

RESEARCH PAPER



Pharmacists as vaccinators: An analysis of their experiences and perceptions of their new role

Sandra Gerges^a, Elizabeth Peter^b, Susan K. Bowles^c, Shelley Diamond^d, Lucie Marisa Bucci^e, Anne Resnick^f, and Anna Taddio^g

^aSunnybrook Health Sciences Centre, Toronto, Ontario, Canada; ^bLawrence S. Bloomberg Faculty of Nursing, University of Toronto, Toronto, Ontario, Canada; ^cNova Scotia Health Authority, Halifax, Nova Scotia, Canada; ^dPedipharm Consultants, Toronto, Ontario, Canada; ^eImmunize Canda, Toronto, Ontario, Canada; ^fOntario College of Pharmacists, Toronto, Ontario, Canada; ^gLeslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Ontario, Canada

ABSTRACT

Objectives: In 2012, Ontario pharmacists were granted immunization privileges to administer influenza vaccines to the public. This study explored the experiences and practices of pharmacist vaccinators and the impact of vaccination pain on their practice. **Methods:** Semi-structured interviews were conducted with 12 pharmacists in the Greater Toronto Area. Transcribed interview data were coded and analyzed via thematic analysis. **Key Findings:** Data analysis revealed 4 main themes: 1) expanded scope of practice as an enhancement and challenge to relationships; 2) professional satisfaction and workload demands; 3) knowledge and attitudes regarding pain and fear; 4) practices regarding pain and fear management. Pharmacists reported satisfaction in their new role, despite the associated increased workload. Pharmacists felt that vaccination pain was not a key consideration when administering vaccines and that pain management was generally not necessary. Fear was identified as more important than pain and vaccinating children was challenging and time intensive. Pharmacists' main focus was on injection techniques in managing pain. **Conclusion:** These findings suggest that pharmacists are accepting of their role as vaccinators but more research is needed to examine impact on workload and pharmacist knowledge and perceptions of injection-related pain and fear.

ARTICLE HISTORY

Received 28 March 2017
Revised 7 October 2017
Accepted 29 October 2017

KEYWORDS

Immunizations; Influenza Vaccine; Pain; Vaccinators; Pharmacists

Introduction

In 2012, the scope of practice for pharmacists in the province of Ontario, Canada was expanded to include the administration of the seasonal influenza vaccine to patients 5 years of age and above. In order to become certified to offer immunization services, pharmacists must complete a skills and knowledge course approved by the Ontario College of Pharmacists (OCP). This new service led to an increase in the uptake rate of the vaccine.¹ Pharmacists are estimated to have delivered more than 650,000 vaccinations in the 2013–2014 influenza season alone.² Patient survey data from Toronto, the largest city in Ontario, indicate that almost all are satisfied with their experience with pharmacist as vaccinators.¹ In a systematic review, it was found that pharmacy based immunization services were widely accepted by patients and pharmacy staff and can improve access and increase vaccination rates.³

What is not currently known is how pharmacists perceive their new role and their satisfaction with it. This new role differs from other services provided by pharmacists as it involves physical contact with patients and the potential for inflicting pain, which might be distressing to pharmacists. Pain mitigation is part of good vaccination practice as it affects the quality of care delivered.⁴ Approximately 2/3

of children and 1/4 of adults are afraid of needles.⁴ This is usually due to negative past experiences with needles. Fear of needles can lead to future traumatic experiences with immunization and in about 10% of children, non-compliance with immunizations altogether.⁴ Needle fears persist into adulthood and contribute to non-compliant behaviors including refusal of immunization and other health care interventions involving needles (e.g. blood tests, dental appointments).⁵ This can result in resurgence of vaccine-preventable diseases and poor health outcomes.⁵

The purpose of this study was to explore pharmacists' general perceptions and experiences regarding immunizations, and more specifically, towards pain and pain management.

Results

Demographic characteristics of the twelve participants are listed in Table 1.

Four main themes emerged from the data: 1) expanded scope of practice as an enhancement and challenge to relationships; 2) professional satisfaction and workload demands; 3) knowledge and attitudes regarding pain and fear; 4) practices regarding pain and fear management. Some samples quotes from each theme can be found in Tables 2 – 5.

CONTACT

Table 1. Pharmacist demographics.

N = 12 Pharmacists	
Age, mean (range)	39 (26–66)
Sex, Male (%)	6 (50)
Ethnicity, Caucasian (%)	8 (67)
Asian (%)	3 (25)
Caribbean (%)	1 (8)
Position, Manager/Owner (%)	6 (50)
Pharmacy Type, Chain (%)	10 (83)
Country of Training, Canada (%)	8 (67)
Hours of Work per Week, mean (range)	32.5 (4–47)
Average Years of Practice in Ontario (range)	11 (1–44)
Years of Practice in Ontario, 1–10 years (%)	8 (67)
Average Number of Years Since Certification (range)	1.4 (0.3–3)
Estimated Total Immunizations Since Certification, mean (range)	287 (20–1400)
Received the flu shot this year? Yes (%)	9 (75)

Theme 1: Expanded scope of practice as an enhancement and challenge to relationships

Participants reported that this new role helped to strengthen their relationship with patients and increased patient satisfaction. Many pharmacists noted the increased convenience that this service provided, which may have introduced more patients to their practice. In addition to this, pharmacists felt that vaccinating patients helped to increase their patients' trust in them as well as allow for more time for clinical interactions. Pharmacists also noted that administering the influenza vaccine allowed them to serve patients they may not have had the opportunity to otherwise (Table 2).

When it came to relationships with physicians, pharmacists either noticed no change or expressed concerns about breaching physician territory. Some pharmacists worried that offering the influenza vaccine to their patients would negatively impact their relationship with their physician colleagues because it had the potential to prevent patients from seeing their physicians.

Theme 2: Professional satisfaction and workload demands

Pharmacists reported that their new role allowed them to offer an additional service to patients and provided pharmacists with

increased knowledge and skills regarding vaccinations. Some pharmacists reported that it expanded their pharmacy business and attracted new patients (Table 3). They reported an increase in their overall professional satisfaction. Participant 3 explained, "It's a very... good experience, very fulfilling."

All pharmacists expressed concern regarding the additional workload that vaccinating patients added. Furthermore, some pharmacists stated that they were pressured to reach certain daily quotas by their employers in terms of the number of vaccinations administered per day. Some pharmacists stated that this was an infringement on their professional autonomy. When asked why they obtained certification to be able to administer the influenza vaccine they often stated pressure from their employers as a reason.

In addition, pharmacists reported concerns about vaccinating children. Participant 9 stated, "I mean when you're immunizing kids, that's probably one of the biggest challenges." Immunizing children was stressful and required a longer time commitment. Pharmacists often needed the assistance of parents in order to administer the vaccine to children (Table 3).

Theme 3: Knowledge and attitudes regarding pain and fear

Pain was not generally identified by pharmacists as an important factor in their new role. Pharmacists reported that injection pain is minimal and did not require treatment. One pharmacist stated that patients who reported experiencing pain were exaggerating (Table 4).

When asked about the pain they thought their patients experienced, many pharmacists referred to fear instead of pain, stating that they felt that pain was not a huge concern for their patients. They noted that fear was an important aspect of immunizing patients, particularly children. Pharmacists reported that if a patient's fear could be managed then there would be no needle pain. However, the differences and the connection between needle pain and fear were not clearly understood or explained by the pharmacists.

Table 2. Theme 1: Expanded scope of practice as an enhancement and challenge to relationships.

Pharmacists' Relationship with Patients	Positive Experiences – Increased convenience – More clinical interactions – Increased trust	"A lot of folks were happy that we were doing it and they were impressed, I guess, by us. And, just pleased at the accessibility and convenience of it." – P8 "It gives me a good opportunity to chat with them sometimes and talk to... talk about different things, about – sometimes about their medicine. They have a question and they don't come and approach the pharmacist and they think it's a good opportunity to do that while we're in the consultation room. So it improves the relationship and we get to know each other. Like where I start to do the immunization I was a new pharmacy manager at that location and it was a good opportunity for me to introduce myself as well and get to know the people more." – P2
Pharmacists Relationship with Physicians	Unchanged Breaching territory	"Probably not a huge change. If I remember correctly, we sometimes would fax the information or the record to the doctors, based on the patients consent. So, I'm sure a bunch of the local doctors, you know, have started to become aware that we're doing this. I don't think we ever got any direct feedback, though, so..." – P8 "See the physician colleagues sometimes like if they're very busy they like to see that but if they're seeking more business they hate to see that. So it depends... who you are dealing with and what kind of relationship you have with them. Like before I had this position I used to work somewhere else that I was worried that the doctors would know that I am doing that they will get so mad if they know that I'm doing that as if I'm competing with them." – P2

Table 3. Theme 2: Professional satisfaction and workload demands.

Professional Satisfaction	Increased knowledge	"I like it. Wish they would expand it to all the other vaccines." – P8 "I could say that I'm happy and proud that I know how to do it." – P4 "It's a very... good experience, very fulfilling." – P3
	Additional Service to Patient	"Well, the opportunity to serve, to supply, to, you know, it's a public service thing. It's also a method of generating some income, as little as it is, it generates. But it gives you an opportunity to interact with people that perhaps you haven't interacted with before, which is also an opportunity to solicit their patronage in the future; get their prescriptions transferred here." – P7
Workload Demands	Increased Workload	"It makes it very hectic. Very tiring. Because we're already busy a hundred percent of the time when the pharmacy is open so to add one more thing that takes a long time to do it's been very very tiring and hectic and really like companies or pharmacies should keep that in consideration that this is another job and it needs time. There should be more help or overlapping pharmacists or something like that." – P3 "It is more labour intensive, and I mean, it's an added job... added responsibility to the pharmacists job, so... you're gonna have to manage that extra duty with respect to just all the other things you usually do: med checks, signing scripts, things like that. So, I have that added workload with respect to the same amount of labour." – P9
	Demands/ Quotas	"Putting quotas on things, it's like asking a doctor to also give a number of you know... vaccines in their you know everyday, or asking a dentist to do this many number of root canals per week, it's the same thing. And I'm pretty sure no dentist and no family doctor is going to accept those terms, but somehow pharmacists are just saying okay and we're just doing it." – P5
	Job Security/ Competition	"I guess, the pharmacy field is changing. And with the surplus of grads, there is no longer a shortage of pharmacists, there is a surplus. So, you need to improve and enhance your skills so that you're still in demand. So, that's probably the main reason, is to get trained so I'm more valuable to a corporation. So, more for job security, I would say." – P9
	Immunizing children as a challenge	"I mean when you're immunizing kids, that's probably one of the biggest challenges." – P9 "It was that one time with the child where the father basically had to end up holding the daughter pretty tight so that I could actually give the injection." – P5

Pharmacists did not distinguish between pain in adults and children, but identified that fear was important in children.

Theme 4: Practices regarding pain and fear management

Although most pharmacists reported that needle pain did not need to be managed, some used a variety of techniques to manage pain and fear in their patients during immunizations (Table 5). These primarily focused on injection technique.

Another pain and fear management strategy employed by pharmacists was to 'talk the patient through the needle'. Some pharmacists stated that they did not manage needle pain at all

in their practice, but when subsequently probed about specific techniques, they did report using distraction techniques. No pharmacist reported using pharmacological interventions to manage needle pain such as topical anesthetics, and all pharmacists stated that they were not worth using due to the minimal amount of pain caused by the injection. However, pharmacists did offer patients acetaminophen and/or ibuprofen for delayed pain and fever after the injection.

None of the pharmacists consulted resources to assist them in managing pain and fear. Instead, they reported learning how to manage pain and fear from work experience and feedback from patients.

Table 4. Theme 3: Knowledge and attitudes about pain and fear.

Pain	Pain is not worth treating	"Typically from my experience and other patients' experience its not a painful procedure so...it hasn't really impacted the way I immunize." – P1
	Comes with the territory of being vaccinated	"It kinda comes with the territory. I mean you wanna get immunized you're gonna have to withstand a needle prick" – P7
	Adults and children feel the same	Interviewer: Can you tell me about the needle pain you think adult patients experience during immunizations? P1: I would describe it as a pinch. Interviewer: And how about children? P1: I would describe it as a pinch. Interviewer: Okay so what are the differences between them? P1: I just described them both as a pinch. Interviewer: So no differences at all? P1: No.
Flu shot causes minimal pain		"Actually, flu shots, it's not really painful." – P6 "Considering that it's a very small amount of pain it's a non-issue for me. I think the cost-benefit is...a no brainer and... the pain is really non-existent after the actual injection." – P1 "With the Agriflu, which is the only one I've had the experience of using, it actually does not cause pain." – P5
		"I've had one elderly patient exaggerate the pain, I mean it might have been real to her" – P1 "I mean it's not so much needle pain. I see a lot of patients probably have, it's the anticipation, or the fear of a needle." – P9 "Needle pain is really minimal and it's a mindset, it's not a true pain, of sorts. So, if you can alleviate the fears – or not instill the fears – then you, you basically won't have the pain." – P7
Fear	Fear is more important than pain	"(Children) seem to be much more worried about it. And they probably react more." – P8
	Children have more fear than adults	

Table 5. Theme 4: Practices regarding pain and fear management.

Strategies Used for Adults and Children	Focus on technique	"If you know how to give a needle, you don't have any pain" and Participant 9: "You have to be... You just do it quickly, and that minimizes that." – P7
	Come back later	"If they're very fearful to the point where they don't want it, I would just say come back later. You know? I don't think I would be too comfortable with having to hold on to them to give the injection and I don't think that would be a good experience for the patient either." – P5
	Distraction	"So distractions for adults I typically say if you're not comfortable with injections I would say look away, I would count down things like that. For children, we would have the... parents distract them." – P1 "Well... in that case, the parent was with the child and asking the parent to somehow distract the child, have the child not look at it, talk to him about maybe a toy, or something to take their mind off what I'm going to do." – P5
	Using prior work experience	"Life and interacting with people,... And seeing the response to, when you inject, and people have anxiety and fear, like... You learn, and you learn to be more empathetic, and other strategies to help deal with pain, like distracting the patient, ... And you, you become more comfortable as you inject them, and then being more quicker, certainly helps too, so... From experience." – P9
	Talking patients through it (the needle)	"And you reassure them, so, it is a factor, but it's just how you approach it and how you relax a patient and calm them." – P9
	Acetaminophen and Ibuprofen after needle	"There's like a few pieces of advice that you'd give them afterwards, you know ice, and Advil or Tylenol if they need." – P4
Strategies Used for Children Only	Parental involvement	"The young boy, and he had a fear for needles, so we were in the counseling room for a few minutes before his parents calmed them down, calmed them down enough to actually allow me to immunize him." – P9
	Bribes	"I would tell them don't look you know just look away. Look away, it'll just be one second. Choose your Band-Aid. We have like fun Band-Aid for the kids." – P4

When it came to dealing with children, pharmacists relied heavily on parents to assist in managing pain and fear. Pharmacists often deferred to offering rewards to children such as colourful bandages, as incentives for being immunized. Fear in children was reported to interfere with workflow and some pharmacists stated that they told fearful patients to come back later.

Pharmacists felt less confident in their ability to manage fear than pain in their patients.

Discussion

This study demonstrated that pharmacists are generally satisfied in their new role as vaccinators as it led to an increase in knowledge, skills and interactions with patients. However, they were concerned about workload and their relationships with physicians. Vaccination pain was not identified as a key consideration when administering vaccines and pain management was not viewed as necessary. Fear was identified as more important than pain, and vaccinating children was challenging and time intensive. Pharmacists' main focus was on injection techniques when asked how they minimize pain and fear.

Pharmacists in this study reported satisfaction in their role as vaccinators and their ability to provide an additional professional service for their patients. This result is consistent with pharmacist satisfaction with expanded prescriber services.^{6–8} However, a survey study by Neuhauser and colleagues⁹ found no significant difference in job satisfaction between immunization-certified and noncertified pharmacists. Factors that can impact pharmacist satisfaction include barriers such as training, time to implement new services, and gaining staff and management support.^{10,11} Also, pharmacists are more likely to experience satisfaction in their roles if they receive positive feedback from their patients, as noted in this study.

Pharmacists reported that immunization services were convenient for patients and led to higher patient satisfaction based

on feedback they received from patients. The perception that patients are satisfied with pharmacist vaccinators services is consistent with the findings of previous surveys in which almost all patients reported they would recommend that friends and family be vaccinated by a pharmacist and the majority of patients supported pharmacist vaccinators.^{1,12}

Pharmacists reported that their expanded scope of practice was linked with higher workloads and quotas, often without a commensurate increase in available resources such as technician hours or pharmacist shift overlap. Some pharmacists also found quotas to be an infringement on their professional autonomy. They stated that other health care professionals do not have imposed quotas on the health care services that they provide. Previous studies have documented that time and space are barriers to providing immunization services^{10,13,14}; however, this is the first study to introduce the notion of quotas. This finding requires further investigation, particularly with respect to investigating workflow systems, including greater utilization of pharmacy technicians. Pharmacists are generally satisfied with the use of regulated pharmacy technicians.^{15,16} Increasing the utilization of pharmacy technicians may free up pharmacists' time and accommodate the changes in pharmacist activities. This may minimize the potential for an increase in errors in dispensing, which can impact patient safety.¹⁷

Some pharmacists reported that they were concerned about breaching physician territory when providing immunizations. This may be because some community pharmacies in the Greater Toronto Area are located near a clinic or family doctor's office where influenza vaccines are often administered. This sentiment has been reported in previous studies of pharmacists in their roles as prescribers^{6,18,19} and vaccinators.^{11,14} This concern exists when pharmacists expand their roles in areas that have historically been held by physicians or other allied health care professionals. It is important to note, however, that none of the pharmacists reported having a negative interaction with other vaccinators as a result of their expanded

role. Importantly, pharmacists did not report any threats to teamwork between physicians and pharmacists.

Despite the subjective and individual nature of pain,²⁰ pharmacists did not feel that it was an important aspect of immunizations. Pain management is part of good immunization practice as per the World Health Organization.²¹ Pharmacists reported that vaccination related pain was only minor and that for the most part, it did not impact the way they vaccinated. They did, however, utilize injection techniques (such as using sharp needles, injecting quickly and not aspirating) and distraction, which are evidence based non-pharmacological techniques.²² None of the pharmacists advocated for or used topical anesthetics, the only evidence-based pharmacological intervention for pain mitigation during vaccination.²² This result is similar to surveys of analgesic utilization in other settings, such as doctors' offices, and reflects sub-optimal prioritization of pain management as part of routine vaccination.^{23,24} These attitudes about pain management persist despite the well-documented negative impact of pain on vaccine compliance.^{4,25}

Pharmacists often described fear of needles as more distressing to their patients than the pain of needles. Pharmacists' focus on fear rather than pain may be due to the fact that fear and anxiety often hindered pharmacists' ability to administer the vaccine and thus interfered with their workflow and efficiency, while patients' pain was not as evident and did not affect their workflow. Although this issue was not explored specifically in this study, it is supported by the fact that time management was more of an issue for pharmacists than pain and fear management. Pharmacists did not make a connection between needle pain and fear. Needle fear is often caused by needle pain and thus treating and preventing needle pain can also alleviate needle fear.^{22,26}

The findings regarding vaccination of children warrant additional discussion. Pharmacists cited that vaccinating children was a challenging experience and they felt uncomfortable, unprepared and ill equipped for dealing with them. Children took more time and required more effort from the pharmacists. Pharmacists reported utilizing restraint in partnership with parents in order to administer vaccinations in children. Restraining children contributes to children's fear,²⁷ which can contribute to pharmacists' anxiety as well. Pharmacists' challenges in dealing with children are consistent with the experience of other health care providers. A survey of health care professionals, which included pharmacists in Canada, recently showed a trend toward more hesitancy to expand pharmacist scope of practice to include children, particularly among physicians.¹² Pharmacists may need additional support to assist them with the challenges of administering vaccinations in children and to allow for more positive experiences between pharmacists, children, and parents. Importantly, needle fears can develop as a result of a negative experience with a needle procedure.²⁵

In general, children perceive needles to be more painful than adults do and regard any procedure involving a needle to be one of the most frightening and painful health-related events.²⁸ There is a bidirectional relationship between fear and pain, whereby an increase in one can increase the other.²⁶ Pharmacists may benefit from learning more about pain and fear in children so that they can promote more positive experiences

with vaccination. Needle fears may persist throughout the life-span if left unaddressed and are linked to broad healthcare avoidance behaviors, including vaccination noncompliance.^{29,30}

Since the time of these interviews, Ontario has increased the number of vaccines that pharmacists are permitted to administer to include protection against influenza and an additional 13 preventable diseases. Some jurisdictions are also considering reducing the age of patients that pharmacists can vaccinate to include younger children to ensure that vaccinations are more convenient and accessible for patients. This has the potential to increase the workload for pharmacists, which was a major concern when administering the influenza vaccine alone. Policy-makers, pharmacy managers and government bodies may need to consider allowing for additional pharmacy resources to be able to carry out these extended patient services. Also, as pharmacists may be participating in childhood vaccinations, efforts should be undertaken to examine ways to better support pharmacists when vaccinating children, including educating them about managing pain and fear. The routine use of topical anesthetics and other proven pain- and fear-reducing interventions are particularly important in the context of childhood vaccinations.²²

Qualitative studies, are by design, not generalizable. The results reflect pharmacist vaccinators from the Greater Toronto Area (GTA) who recently started vaccinating. It is unknown if the results would be comparable for pharmacists outside the GTA or pharmacists who have been vaccinating for multiple years. As pharmacists gain more experience in vaccinating, it is possible that their perceptions and attitudes may change. We employed purposive sampling strategies, and included pharmacists in different practice settings with a broad range of experiences. These findings may however be applied to pharmacists practicing in a similar practice setting, who are new to pharmacy-based immunizations.

Additional strengths of this study include the qualitative approach, which allowed for a deeper understanding compared to prior quantitative surveys and use of methodology to improve the credibility of the findings. For example, we employed multiple meetings of the research team to review transcripts and identify codes and emerging themes, and we checked with a few of the participants to obtain a thorough understanding of their experiences.

Methods

This study used a qualitative descriptive design as described by Sandelowski³¹ and Neergaard et al.³² A qualitative design was chosen to allow for the experiences of pharmacists to be explored. The study was approved by the University of Toronto Health Sciences Research Ethics Board and all participants signed a consent form.

Pharmacists practicing in community pharmacies across the Greater Toronto Area (GTA) were eligible for participation. Community pharmacies were defined as any chain or retail pharmacies operating in the community and not in a hospital. The GTA encompasses a geographical area with the greatest population density in Ontario, including Toronto, and includes over 6 million inhabitants.³³ Pharmacists were included if they were both certified to administer influenza vaccinations and

had been administering vaccinations for a minimum of one month during the immunization season when the study was conducted (2014–2015). Purposeful sampling³⁴ was used for initial recruitment, with snowball sampling subsequently used to obtain participants with varied number of years in practice, gender, number of hours working per week, number of influenza vaccines administered, location of training, and geographical location of work.

After receiving informed consent, a semi-structured interview guide was used to guide the interview process. The guide included a series of open-ended questions in order to allow participants to speak openly about their experiences. Experts in vaccination and pain reviewed the questions and one pilot interview was conducted with a study participant. This pilot interview was included in the analysis. During the data collection period, the questions were modified to focus on emerging themes. There were two areas of inquiry: 1) overall experiences of pharmacists as vaccinators and 2) impact of injection pain. All interviews were conducted by a single interviewer (SG) and lasted 15–25 minutes.

Twelve pharmacists were interviewed at various pharmacies from May 20, 2014 to January 22, 2015. The interviews were audio-recorded and transcribed verbatim. Participants also filled out a demographics questionnaire.

Data collection and analysis occurred simultaneously. Four members of the research team met regularly throughout the process to discuss themes and coding. Line by line coding was done using the software package QSR NVivo version 10. Saturation was reached after 10 interviews.³⁵ Two more interviews were conducted after saturation. Coding and thematic analysis continued in an iterative fashion until consensus was reached in order to ensure the credibility of the interpretation of the data. Throughout the process of data analysis, the team reflected on the possible influences of their backgrounds as pain researchers, nurses and pharmacists.

Conclusion

Pharmacists expressed an overall positive experience as vaccinators and the effect it had on their relationship with patients, despite some concern about breaching physician territory and the impact on physician-pharmacist relationships. While pain was reported to have minimal impact on their practice, needle fear was perceived as an impediment to efficiency, particularly when vaccinating children. Pharmacists used injection techniques and non-pharmacological techniques during vaccination intended to ensure successful and quick injections.

Policy makers and governing bodies have expanded pharmacist immunization services to include other vaccines in addition to the influenza vaccine, which in turn will increase access to health services. It will be important to investigate the challenges that pharmacists identified for vaccinating children as well as the potential increase in organizational pressures, as these issues may be more magnified when services are expanded. Also, it is important to address perceptions regarding workload issues associated with immunization injections, especially for pharmacies where management apply performance metrics or quotas. Most pharmacists in those practice settings reported increased workload, and lack of support with

immunization services. Pharmacy chain head offices and regulators need to be aware of these concerns, as they may impact on pharmacist satisfaction, and performance, including error rates. Overall, these findings suggest that pharmacists are accepting of their role as vaccinators. More research is needed to examine impact on workload, challenges vaccinating children and patient satisfaction with pharmacist vaccinators.

Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

References

- Papastergiou J, Folkins C, Li W, Zervas J. Community pharmacist-administered influenza immunization improves patient access to vaccination. *Can Pharm J (Ott)*. 2014;147(6):359–65. doi:10.1177/1715163514552557. PMID:25364353
- Foxman S. Giving it their best shot. *Pharmacy Connection*. Vol 20. Winter 2013 ed. >Ontario: Ontario College of Pharmacists; 2013:15–21.
- Burson RC, Bутtenheim AM, Armstrong A, Feemster KA. Community pharmacies as sites of adult vaccination: A systematic review. *Human vaccines & immunotherapeutics*. 2016;12(12):3146–59. doi:10.1080/21645515.2016.1215393.
- Taddio A, Ipp M, Thivakaran S, Jamal A, Parikh C, Smart S, Sovran J, Stephens D, Katz J. Survey of the prevalence of immunization non-compliance due to needle fears in children and adults. *Vaccine*. 2012;30(32):4807–12.
- Madlon-Kay DJ, Harper PG. Too many shots? Parent, nurse, and physician attitudes toward multiple simultaneous childhood vaccinations. *Arch Fam Med*. 1994;3(7):610–13. doi:10.1001/archfami.3.7.610. PMID:7921297
- McCann L, Lloyd F, Parsons C, Gormley G, Haughey S, Crealey G, Hughes C. “They come with multiple morbidities”: a qualitative assessment of pharmacist prescribing. *J Interprof Care*. 2012;26(2):127–33. doi:10.3109/13561820.2011.642425. PMID:22360391
- Schindel TJ, Yuksel N, Breault R, Daniels J, Varnhagen S, Hughes CA. Perceptions of pharmacists’ roles in the era of expanding scopes of practice. *Research in social & administrative pharmacy: RSAP*. 2017;13(1):148–161.
- Hughes CA, Makowsky M, Sadowski CA, Schindel TJ, Yuksel N, Guirguis LM. What prescribing means to pharmacists: a qualitative exploration of practising pharmacists in Alberta. *Int J Pharm Pract*. 2014;22(4):283–91. doi:10.1111/ijpp.12079. PMID:25121165
- Neuhauser MM, Wiley D, Simpson L, Garey KW. Involvement of immunization-certified pharmacists with immunization activities. *Ann Pharmacother*. 2004;38(2):226–31. doi:10.1345/aph.1D257. PMID:14742755
- Kummer GL, Foushee LL. Description of the characteristics of pharmacist-based immunization services in North Carolina: results of a pharmacist survey. *J Am Pharm Assoc (2003)*. 2008;48(6):744–51. doi:10.1331/JAPhA.2008.07080. PMID:19019803
- Pace AC, Flowers SK, Hastings JK. Arkansas community pharmacists’ opinions on providing immunizations. *Journal of pharmacy practice*. 2010;23(5):496–501. doi:10.1177/0897190010362105. PMID:21507853
- MacDougall D, Halperin BA, Isenor J, MacKinnon-Cameron D, Li L, McNeil SA, Langley JM, Halperin SA. Routine immunization of adults by pharmacists: Attitudes and beliefs of the Canadian public and health care providers. *Human vaccines & immunotherapeutics*. 2016;12(3):623–31. doi:10.1080/21645515.2015.1093714.
- Valiquette JR, Bedard P. Community pharmacists’ knowledge, beliefs and attitudes towards immunization in Quebec. *Canadian journal of public health = Revue canadienne de sante publique*. 2015;106(3):e89–94. PMID:26125247
- Edwards N, Gorman Corsten E, Kiberd M, Bowles S, Isenor J, Slayter K, McNeil S. Pharmacists as immunizers: a survey of community pharmacists’ willingness to administer adult immunizations. *International journal of clinical pharmacy*. 2015;37(2):292–5. doi:10.1007/s11096-015-0073-8. PMID:25687902

15. Schmitt MR, Desselle SP. Pharmacists' Attitudes toward Technician Certification: A Qualitative Study. *Journal of Pharmacy Technology*. 2009/03/01 2009;25(2):79–88. doi:10.1177/875512250902500203.
16. Watson T, Hughes C. Pharmacists and harm reduction: A review of current practices and attitudes. *Canadian Pharmacists Journal: CPJ*. 2012;145(3):124–7.e122. doi:10.3821/145.3.cpj124.
17. McDowell SE, Ferner HS, Ferner RE. The pathophysiology of medication errors: how and where they arise. *British Journal of Clinical Pharmacology*. 2009;67(6):605–13. doi:10.1111/j.1365-2125.2009.03416.x. PMID:19594527
18. Makowsky MJ, Guirguis LM, Hughes CA, Sadowski CA, Yuksel N. Factors influencing pharmacists' adoption of prescribing: qualitative application of the diffusion of innovations theory. *Implement Sci*. 2013;8(1):109. doi:10.1186/1748-5908-8-109.
19. Hughes CA, Makowsky M, Sadowski CA, Schindel TJ, Yuksel N, Guirguis LM. What prescribing means to pharmacists: A qualitative exploration of practising pharmacists in Alberta. *The International journal of pharmacy practice*. 2014;22(4):283–291.
20. Taddio A, Appleton M, Bortolussi R, Chambers C, Dubey V, Halperin S, Hanrahan A, Ipp M, Lockett D, MacDonald N, et al. Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. *CMAJ: Canadian Medical Association Journal*. 2010;182(18):E843–E855. doi:10.1503/cmaj.101720.
21. World Health Organization. Reducing pain at the time of vaccination: WHO position paper – September 2015. *WER* 2015;39(90):505–16).
22. Taddio A, McMurtry CM, Shah V, Riddell RP, Chambers CT, Noel M, MacDonald NE, Rogers J, Bucci LM, Mousmanis P, et al. Reducing pain during vaccine injections: clinical practice guideline. *CMAJ: Canadian Medical Association journal = journal de l'Association medicale canadienne*. 2015;187(13):975–82. doi:10.1503/cmaj.150391.
23. Taddio A, Manley J, Potash L, Ipp M, Sgro M, Shah V. Routine immunization practices: use of topical anesthetics and oral analgesics. *Pediatrics*. Sep 2007;120(3):e637–643. doi:10.1542/peds.2006-3351. PMID:17766503
24. Harrison D, Elia S, Royle J, Manias E. Pain management strategies used during early childhood immunisation in Victoria. *J Paediatr Child Health*. 2013;49(4):313–8. doi:10.1111/jpc.12161. PMID:23489548
25. Taddio A, Chambers CT, Halperin SA, Ipp M, Lockett D, Rieder MJ, Shah V. Inadequate pain management during routine childhood immunizations: the nerve of it. *Clin Ther*. 2009;31 Suppl 2:S152–167. doi:10.1016/j.clinthera.2009.07.022. PMID:19781434
26. McMurtry CM, Pillai Riddell R, Taddio A, Racine N, Asmundson GJ, Noel M, Chambers CT, Shah V; HELPinKids&Adults Team. Far From “Just a Poke”: Common Painful Needle Procedures and the Development of Needle Fear. *The Clinical journal of pain*. 2015;31(10 Suppl):S3–11. doi:10.1097/AJP.0000000000000272. PMID:26352920
27. Lacey CM, Finkelstein M, Thygeson MV. The impact of positioning on fear during immunizations: supine versus sitting up. *J Pediatr Nurs*. 2008;23(3):195–200. doi:10.1016/j.pedn.2007.09.007. PMID:18492548
28. Taddio A. Needle procedures. In: McGrath P, Stevens B, Walker S, Zempsky W eds. *Oxford Textbook of Paediatric Pain*. Oxford University Press, Oxford. 2013: pp. 184–93).
29. Taddio A, Gurguis MG, Koren G. Lidocaine-prilocaine cream versus tetracaine gel for procedural pain in children. *The Annals of pharmacotherapy*. Apr 2002;36(4):687–92. doi:10.1345/aph.1A138. PMID:11918521
30. Ost LG. Acquisition of blood and injection phobia and anxiety response patterns in clinical patients. *Behaviour research and therapy*. 1991;29(4):323–32. doi:10.1016/0005-7967(91)90067-D. PMID:1679627
31. Sandelowski M. Whatever happened to qualitative description? *Research in nursing & health*. 2000;23(4):334–340. doi:10.1002/1098-240X(200008)23:4%3c334::AID-NUR9%3e3.0.CO;2-G.
32. Neergaard MA, Olesen F, Andersen RS, Sondergaard J. Qualitative description – the poor cousin of health research? *BMC medical research methodology*. 2009;9:52. doi:10.1186/1471-2288-9-52. PMID:19607668
33. Statistics Canada. Table 051–0056 – Estimates of population by census metropolitan area, sex and age group for July 1, based on the Standard Geographical Classification (SGC) 2011, annual (persons), CANSIM (database). 2011.
34. Curtis S, Gesler W, Smith G, Washburn S. Approaches to sampling and case selection in qualitative research: examples in the geography of health. *Soc Sci Med*. 2000;50(7–8):1001–14. doi:10.1016/S0277-9536(99)00350-0. PMID:10714922
35. Guest G, Bunce A, Johnson L. How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field Methods*. February 1, 2006 2006;18(1):59–82. doi:10.1177/1525822X05279903.