the first few months after pharmacists began immunizing people, they administered a significant number of immunizations, mostly for the seasonal influenza vaccine. They were an important service provider of influenza immunizations among all Manitoba residents seven years of age and older, especially among those aged 45 and older, and those from urban areas. Overall, they administered over 15% of the total influenza immunizations in Manitoba between September 1, 2014 and January 31, 2015.

The vaccine uptake in 2014-2015, especially the influenza vaccine, did not increase from 2013-2014 despite the additional service provided by pharmacists according to the coverage rate by end of the 2013-2014 and 2014-2015 influenza season [28,29]. There were a number of contributing factors. First, doses administered in January 2014 exceeded the normal number in previous Januaries. In January 2014, Manitoba and every other province/territory in Canada experienced a surge in demand for the influenza vaccine, partially due to a perception of limited supply of the vaccine and public concerns over the circulating influenza A (H1N1) strain. In January 2015, the demand for the influenza vaccine returned to the level in previous seasons. Second, lower vaccine effectiveness was expected earlier in the season due to the antigenic shifting in the circulating influenza strain. Subsequently, interim estimates of the effectiveness of the 2014-2015 influenza vaccine in January 2015 were reported to be virtually zero in Canada and 23% in the United States in comparison to 70% in 2013-2014 [30-33]. This might have had a negative impact on the uptake of the influenza vaccine in the 2014-2015 season.

More possibly, the study period was within the first five months after pharmacists began the immunization service. Not many pharmacists were certified to provide the service and the public may not have been fully aware of the immunization service available from pharmacists. In other provinces, increasing uptake of the influenza

vaccine from pharmacists continued to be observed after the first year they were authorized to immunize patients. In Manitoba, preliminary immunization data in the 2015-2016 influenza season indicate that there were more pharmacist-administered immunizations than in 2014-2015. In addition, a higher percentage of patients immunized by pharmacists in 2014-2015 had never been previously immunized compared to those immunized by physicians and public health nurses. Continuous surveillance of immunization is necessary to evaluate the acceptability of immunizations by pharmacists and to identify barriers from the perspectives of both patients and pharmacists [34,35].

The main advantage for pharmacist-administered immunizations is convenience [36,37]. As of November 2013, there were almost 350 pharmacies in Manitoba. Many pharmacies are open 7 days a week with longer hours than most medical clinics. Patients can drop in rather than setting up an appointment to be immunized. Besides, pharmacies are often close to residential neighborhoods and there is a high visibility of this service in the community setting. More importantly, over 130 pharmacies are located outside Winnipeg, serving populations in rural and northern areas, which has the potential to increase accessibility to underserviced and remote communities. Within the first few months after pharmacists began immunizing patients, less than 20% of the pharmacist-administered influenza immunizations were delivered to residents in rural areas, which accounted for less than 9% of the total in rural areas in comparison to 19% in urban areas. This recommends that the acceptability of pharmacist-administered immunizations in rural areas has not been as high as in urban areas. There is a potential for improvement. Barriers to access the immunization service by pharmacists particularly in rural areas should be further investigated.

Adding pharmacists as immunization providers could benefit primary care delivery by reducing some pressure on other care providers. This might positively impact wait times and availability for patients with serious health issues. We found that physicians immunized 500 more young children in 2014-2015 than in 2013-2014, children that pharmacists were not authorized to immunize. Further analysis of the shift of service providers and the potential impact on improving primary care service delivery in Manitoba is required.

There are a few limitations in this study. First, only immunizations between September 2014 and January 2015 were included, while an influenza immunization season usually continues till the end of March. Compared to the total influenza immunizations between September 1, 2014 and March 31, 2015 in Manitoba, nearly 15,000 doses in February and March 2015 were not included in this study [28]. Second, pharmacists began administering publicly funded immunizations in September 2014, just before the influenza immunization campaign began. Therefore, the general public was mostly unaware of the other three vaccines that pharmacists were also authorized to administer. Immunizations of the other publicly funded vaccines by pharmacists should be further evaluated when more data become available.

The practice of pharmacists has been expanded to include immunizing people to improve vaccine coverage. As of October 2014, certified pharmacists in many provinces, British Columbia, Alberta, Manitoba, Ontario, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador, were authorized to administer immunizations [38]. Pharmacists in Saskatchewan began vaccinating people in October 2015 [39]. In provinces with available data, pharmacist-administered influenza immunizations seem to be well accepted by the public.

Recently, in a few provinces, pharmacists have been authorized to provide other vaccines. In British Columbia, since February 2013, pharmacists can administer publicly funded vaccines such as Tetanus-diphtheria (Td), Measles-Mumps-Rubella (MMR), HPV-Cervarix, Influenza and Pneumococcal Polysaccharide, Hepatitis A and B, HPV-Gardasil, Meningococcal-C, and Tetanus, diphtheria and acellular pertussis (Tdap) among several others by special request [40]. Ontario is also considering expanding the vaccines pharmacists can administer [41]. With the improved accessibility and reduced barriers, it is expected that vaccine coverage will be increased, contributing to the continuous prevention and control of a number of vaccine preventable diseases. Hopefully, pharmacists' provision of immunizations will also bring noticeable benefits to the other perspectives of the primary care system.

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